Oregon State University
Graduate-Level Courses Related To Human-Centered Design

14 April 2016

The courses listed below are related to our understanding of human interaction with the built environment and the design of systems, devices, and environments so as to enhance human performance, safety, comfort, and pleasure.

Course Offerings

<table>
<thead>
<tr>
<th>Fall Term</th>
<th>Winter Term</th>
<th>Spring Term</th>
</tr>
</thead>
<tbody>
<tr>
<td>CCE 526. Design for Safety (3).</td>
<td>CE 554. DRIVING SIMULATION (3)*.</td>
<td>H 599. ADVANCED ERGONOMICS (3).</td>
</tr>
<tr>
<td>CS 519. RESEARCH METHODS IN HCI (?).</td>
<td>CS 569. EMPIRICAL LAB STUDIES (?).</td>
<td>IE 507. SEM/HUMAN-CENTERED DESIGN (1).</td>
</tr>
<tr>
<td>PSY 599. BEHAVIORAL RESEARCH METHODS (4).</td>
<td>IE 546. HUMAN FACTORS ENGINEERING II (4).</td>
<td>KIN 575. RESEARCH IN HUMAN MOVEMENT (3)</td>
</tr>
</tbody>
</table>

* Not every year.

Course Descriptions

CCE 526. Design for Safety (3).

Theoretical concepts and industry practices used to model, evaluate, and improve construction worker safety through the design of the project features, construction operations, and site safety program elements. Causes of construction site accidents, hazard recognition and comprehension, safety risk valuation and mitigation, and the true costs of injuries and fatalities.
PREREQs: Graduate standing or consent of instructor.
OFFERINGS: F every year

CE 554. DRIVING SIMULATION (3).

Relationships between the functional elements of driving simulation (simulation computer processing, sensory feedback generation, sensory display devices, & the human operator) are examined in detail. The role of driving simulation in transportation engineering research and practice is also considered in depth. Students will design experiments, analyze and interpret data, and extrapolate simulator results to real world scenarios.
PREREQs: None
OFFERINGS: usually every other winter
NOTES: Previously known as CE 590 Driving Simulation, has been offered twice

H 594. APPLIED ERGONOMICS (3).
This course covers principles of occupational ergonomics for managing optimal worker performance and well-being, including common work-related musculoskeletal disorders and high risk industries; work task, individual, and organizational risk factors which contribute to musculoskeletal disorders; specific workplace ergonomics regulations and guidelines; various assessment tools for evaluation of upper extremity, lifting and manual handling hazards in the workplace; solutions for identified workplace hazards, accounting for impact, implementation, and cost in different work environments; the significance, strategy, and structure of an occupational ergonomics program for preventing musculoskeletal disorders; and current literature on research findings in occupational ergonomics.
PREREQS: None
OFFERINGS: W every other year (last offered W 2015)
NOTES: A slash course so very basic. Could be in transition with Dr. Kim developing an Advanced Ergonomic Course so that we can make the course complementary.

H 599. ADVANCED ERGONOMICS (3).
In this course students will learn the advanced theories, applications, and contemporary topics of occupational ergonomics and biomechanics. Topics include muscle physiology, work-related musculoskeletal disorders, assessing biomechanical exposure in the workplace, various material handling assessment tools, three-dimensional Static Strength Prediction Program, human vibrations, and implementing ergonomic interventions.
PREREQS: None
OFFERINGS: S, frequency of offering TBD
NOTES: A new course being offered at OSU. It will cover objective assessment tools including electromyography, electro-goniometers, force transducers, vibration measurement, signal processing, etc.

IE 507. SEM/HUMAN-CENTERED DESIGN (1).
The purpose of this seminar is to bring together graduate students and faculty from around the University whose research focuses on understanding human interaction with the built environment and designing systems, devices, and environments to enhance human performance, safety, comfort, and pleasure. The format of the Seminar will be flexible to accommodate formal presentations, poster sessions, and informal discussions of a variety of topics in human-centered design.
PREREQS: Graduate standing.
OFFERINGS: initially S16, but perhaps more frequently in future years

IE 545. HUMAN FACTORS ENGINEERING (4).
Analysis and design of work systems considering human characteristics, capabilities and limitations. Analysis and design of displays, controls, tools, and workstations. Human performance analysis. Human factors research methods.
PREREQS: Graduate standing.
OFFERINGS: F every year

IE 546. HUMAN FACTORS ENGINEERING II (4).
Advanced topics in human factors engineering, including: advanced human-machine systems engineering; human cognition and its impacts on the operation of complex, high-risk systems; cognitive task analysis; mental models; human factors requirements, specifications, and standards; human error and human error frameworks; human factors in important human-machine system domains, such as health care, transportation, and manufacturing; human factors of automation; recent developments in human
factors research and engineering.
PREREQS: IE 545
OFFERINGS: usually W every year [formerly S in even academic years]
NOTES: In transition. Current offering is as IE 599.001. ST/HUMAN FACTORS ENGINEERING II.
Title, description and syllabus subject to change.

**KIN 523. BIOMECHANICS OF MOTOR ACTIVITIES (3).**

Kinematic and kinetic analysis of volitional human movement with emphasis on analytical techniques and quantitative problem solving.
PREREQS: KIN 323 or PH 201
OFFERINGS: F of every other year (alternates with KIN 525)
NOTES: Course and/or offerings may change, as the KIN graduate curriculum is currently under revision.

**KIN 525. BIOMECHANICS OF MUSCULOSKELETAL INJURY (3).**

Mechanical causes and effects of forces applied to the musculoskeletal system, material properties of human tissues, pathomechanics of injury, and degenerative changes across the lifespan.
PREREQS:
OFFERINGS: F of every other year (alternates with KIN 523)
NOTES: Course and/or offerings may change, as the KIN graduate curriculum is currently under revision.

**KIN 575. RESEARCH IN HUMAN MOVEMENT (3).**

Investigation and evaluation of research methods applicable to human movement study and professional physical education.
PREREQS: ST 511 or equivalent
OFFERINGS: S of each year
NOTES: As part of the course, students apply the material taught to develop a research proposal.

**PSY 542. PERCEPTION (4).**

Fundamental concepts of animal and human sensation and perception, with emphasis on audition and vision. Applications of psychophysical methods to research in all sensory modalities. Includes review workshops on basic mathematical, physical and physiological concepts necessary to interpret research in this field.
PREREQS: PSY 301 and (PSY 330 or PSY 340) but overrides possible
OFFERINGS: usually W every year, and we currently have a lecturer teaching it in F and S as well

**PSY 594. ENGINEERING PSYCHOLOGY (4).**

Survey human capabilities and limitations in human-machine interaction, including vision, memory, attention, motor control, and human error. Emphasis on theory and implications for system designs.
PREREQS: (PSY 301 and PSY 340)
OFFERINGS: W
NOTES:

**PSY 599 APPLIED COGNITION & HUMAN FACTORS (4).**

Topics including skill acquisition, sport psychology, spatial navigation, and virtual reality with a focus on the strengths and limitations of human performance, and an emphasis on real-world behavior. Cognitive, perceptual, and motor processes in the context of everyday actions. Issues related to human-computer interaction, such as usability, interface design, and automation.
PREREQS: PSY 340, PSY 301 but overrides possible
OFFERINGS: usually W every other year
NOTES: This will likely be called PSY 613 Applied Cognition instead in PhD program.

**PSY 599 BEHAVIORAL RESEARCH METHODS (4).**

Focus on experimental design. Includes development of an independent proposal along with a combination of readings, discussions, and class exercises. Develop the skills necessary for completing a research study: hypothesis formation, design criteria, data collection, analysis, interpretation, write-up, and presentation of results. Provides building blocks for graduate career development.

PREREQs: Graduate standing

OFFERINGS: was F every two or three years, but this will likely increase to F every year or every other year in PhD program

NOTES: This will likely be called PSY 514 Research Methods I instead in PhD program.

**PSY 599 VISUAL PERCEPTION (4).**

Fundamental concepts of human visual perception illustrated through a variety of demonstrations, lectures, and class discussions, with emphasis on the underlying psychological and biological processes that allow us to see and occasionally result in visual illusions. Includes research in neuroscience, neuropsychology, and psychophysics.

PREREQs: PSY 340, PSY 301 but overrides possible

OFFERINGS: offered for the first time this S. My guess is that it will be offered every other year or so.

OTHER PSY NOTES: We plan to add PSY 541. COGNITION (4) in the PhD program.

**ROB 567 HUMAN-ROBOT INTERACTION (4)**

This course focuses on the emerging field of human-robot interaction (HRI), bringing together research and application of methodology from robotics, human factors, human-computer interaction, interaction design, cognitive psychology, education and other fields to enable robots to have more natural and more rewarding interactions with humans throughout their spheres of functioning. Each lecture session will consist of presentation of state-of-art readings followed by focused team exercises applying those readings to small-scale problems. Students will be expected to analyze the readings, contribute to discussions, and formulate solutions to small-scale HRI problems. Students will also work together as a team on a larger project which addresses a more complex HRI scenario.

PREREQs: Recommended background in one of: human factors, usability/hci, programming experience, design

OFFERINGS: Spring every year

NOTES: In transition. Currently a special topics course. Spring 2016 will be the first offering.
Course Syllabi

(Not all syllabi are included.)
Civil Engineering (CE) 590
Driving Simulation – 3 credits
Winter 2014

Instructor:
Dr. David S. Hurwitz
Room: 305 Owen Hall
Phone: 541-737-9242
E-mail: david.hurwitz@oregonstate.edu

Class Website:
http://myoregonstate.edu/ (This is the Blackboard Login Site)

Lecture Schedule:
Tuesday & Thursday
2:00 pm - 3:20 pm
Room 320, Owen Hall

Office Hours:
Mondays: 2:00 pm – 3:00 pm
Wednesday: 2:00 pm – 3:00 pm, or by appointment via email

Email:
Every student must have ENGR and ONID accounts. Read email daily. Note: a class email distribution list will be generated from ENGR accounts. You can “forward” ENGR or ONID to any account.

Course Description:
Relationships between the functional elements of driving simulation (simulation computer processing, sensory feedback generation, sensory display devices, & the human operator) are examined in detail. The role of driving simulation in transportation engineering research and practice is also considered in depth. Students will design experiments, analyze and interpret data, and extrapolate simulator results to real world scenarios.

Course Prerequisite:
None Required
Course Learning Outcomes:
By the end of the course, you will be able to:
1. Describe the relationships between simulation computer processing, sensory feedback generation, sensory display devices and the human operator;
2. Describe the potential uses of driving simulation in transportation engineering and other related fields such as medicine and psychology;
3. Design static and dynamic objects that can be rendered in a simulator operating system;
4. Design experiments evaluating the operational and safety performance of traffic control devices, including the selection independent and dependent variables and variable levels for such experiments;
5. Analyze and interpret driving simulator outputs such as vehicle trajectory, vehicle position, driver visual search patterns, and perception reaction time;
6. Evaluate alternative solutions to a variety of traffic engineering problems through the application of driving simulation.

Required Textbook:

Supplemental Resources:

Homework:
Homework is instrumental in helping you grasp fundamental concepts and in exposing you to techniques and skills for applying these principles to real-life situations. You may discuss homework problems with your classmates (NOT COPY THEIR SOLUTIONS), but please try all homework on your own initially. Additionally solutions must be developed and submitted independently. For homework activities that require the use of a computer software package, the student may be required to submit his or her input files. It is not appropriate to copy a computer file prepared by someone else and administrative actions will be taken in the event this occurs.

Use the following guidelines for homework preparation:
- Use clean, 8.5 x 11 inch paper. Engineering paper is also acceptable; neatness is important and appreciated.
- Write on only one side of the paper, and start a new problem on a new sheet of paper unless otherwise directed.
- Write your name and course number in the upper right corner of each page.

• Securely staple all pages.
• Show all of your work and state any assumptions clearly. Draw a block or a cloud around your final answer(s).
• For graphical solutions, use graph paper or computer generated plots. Label the axes of your graph and include units.
• When drawing sketches, use a straight edge.
• Write your name on the outside of the folded homework.

Late homework is not accepted unless specific arrangements are made with Dr. Hurwitz prior to the deadline.

Exams:
There will be at least one exam during the quarter plus one final exam. The exams must be taken as scheduled. If you MUST miss an exam for an emergency situation, please let Dr. Hurwitz know as soon as possible (prior to the exam). If you oversleep or skip an exam you will not have an opportunity to make it up. If you have a valid (according to Dr. Hurwitz) time conflict and you let him know in advance, there is the possibility of taking an exam at an alternate time.

Class Attendance:
You are expected to attend every class and participate in discussion. If you are not able to make class, notify the instructor before class. If you do miss class, it is your responsibility to find out what was covered and any administrative information that was presented.

Statement of Disruptive Behavior:
In an academic community, students, faculty and staff each have responsibility for maintaining an appropriate environment conducive to learning. Students, faculty and staff have the responsibility to treat each other with understanding, dignity and respect.

OSU’s policy on disruptive behavior may be found at:
http://oregonstate.edu/studentconduct/disruptive-behavior

The following specific behavior is never allowed:
• No cell phones or pagers in class.
• No use of Laptops or other electronic devices for activity outside of its use in THIS class.
• No reading the Barometer during class.

Statement of Expectations for Student Conduct:
OSU’s policy on academic honesty may be found at:
http://oregonstate.edu/studentconduct/http:/%252Foregonstate.edu/studentconduct/code/index.php

Statement Regarding Students with Disabilities:
"Accommodations are collaborative efforts between students, faculty and Disability Access Services (DAS). Students with accommodations approved through DAS are responsible for
contacting the faculty member in charge of the course prior to or during the first week of the term to discuss accommodations. Students who believe they are eligible for accommodations but who have not yet obtained approval through DAS should contact DAS immediately at 737-4098.”
## Class Schedule:

<table>
<thead>
<tr>
<th>Week</th>
<th>Weekday</th>
<th>Date</th>
<th>Content / Topic</th>
<th>Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Class Overview &amp; Syllabus Evolution of Driving Sim</td>
<td>Handbook: Chp. 1 &amp; Chp. 2</td>
</tr>
<tr>
<td>1</td>
<td>Tuesday</td>
<td>1/7</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Thursday</td>
<td>1/9</td>
<td>Tour of OSU Sim</td>
<td>Human Subjects Testing: CITI &amp; NIH websites</td>
</tr>
<tr>
<td>2</td>
<td>Tuesday</td>
<td>1/14</td>
<td>No Class: TRB</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Thursday</td>
<td>1/16</td>
<td>No Class: TRB</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Tuesday</td>
<td>1/21</td>
<td>Independent &amp; Dependent Variables</td>
<td>Handbook: Chp. 2 &amp; 15</td>
</tr>
<tr>
<td></td>
<td>Thursday</td>
<td>1/23</td>
<td>Variable Interaction &amp; Validation of Results</td>
<td>Handbook: Chp. 12 Handbook: Chp. 14</td>
</tr>
<tr>
<td>4</td>
<td>Tuesday</td>
<td>1/28</td>
<td>Simulator Sickness</td>
<td>Handbook: Chp. 14</td>
</tr>
<tr>
<td></td>
<td>Thursday</td>
<td>1/30</td>
<td>Traffic Signals</td>
<td>Handbook: Chp. 35</td>
</tr>
<tr>
<td>5</td>
<td>Tuesday</td>
<td>2/4</td>
<td>Introduction of Class Projects</td>
<td>No Reading</td>
</tr>
<tr>
<td></td>
<td>Thursday</td>
<td>2/6</td>
<td>Signs &amp; Pavement Markings</td>
<td>Handbook: Chp. 36</td>
</tr>
<tr>
<td>6</td>
<td>Tuesday</td>
<td>2/11</td>
<td>In Vehicle Technologies</td>
<td>Handbook: Chp. 40 &amp; 41</td>
</tr>
<tr>
<td></td>
<td>Thursday</td>
<td>2/13</td>
<td>Mid Term Exam</td>
<td>No Reading</td>
</tr>
<tr>
<td>7</td>
<td>Tuesday</td>
<td>2/18</td>
<td>Driver Behavior</td>
<td>Handbook: Chp. 42</td>
</tr>
<tr>
<td></td>
<td>Thursday</td>
<td>2/20</td>
<td>Situational Awareness in Driving</td>
<td>Chapter 19</td>
</tr>
<tr>
<td>8</td>
<td>Tuesday</td>
<td>2/25</td>
<td><strong>Tour: Ergoneers Portland Oregon</strong></td>
<td>No Reading</td>
</tr>
<tr>
<td></td>
<td>Thursday</td>
<td>2/27</td>
<td>Visual Search Tasks &amp; Eye-tracking</td>
<td>Chapter 18</td>
</tr>
<tr>
<td>9</td>
<td>Tuesday</td>
<td>3/4</td>
<td>Applications in Psychology &amp; Medicine</td>
<td>Handbook: Chp. 24, 25, 44 &amp; 45</td>
</tr>
<tr>
<td></td>
<td>Thursday</td>
<td>3/6</td>
<td>Future of Driving Simulation &amp; 3D Design</td>
<td>No Reading</td>
</tr>
<tr>
<td>10</td>
<td>Tuesday</td>
<td>3/11</td>
<td>Project Presentations</td>
<td>No Reading</td>
</tr>
<tr>
<td></td>
<td>Thursday</td>
<td>3/13</td>
<td>Class Summary &amp; Review</td>
<td></td>
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</tbody>
</table>

Notes: The final exam is scheduled for Friday 3/21 at 9:30am; This outline is flexible and subject to change.
Course Evaluation:

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Percent of Final Grade</th>
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<tbody>
<tr>
<td>Participation</td>
<td>5%</td>
</tr>
<tr>
<td>Average of Homework</td>
<td>25%</td>
</tr>
<tr>
<td>Project Grade</td>
<td>20%</td>
</tr>
<tr>
<td>Average of Mid Term Exams</td>
<td>20%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>30%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Grading Scheme:

- 92.0 - 100.0 ➞ A
- 90.0 – 91.9 ➞ A-
- 88.0 – 89.9 ➞ B+
- 82.0 - 88.0 ➞ B
- 80.0 – 81.9 ➞ B-
- 78.0 – 79.9 ➞ C+
- 72.0 - 78.0 ➞ C
- 70.0 – 71.9 ➞ C-
- 60.0 - 69.9 ➞ D
- 59.9 or lower ➞ F
Credit Hours: 3  
Room: ROG 440  
Schedule: T 4-6:60pm  

**Course Instructor:** Laurel Kincl  
**Teaching Assistant:** None  
**Office Location:** 14B Milam Hall  
**Office Phone:** 541-737-1445  
**E-Mail:** laurel.kincl@oregonstate.edu  
**Office Hours:** M 10:30-noon or by appointment  

**COURSE DESCRIPTION:** This course will cover principles of occupational ergonomics for managing optimal worker performance and well-being.

**Prerequisites:** None  
**Co-requisites:** None  

**LEARNING RESOURCES:**  
ISBN 9781439819340

Available for purchase in OSU bookstore or electronically from CRC Press in ebook format at:  
[www.crcpress.com/product/isbn/9781439819340](http://www.crcpress.com/product/isbn/9781439819340) or for short term loan in course reserves at OSU library.

Additional required reading will include journal articles, government documents, and other relevant texts that will be provided during the course.

**STUDENT LEARNING OUTCOMES:** At the completion of the course, all students will be able to:

A. Identify common work-related musculoskeletal disorders and high risk industries.

B. Identify work task, individual, and organizational risk factors which contribute to musculoskeletal disorders.

C. Demonstrate knowledge about specific workplace ergonomics regulations and guidelines.

D. Use various assessment tools for evaluation of upper extremity, lifting and manual handling hazards in the workplace.

E. Create and assess solutions for identified workplace hazards, accounting for impact, implementation, and cost in different work environments.

F. Explain the significance, strategy, and structure of an occupational ergonomics program for preventing musculoskeletal disorders.

At the completion of course, graduate students will be able to:

G. Synthesize current literature on research findings in occupational ergonomics.

**PROGRAM COMPETENCIES IN ENVIRONMENTAL & OCCUPATIONAL HEALTH:**
Upon satisfactory completion of the degree in Environmental and Occupational Health, the students will have met the program competencies found at http://health.oregonstate.edu/degrees/competencies

**COURSE CONTENT:**

January 6
Week 1: Overview of course/course requirements
Introduction to Ergonomics and Musculoskeletal Disorders (MSDs)

*Reading assignment:* review the NIOSH webpage:
Ergonomics and Musculoskeletal Disorders
www.cdc.gov/niosh/topics/ergonomics/

January 13
Week 2: Anthropometry and Physiology: Application to Ergonomics
*Guest lecturer:* Bruce Coulter, MS, CPE
Ergonomist, Washington State Department of Labor and Industries

*Reading assignment:* Chapters 1 of text

January 20
Week 3: Psychosocial and Psychophysical Factors in Ergonomics

*Reading Assignment:* Chapter 6 of text

January 27
Week 4: Homework # 1 due (online in Canvas by class time)
Workstation and Tool Evaluation and Design

*Reading Assignment:* Chapters 10 and 11 of text

February 3
Week 5: MID TERM EXAM (online)
Manual Material Handling Evaluation and Control
*Guest lecturer:* Richard Goggins, MS, CPE
Ergonomist, Washington State Department of Labor and Industries

*Reading assignment:* Chapter 12 of text
*Liberty Mutual Manual Materials Handling Tables*
*NIOSH Lifting Equation Guidance Document*

February 10
Week 6: Biomechanics and Back Health
*Guest lecturer:* Jennifer Hess, DC, MPH, PhD
Ergonomist, Labor Education and Research Center, University of Oregon
Hess Chiropractic

*Reading assignment:* Research Article provided in Canvas: Peate, et al. *Core Strength in Injury Prediction and
Ergonomics Plus Inc.

February 17
Week 7: Physical Agents in Ergonomics (Temperature Extremes, Vibration)

Reading Assignment: Chapters 12A (Vibration) and 12B (Extremes in Temperature) in Occupational and Environmental Health Recognizing and Preventing Disease and Injury Barry S. Levy David H Wegman; Sherry L Baron 2010
Online access. The OSU library also has physical copies.

February 24
Week 8: Homework #2 due (online in Canvas by class time)
Implementation and evaluation of effective ergonomics programs

Reading Assignment: Chapter 9 of text
Elements of Ergonomics Programs www.cdc.gov/niosh/docs/97-117/

March 3
Week 9: Ergonomic Case Studies

Reading Assignment:
Group 1: Chapter 23. Health Care Ergonomics
Group 2: Chapter 24. Injuries and Ergonomic Applications in the Construction Industry
Group 3: Chapter 26. Ergonomics in the Agricultural Industry
Group 4: Chapter 27. Ergo in Warehousing

March 10
Week 10: TARGETED RESEARCH ASSIGNMENT DUE (online in Canvas by class time)
Course Review and Student Presentations

FINAL EXAM - 9:30am Wednesday, March 18th

EVALUATION OF STUDENT PERFORMANCE:

<table>
<thead>
<tr>
<th>Class participation</th>
<th>10%</th>
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<tbody>
<tr>
<td>Homework Assignments (2 @ 10%)</td>
<td>20%</td>
</tr>
<tr>
<td>Midterm exam</td>
<td>20%</td>
</tr>
<tr>
<td>Targeted Research Assignment</td>
<td>25%</td>
</tr>
<tr>
<td>Final exam</td>
<td>25%</td>
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</tbody>
</table>

The following letter grade and percentage equivalents will be used in determining grades.

<table>
<thead>
<tr>
<th>A 93 -100%</th>
<th>B+ 87 - 89%</th>
<th>C+ 77 - 79%</th>
<th>D+ 67 - 69%</th>
<th>F 0 – 59%</th>
</tr>
</thead>
<tbody>
<tr>
<td>A- 90 - 92%</td>
<td>B 83 - 86%</td>
<td>C 73 - 76%</td>
<td>D 63 - 66%</td>
<td></td>
</tr>
<tr>
<td>B- 80 - 82%</td>
<td>C- 70 - 72%</td>
<td>D- 60 - 62%</td>
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</table>

Student Responsibilities:
1. Reading assignments: You must complete all reading assignments (text and other assigned
readings) prior to coming to class. You are expected to participate in group/class discussions and activities. Reading these assignments will prepare you for this.

2. Class participation: The class (in person and online) is more interesting for you and others if you are an educated and active participant. Each person has questions, comments and experiences that enrich our learning. Be prepared to be involved.

3. Class attendance: This class meets once a week and attendance is required. Attendance will be taken. Two unexcused absences will result in a failing grade for the course. If you must miss a class, you must contact the instructor (by email) PRIOR to the class meeting. You are responsible for getting any resources or information that you miss from being absent.

4. Assignments: There are two assignments which will be described in detail two weeks prior to the due date. You must turn in the assignment by the deadline in Canvas. No late assignments will be accepted for any reason, no exceptions. No make-up assignments or extra credit assignments will be given.

5. Targeted research assignment: There is a research assignment that will be due the last meeting time of the class along with a short presentation to the class. Details and milestones for completing this will be given during the second week of class. Questions regarding the research assignment should be addressed in class or via the discussion board.

6. Exams: There is a midterm and a final exam. The midterm is scheduled during the 5th week of class and will be given online. The final exam time is scheduled though the university system and is during finals week. No make-up exams will be given, no exceptions. Any student unable to take an exam during the assigned time must make appropriate arrangements with the instructor during the first three weeks of the term prior to any exam date.

DIVERSITY STATEMENT
The College of Public Health and Human Sciences strives to create an affirming climate for all students including underrepresented and marginalized individuals and groups. Diversity encompasses differences in age, color, ethnicity, national origin, gender, physical or mental ability, religion, socioeconomic background, veteran status, sexual orientation, and marginalized groups. We believe diversity is the synergy, connection, acceptance, and mutual learning fostered by the interaction of different human characteristics.

EXPECTATIONS FOR STUDENT CONDUCT
The Student Conduct Code establishes community standards and procedures necessary to maintain and protect an environment conducive to learning, in keeping with the educational objectives of Oregon State University. This code is based on the assumption that all persons must treat one another with dignity and respect in order for scholarship to thrive. For the full Student Conduct Code see http://oregonstate.edu/studentconduct/

Academic or Scholarly Dishonesty is prohibited and considered a serious violation of the Student Conduct Code. It is defined as an act of deception in which a Student seeks to claim credit for the work or effort of another person, or uses unauthorized materials or fabricated information in any academic work or research, either through the Student’s own efforts or the efforts of another. For specifics related to offenses proscribed by the University see: http://oregonstate.edu/studentconduct/offenses-0

RELIGIOUS HOLIDAY STATEMENT
Oregon State University strives to respect all religious practices. If you have religious holidays that are in conflict with any of the requirements of this class, please see me immediately so that we can make alternative arrangements.

STUDENTS WITH DOCUMENTED DISABILITIES
“Accommodations are collaborative efforts between students, faculty, and Disability Access Services (DAS). Student with accommodations approved through DAS are responsible for contacting the faculty member in charge of the course prior to or during the first week of the term to discuss
accommodations. Students who believe they are eligible for accommodations but who have not yet obtained approval through DAS should contact DAS immediately at 737-4098.”
COURSE DESCRIPTION:

This course will cover the advanced theories, applications, and contemporary topics of occupational ergonomics and biomechanics. Topics include muscle physiology, work-related musculoskeletal disorders, assessing biomechanical exposure in the workplace, various material handling assessment tools, 3-Dimensional Static Strength Prediction Program, human vibrations, and implementing ergonomic interventions.

LEARNING RESOURCES:

Text (required): Occupational Biomechanics, 4th edition

- Available for purchase in OSU bookstore or electronically from CRC Press in ebook format at: www.crcpress.com/product/isbn/9781439819340 or for short term loan in course reserves at OSU library.


ISBN 9781439819340

Additional required reading will include journal articles, government documents, and other relevant texts that will be provided during the course.

STUDENT LEARNING OUTCOMES:
At the end of the course, students will be able to do the following:

A. Identify and be familiar with the physical, individual and organizational factors which can contribute to work-related musculoskeletal disorders.
B. Identify and be familiar with the structure and anatomy of the upper extremities and low back.

C. Be familiar with basic principles of muscle physiology.

D. Use various bioinstrumentation to quantify and characterize various physical hazards in the workplace.

E. Develop and use various occupational biomechanics models.

F. Develop and implement solutions/interventions in various occupational environments.

G. Justify implementing ergonomic solutions in the workplace through cost-benefit analyses.

H. Design, set-up, establish and maintain a workplace ergonomics program

PROGRAM COMPETENCIES IN ENVIRONMENTAL & OCCUPATIONAL HEALTH:
Upon satisfactory completion of the degree in Environmental and Occupational Health, the students will have met the program competencies found at http://health.oregonstate.edu/degrees/competencies

COURSE CONTENT:

Week 1: Introduction to Ergonomics March 28, 2016

Assigned readings for April 4 – Book and Website:
1. Book - Chapters 1, 4, and 7
2. Chapter 10 – NRC
3. NIOSH Yellow Book Executive Summary
4. 2012 BLS Injury Data
5. 2012 BLS Lost Work Time

Homework
Job Opening - Create a Resume (Practitioner) or CV (Researcher) and supply a one page cover letter why you feel you are suitable for our job opening as an ergonomics consultant (Practitioner) or ergonomic researcher (Researcher) posted on the class website. Submit your cover letter and resume/CV to the class website before class April 4th.

Week 2: Anthropometry and workplace design April 4, 2016

Assigned readings for April 11 – Book and Website:
1. Book - Chapters 2 and 3

Homework
Consider the things you encounter in everyday activities, identify 5 bad designs/abuses based on ergonomics and anthropometry and identify 5 good designs based on ergonomics and anthropometry. Submit your photos or examples to the class website before class. Due April 11th at the beginning of class.

Week 3: Musculoskeletal system April 11, 2016
Assigned readings for April 18 – Book and Website:
1. Book - Chapters 3.7, 5, 8.3, and 9.2

Week 4: Biomechanics

Assigned readings for April 25 – Book and Website:
1. Book - Chapters 3 and 6

Homework

Biomechanical loading calculation will be assigned and due April 25th.

Week 5: Work physiology

Assigned readings for May 2 – Book and Website:
1. Book - Chapters 6 and 10

Homework (Due April May 2nd)

1. Targeted Research Assignment. Choose one of the following topics (or propose your own topic) and write a maximum 10 page paper double spaced providing an introduction and the state of the art knowledge in your proposed topic area. The content should be based on a minimum of five sources (peer reviewed journal articles preferred). Students will present a 10-minute PowerPoint presentation to the class. Topic must be presented and approved by instructors by April 18th, presentations will be given in class April 21st or 28th and the paper is due at the beginning of class April 21st.

Potential Topics: ergonomics and productivity, ergonomic standards, lean manufacturing and ergonomics, ergonomics and the fishing industry, hand tool design, construction ergonomics, office ergonomics, manufacturing ergonomics, manual material handling, patient handling, whole body vibration, hand-arm vibration, agricultural ergonomics, instrumentation, electromyography, goniometry, inclinometry

Week 6: Bioinstrumentation for occupational biomechanics

Week 7: Bioinstrumentation for occupational biomechanics

Week 8: Human Vibration

Week 9: Students targeted research presentation

Week 10: Memorial Day (No class)

EVALUATION OF STUDENT PERFORMANCE:
Homework: Homework will be assigned (see course schedule) and hardcopies of your homework must be handed in at the beginning of class the following week.

Exams: Exams are based entirely on class presentations, homework and material used in the classes. Exams will be closed book and closed notes. You are allowed to bring one sheet of notes to the Midterm Exam and two sheets of notes to the Final Exam. These note sheets must be handwritten on paper no larger than 8” x 11.5”. They will be turned in with your exam. The final examination is cumulative and will be held on day, June 6th (4-6:50pm). Please arrange any summer travel plans accordingly; you MUST take the final exam during this assigned exam period. No exceptions.

Late Policy: Homework submitted late (any time after the beginning of class on due date) will be penalized by 20% of the total points and late assignments will be accepted no later than the beginning of the next class.

If you must miss Midterm because of an emergency/illness, I will re-weight your Final Exam grade (30% -> 50%) ONLY IF you let me know (via phone or email) before the exam start.

I will provide a make-up exam for the Final Exam in the event of a verifiable emergency only. An example of verification might be a letter from your doctor stating that you were too ill to take the exam. A make-up version of the Final Exam will be more difficult than the original in-class Final Exam.

Changes: The instructor reserves the right to make changes to the syllabus during the course. Any necessary changes will be announced in class and posted on the website.

Other Policy: Smart phone use is not allowed during any classes. Laptops and tablets can be used only for class purpose only (e.g. note taking and viewing lecture notes).

DIVERSITY STATEMENT
The College of Public Health and Human Sciences strives to create an affirming climate for all students including underrepresented and marginalized individuals and groups. Diversity encompasses differences in age, color, ethnicity, national origin, gender, physical or mental ability, religion, socioeconomic background, veteran status, sexual orientation, and marginalized groups. We believe diversity is the synergy, connection, acceptance, and mutual learning fostered by the interaction of different human characteristics.

EXPECTATIONS FOR STUDENT CONDUCT
The Student Conduct Code establishes community standards and procedures necessary to maintain and protect an environment conducive to learning, in keeping with the educational objectives of Oregon State University. This code is based on the assumption that all persons must treat one
another with dignity and respect in order for scholarship to thrive. For the full Student Conduct Code see [http://oregonstate.edu/studentconduct/](http://oregonstate.edu/studentconduct/)

Academic or Scholarly Dishonesty is prohibited and considered a serious violation of the Student Conduct Code. It is defined as an act of deception in which a Student seeks to claim credit for the work or effort of another person, or uses unauthorized materials or fabricated information in any academic work or research, either through the Student's own efforts or the efforts of another. For specifics related to offenses proscribed by the University see: [http://oregonstate.edu/studentconduct/offenses-0](http://oregonstate.edu/studentconduct/offenses-0)

**RELIGIOUS HOLIDAY STATEMENT**

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**STUDENTS WITH DOCUMENTED DISABILITIES**

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IE 545, Human Factors Engineering

Fall Term 2015

Course Information

OSU Catalog Description

Analysis and design of systems considering human characteristics, capabilities and limitations. Analysis and design of displays, controls, tools, and workstations. Human performance analysis. Human factors research methods. 4 credits (three hours of lecture, two hours of lab per week).

Meeting Times and Location

Lecture: MW 0830-0950 in GRAF 307  Lab: F 0800-0950 in GRAF 307

Instructor: Dr. Ken Funk

E-mail: funkk@engr.orst.edu
Phone: 541-737-2357
Office: Rogers 212
Office Hours: MW 1400-1550, or when the door is open, or by appointment

Required Text


Learning Outcomes

Upon completing this course, you should be able to:

1. Describe in writing the meaning and importance of human factors engineering, without reference materials.
2. Describe in writing and/or by illustrations human sensory, cognitive, and physical capabilities and limitations relevant to the design of human-machine systems, with reference materials.
3. Correctly apply human-machine system design principles to develop written and graphical design specifications, with reference materials.
4. Select and correctly use appropriate human-machine system analysis and design tools, with reference materials.
5. Recognize and make effective recommendations in written and/or graphical form to correct human factors deficiencies in existing human-machine systems, with reference materials.
6. Describe in writing and/or by illustrations the human-machine systems engineering process, with reference materials.
7. Correctly apply the human-machine systems engineering process by developing analysis documents and design specifications for a simple human-machine system, with reference materials.
8. Design, conduct, and document a human factors experiment or other human factors study.
Coursework

Readings, Lectures, and Laboratories

Readings, as assigned in the course Schedule, should be completed before class. In most class meetings, time will be devoted to discussion and students should be prepared to ask and answer questions about the assigned materials. Laboratory sessions will generally focus on the HFE Project, described below. Class meetings, both lectures and labs, will start on time and students are expected to be in their seats and ready when class begins. Laptops, tablets, etc. may be used in class for course purposes only. Phones must be off or in vibrate-only mode. No calls may be made or received in the classroom during class.

Midterm Examination

The midterm examination will cover all assigned readings, lectures, labs and class discussions up to the time of the exam. It will be a closed-book, closed-notes exam, with the exception that one sheet of notes (8.5" x 11", both sides) may be used as a memory aid.

Human Factors Engineering (HFE) Project

Students will work in small teams to perform analyses, design, prototype, and evaluate a user interface, tool, workstation, or other human-machine system. At the beginning of the term, each team will submit a Statement of Need for a proposed project, to be approved by the instructor.

Progress Reports

Stages in the human-machine systems engineering process will be covered in the labs and students will apply that information to the work on their projects. Each team will submit regular progress reports during the term and a final report at the end of the term (see Schedule). Progress reports will consist of a one-page memo describing

- progress made since the last progress report (or beginning of the project),
- the work products that were produced,
- challenges or difficulties encountered and how they were or will be dealt with, and
- plans for the next period,

with work products attached as appendices.

User Panel

Each team will recruit a User Panel of at least three persons representative of the target user population. The Panel will advise the team on background and need information, requirements development, and design, they will participate in the trade study (see below) and evaluation, and the team should generally consult the Panel early and often throughout the project.

Trade Study

As part of the project, the team must perform a trade study, a small pseudo-experiment to compare two or more design options (either design elements or complete designs) to decide which to use in the final design. The trade study must involve at least five participants (User Panel members and others representative of the target user population) and collect and analyze speed, accuracy, and user satisfaction data to make that determination.

Final Report

Each team will submit a final report, by the time specified in the schedule, consisting of the following sections, with work products either incorporated into the text or attached as appendices.

- Executive Summary of the report (not more than one page)
- Background and Statement of Need
- Objectives of the project
• Task Analysis (IDEF0 task mode) -- Summarize the task analysis and modeling process, include the model, and describe it, highlighting subprocesses where there are special challenges or that led you to important requirements.
• Detailed Task Analysis -- Summarize the detailed task analysis process and major findings.
• Final Requirements -- Include comments on how the design meets them.
• Trade Study - Describe objectives, alternative designs or design elements that were compared, trade study procedure, and findings.
• Design Specifications -- Include in the report drawings, design descriptions, and descriptions of how the user interacts with the system. If the prototype is small, it should be handed in with the report.
• Mockup/Prototype -- Include images and descriptions of the mockup/prototype.
• Evaluation -- Describe the evaluation process and findings.
• Conclusions and Recommendations -- Discuss how well your design satisfied the objectives and met the requirements. Offer recommendations for design improvements.
• Appendices (as necessary)

HFE Project Grading

HFE project progress and final reports will be graded on technical content as well as clarity and conciseness, organization, spelling, grammar, and other writing criteria. Work products will be graded on completeness and technical accuracy of each component. Graded work products from the progress reports will be revised by the team and incorporated into the final report.

Final Examination

The final examination will cover all assigned readings, lectures, and discussions after the midterm and prior to the final exam (i.e., it will not be comprehensive). It will be a closed-book, closed-notes exam, with the exception that one sheet of notes (8.5” x 11”, both sides) may be used as a memory aid.

Grading

Grading Criteria

Examination questions will be graded on appropriate technical criteria. Project final report grading will be based on completeness, technical accuracy and other criteria, including the following:

• factual accuracy;
• logic, including validity of assumptions and the extent to which conclusions logically follow;
• organization of paragraphs and the clear and orderly flow of the text;
• clarity of expression;
• style appropriate to a technical audience;
• structure, including proper sentence construction and readability;
• wording, the appropriate selection of words;
• grammar, conformance to accepted rules of English grammar;
• spelling accuracy;
• punctuation, conformance to accepted rules of English punctuation; and
• formatting, the extent to which document formatting (headings and subheadings, text font, face, indentation, bullets and numbering, page breaks, etc.) are used to enhance readability, organization, and clarity.

Points

Grading will be based on points earned for course work as defined in the following table.

<table>
<thead>
<tr>
<th>Description</th>
<th>Points</th>
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</table>


Midterm Examination 100
Final Examination 100
6 HFE Project Progress Reports @ 20 points 120
HFE Project Final Written Report 100
Final Oral Presentation 20
Total 440

Grading Scale

Points will be assigned to student work according to the above and each student's final course grade will be based on the percentage of maximum possible points earned, according to the following table.

- 93% - 100% A
- 90% - 92% A-
- 87% - 89% B+
- 83% - 86% B
- 80% - 82% B-
- 77% - 79% C+
- 73% - 76% C
- 70% - 72% C-
- 67% - 69% D+
- 63% - 66% D
- 60% - 62% D-
- 0% - 59% F

Peer Evaluation

At the end of the term, each member of every project team will confidentially evaluate all the members of the team, including her-/himself, on their contribution to the project, rating each with a percentage out of 100% (totalling to 100%) as an estimate of that member's relative contribution to the total project. These ratings should consider the member's technical and report writing contributions, commitment to the project, responsibility, collegiality, attendance and punctuality at team meetings, and other criteria the rater deems relevant. The instructors will consider these ratings in the assignment of final grades, adjusting the grading scale up or down as appropriate.

Questions about Grading

Any questions or concerns about the grading of specific work must be brought to the attention of the Instructor within one week of when the graded work is returned.

Disabilities Information

Accommodations are collaborative efforts between students, faculty and Services for Students with Disabilities (SSD). Students with accommodations approved through SSD are responsible for contacting the faculty member in charge of the course prior to or during the first week of the term to discuss accommodations. Students who believe they are eligible for accommodations but who have not yet obtained approval through SSD should contact SSD immediately at 737-4098.
Academic Honesty

In this course, you will naturally be held to high standards of academic honesty, and any dishonest acts will be dealt with firmly. The following is adapted from the OSU Student Conduct Regulations website. For further information, please refer to [http://oregonstate.edu/studentconduct/](http://oregonstate.edu/studentconduct/).

Academic or Scholarly Dishonesty is defined as an act of deception in which a Student seeks to claim credit for the work or effort of another person, or uses unauthorized materials or fabricated information in any academic work or research, either through the Student's own efforts or the efforts of another. It includes:

- **CHEATING** - use or attempted use of unauthorized materials, information or study aids, or an act of deceit by which a Student attempts to misrepresent mastery of academic effort or information. This includes but is not limited to unauthorized copying or collaboration on a test or assignment, using prohibited materials and texts, any misuse of an electronic device, or using any deceptive means to gain academic credit.
- **FABRICATION** - falsification or invention of any information including but not limited to falsifying research, inventing or exaggerating data, or listing incorrect or fictitious references.
- **ASSISTING** - helping another commit an act of academic dishonesty. This includes but is not limited to paying or bribing someone to acquire a test or assignment, changing someone's grades or academic records, taking a test/doing an assignment for someone else by any means, including misuse of an electronic device. It is a violation of Oregon state law to create and offer to sell part or all of an educational assignment to another person.
- **TAMPERING** - altering or interfering with evaluation instruments or documents.
- **PLAGIARISM** - representing the words or ideas of another person or presenting someone else’s words, ideas, artistry or data as one's own, or using one's own previously submitted work. Plagiarism includes but is not limited to copying another person's work (including unpublished material) without appropriate referencing, presenting someone else's opinions and theories as one's own, or working jointly on a project and then submitting it as one's own.

Any acts of academic dishonesty in this course will be handled initially by the School of Mechanical, Industrial, and Manufacturing Engineering. Any such matters not quickly resolved will also be referred to the Student Conduct Coordinator for action under Oregon Revised Statute 351.070.

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**Schedule**

Subject to change, so check this page frequently.

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<th>Week 0</th>
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<tbody>
<tr>
<td><strong>Meeting</strong></td>
<td><strong>Reading</strong></td>
<td><strong>Topic</strong></td>
<td><strong>Deliverables Due</strong></td>
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<tr>
<td>Friday Lab 25 Sep</td>
<td>Chap. 1</td>
<td>Introduction to Human Factors Engineering, Course Overview, HFE Project Requirements</td>
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<th>Week 1</th>
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<td><strong>Meeting</strong></td>
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<tr>
<td>Monday 28 Sep</td>
<td>Chap. 3</td>
<td>The Human-Machine Systems Engineering Process</td>
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<tr>
<td>Wednesday 30 Sep</td>
<td>Chap. 4</td>
<td>Vision</td>
<td>&quot;Progress&quot; Report 1: - (no memo required) - Statement of Need</td>
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<td>Requirements.</td>
<td>IDEFO-1, IDEFO-2</td>
<td>Writing Requirements, Introduction to Task Analysis Using IDEF0</td>
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<td>Week 2</td>
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<td>Monday 5 Oct</td>
<td>Chap. 5</td>
<td>Auditory, Tactile, and Vestibular Senses</td>
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<td>Wednesday 7 Oct</td>
<td>Chap. 6</td>
<td>Cognition</td>
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<tr>
<td>Friday Lab 9 Oct</td>
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<td>IDEFO Task Analysis (continued) Using AI0WIN</td>
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<td>- Initial IDEFO Task Model</td>
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<td>Monday 12 Oct</td>
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<td>Wednesday 14 Oct</td>
<td>Chap. 7</td>
<td>Decision Making</td>
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<td>Friday Lab 16 Oct</td>
<td>Chap. 3</td>
<td>Detailed Task Analysis</td>
<td>Progress Report 3:</td>
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<td>pp. 38-50</td>
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<td>- Memo</td>
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<td>- Final IDEFO Task Model</td>
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<td>Monday 19 Oct</td>
<td>Chap. 8</td>
<td>Decision Making</td>
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<td></td>
<td>pp. 184-207</td>
<td>Displays</td>
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<td>Wednesday 21 Oct</td>
<td>Chap. 8</td>
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<td>Friday Lab 23 Oct</td>
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<td>Human Factors Design</td>
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<td>Monday 26 Oct</td>
<td>Chap. 9</td>
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<td>pp. 218-231</td>
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<td>Wednesday 28 Oct</td>
<td>Chap. 9</td>
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<td>pp. 231-242</td>
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<td>Friday Lab 31 Oct</td>
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<td>Midterm Examination</td>
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<tr>
<td>Monday 2 Nov</td>
<td>Chap. 15 (pp. 383-406)</td>
<td>Human-Computer Interaction</td>
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<tr>
<td>Wednesday 4 Nov</td>
<td>Chap. 15 (pp. 406-417)</td>
<td>Human-Computer Interaction</td>
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<tr>
<td>Friday Lab 6 Nov</td>
<td>Chap. 2</td>
<td>HF Research, Design Trade Studies</td>
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<td>Preliminary Design Review</td>
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<td>Monday 9 Nov</td>
<td>Chap. 10</td>
<td>Anthropometry</td>
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<tr>
<td>Wednesday 11 Nov</td>
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<td>No Class: Veterans Day</td>
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<tr>
<td>Friday Lab 13 Nov</td>
<td></td>
<td>Design Presentations</td>
<td>Design Presentations</td>
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<tr>
<td></td>
<td></td>
<td>Models, Mockups, and Prototyping</td>
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<tr>
<td>Week 8</td>
<td>Reading</td>
<td>Topic</td>
<td>Deliverables Due</td>
<td></td>
</tr>
<tr>
<td>Monday 16 Nov</td>
<td>Chap. 10</td>
<td>Workstation Design</td>
<td></td>
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<tr>
<td>Wednesday 18 Nov</td>
<td>Chap. 11</td>
<td>Biomechanics, Ergonomics</td>
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<tr>
<td>Friday Lab 20 Nov</td>
<td></td>
<td>Human Factors Testing and Evaluation</td>
<td>Progress Report 6:</td>
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<td>- Memo</td>
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<td>- Final Requirements</td>
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<td>- Final Design for Critical</td>
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<td>Design Review</td>
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</tr>
<tr>
<td>Week 9</td>
<td>Reading</td>
<td>Topic</td>
<td>Deliverables Due</td>
<td></td>
</tr>
<tr>
<td>Monday 23 Nov</td>
<td>Chap. 12</td>
<td>Work Physiology</td>
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<tr>
<td>Wednesday 25 Nov</td>
<td>Chap. 13</td>
<td>Stress</td>
<td></td>
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<tr>
<td>(pp. 324-334)</td>
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<tr>
<td>Friday Lab 27 Nov</td>
<td></td>
<td>No lab: Thanksgiving Holiday</td>
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<tr>
<td>Week 10</td>
<td>Reading</td>
<td>Topic/Activity</td>
<td>Deliverables Due</td>
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</tr>
<tr>
<td>Monday 1 Dec</td>
<td>Chap. 13</td>
<td>Mental Workload, Fatigue, and Sleep</td>
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<tr>
<td>(pp. 334-350)</td>
<td></td>
<td>Disruption</td>
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<tr>
<td>Wednesday 3 Dec</td>
<td>Chap. 14</td>
<td>Safety and Human Error</td>
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<tr>
<td>Friday Lab 5 Dec</td>
<td></td>
<td>HFE Project Final Oral Presentations</td>
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<tr>
<td>Finals Week</td>
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<tr>
<td>Day</td>
<td>Activity</td>
<td>Deliverables Due</td>
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<tr>
<td>9 Dec</td>
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</tbody>
</table>

**Resources**

This section provides links to course resources, as they become available.

- [Lecture Slides](#)
- [Handouts](#)
- [Other Resources](#)

Last update: 3 December 2015
IE 546, Human-Machine Systems Engineering

(Offered initially as IE 599, ST/Human Factors Engineering II)

Winter Term 2016

Course Information

OSU Catalog Description

IE 546. HUMAN-MACHINE SYSTEMS ENGINEERING (4).

Advanced topics in human factors engineering, including: advanced human-machine systems engineering; human cognition and its impacts on the operation of complex, high-risk systems; cognitive task analysis; mental models; human factors requirements, specifications, and standards; human error and human error frameworks; human factors in important human-machine system domains, such as health care, transportation, and manufacturing; human factors of automation; recent developments in human factors research and engineering. PREREQS: IE 545

Meeting Times and Location

Lecture: TBD in room TBD

Instructor: Dr. Ken Funk

E-mail: funkk@engr.orst.edu
Phone: 541-737-2357
Office: Rogers 212
Office Hours: times TBD, or when the door is open, or by appointment

Required Tests

4. Selected papers from the Human Factors literature, available online, on reserve in the OSU Library, or provided by the instructor.

[A reading packet, to be available from the OSU Bookstore, may be prepared of selected chapters from 1 and 2.]

Learning Outcomes

Upon completing this course, students should be able to:

1. describe the human-machine systems engineering process by way of specific examples;
2. describe human cognition and how its characteristics and limitations influence human performance in
complex Human-Machine Systems;
3. apply at least two types of Cognitive Task Analysis to a HMS and from the results write HMS design
   requirements;
4. describe and explain human performance problems in healthcare, transportation, and manufacturing
   systems and suggest effective and feasible countermeasures; and
5. apply the concepts and methods covered in the course to design, prototype, and test the user interface of
   a HMS.

Coursework

Class Meetings

Tuesday class meetings will be lecture and discussion on the readings assigned for those days. In preparation
for each discussion, each student shall read the assignment and prepare brief written responses to the Study
Questions for that reading. One copy shall be submitted to the instructor at the beginning of class and one copy
should be kept for reference during the discussion. Thursday meetings will be reserved for additional topics and
for team progress reports (see below).

Examinations

Examinations will cover readings and discussions. The midterm examination will be over all of them covered
from the beginning of the term through the preceding class meeting. The exam will be closed book, but one 8.5"
× 11" sheet of notes (both sides) may be used. The final examination will cover material from the class after the
midterm examination through the end of the term. The exam will be closed book, but one 8.5" x 11" sheet of
notes (both sides) may be used.

Human Factors Engineering (HFE) Project

Students will work in teams to develop and evaluate human-machine systems chosen by the instructor.
Assignments for each project phase will be given in class and each team shall prepare progress reports and a
final report, according to the course schedule. Each progress report shall consist of a refined draft section of the
final report and the final report shall consist of the following sections, combined in a loose-leaf, three-ring binder.

1. Cover Page, bearing the number and title of the course, the name of the system, the names of all team
   members, and the date of submission.
2. Executive Summary, giving a brief overview of the project and of the remainder of the report.
3. Statement of Need, as provided by the instructor and updated, if changes were made during the term.
4. Operational Concept Statement.
5. Task Analyses, including the final IDEF0 Task Mode, and the final Detailed Task Analysis.
6. Requirements, finalized.
7. Final Design and Implementation as Mockup/Prototype, including annotated drawings, photos, or
   screenshots, reconciliation with requirements, and explanation of operation.
8. Verification and Evaluation, consisting of a one-to-two-page description of how requirements were
   verified, how the mockup/prototype was evaluated by users, and a summary of verification and evaluation
   results. This may be supplemented by materials (e.g., procedures, questionnaires, etc.) in an appendix,
   but that is optional.
9. Conclusions and Recommendations, consisting of a one-page summary of reflections on the project
   and recommendations for the next phase of development, if it should occur.

A PDF of the report should be sent to the instructor to forward to the project sponsor, or may be sent directly to
the sponsor, with a copy cc-ed to the instructor.

Also, each team shall give one or more oral progress reports during the term and a final oral presentation at the
end of the term.

Additional assignments related to the projects may be made by the instructor, such as literature reviews or
technology assessments. Results from these shall be incorporated into appropriate progress reports and final report.

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**Grading**

**Grading Criteria**

Examination questions will be graded on appropriate technical criteria. Project report grading will be based on completeness, technical accuracy and other criteria, including the following:

- factual accuracy;
- logic, including validity of assumptions and the extent to which conclusions logically follow;
- logical organization of sections and paragraphs and the clear and orderly flow of the text;
- clarity of expression;
- style appropriate to a technical audience;
- structure, including proper sentence construction and readability;
- wording, the appropriate choice of words;
- grammar inconformance with accepted rules of English grammar;
- spelling accuracy;
- punctuation in conformance with accepted rules of English punctuation; and
- formatting, the extent to which document formatting (headings and subheadings, text font, face, indentation, bullets and numbering, page breaks, etc.) are used to enhance readability, organization, and clarity.

**Points**

Grading will be based on points earned for course work as defined in the following table.

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Points Possible</th>
</tr>
</thead>
<tbody>
<tr>
<td>Midterm Examination</td>
<td>100</td>
</tr>
<tr>
<td>Final Examination</td>
<td>100</td>
</tr>
<tr>
<td>HMSE Project</td>
<td>150</td>
</tr>
<tr>
<td>4 Progress Reports @ 20</td>
<td>80</td>
</tr>
<tr>
<td>Final Oral Presentation</td>
<td>20</td>
</tr>
<tr>
<td>Final Written Report</td>
<td>50</td>
</tr>
<tr>
<td>Study Question Answers</td>
<td>credit</td>
</tr>
<tr>
<td>Peer Evaluation</td>
<td>credit</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>350</strong></td>
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</tbody>
</table>

**Grading Scale**

Points will be assigned to student work according to the above and each student's final course grade will be based on the percentage of maximum possible points earned, according to the following table.

- 93% - 100% A
- 90% - 92% A-
- 87% - 89% B+
- 83% - 86% B
- 80% - 82% B-
- 77% - 79% C+
Each student is required to submit Study Question answers for most readings. If a student misses more than one set, that student's final grade will be lowered one-third letter grade (i.e., one +/- step) for each missing set in excess of one.

Each student is required to submit a Peer Evaluation of his/her team members. Failure to do so will result in a final grade deduction of one-third letter grad. Uneven distribution of contribution revealed in Peer Evaluations within a team may result in adjustments to project and/or final grades to account for inequities.

Questions about Grading

Any questions or concerns about the grading of specific work must be brought to the attention of the Instructor within one week of when the graded work is returned.

Disabilities Information

Accommodations are collaborative efforts between students, faculty and Services for Students with Disabilities (SSD). Students with accommodations approved through SSD are responsible for contacting the faculty member in charge of the course prior to or during the first week of the term to discuss accommodations. Students who believe they are eligible for accommodations but who have not yet obtained approval through SSD should contact SSD immediately at 737-4098.

Academic Honesty

In this course, you will naturally be held to high standards of academic honesty, and any dishonest acts will be dealt with firmly. The following is adapted from the OSU Student Conduct Regulations website. For further information, please refer to http://oregonstate.edu/admin/stucon/regs.htm.

Academic or Scholarly Dishonesty is defined as an act of deception in which a Student seeks to claim credit for the work or effort of another person, or uses unauthorized materials or fabricated information in any academic work or research, either through the Student's own efforts or the efforts of another. It includes:

- CHEATING - use or attempted use of unauthorized materials, information or study aids, or an act of deceit by which a Student attempts to misrepresent mastery of academic effort or information. This includes but is not limited to unauthorized copying or collaboration on a test or assignment, using prohibited materials and texts, any misuse of an electronic device, or using any deceptive means to gain academic credit.
- FABRICATION - falsification or invention of any information including but not limited to falsifying research, inventing or exaggerating data, or listing incorrect or fictitious references.
- ASSISTING - helping another commit an act of academic dishonesty. This includes but is not limited to paying or bribing someone to acquire a test or assignment, changing someone's grades or academic records, taking a test/doing an assignment for someone else by any means, including misuse of an electronic device. It is a violation of Oregon state law to create and offer to sell part or all of an educational assignment to another person.
- TAMPERING - altering or interfering with evaluation instruments or documents.
- **PLAGIARISM** - representing the words or ideas of another person or presenting someone else's words, ideas, artistry or data as one's own, or using one's own previously submitted work. Plagiarism includes but is not limited to copying another person's work (including unpublished material) without appropriate referencing, presenting someone else's opinions and theories as one's own, or working jointly on a project and then submitting it as one's own.

Any acts of academic dishonesty in this course will be handled initially by the School of Mechanical, Industrial, and Manufacturing Engineering. Any such matters not quickly resolved will also be referred to the Student Conduct Coordinator for action under Oregon Revised Statute 351.070.

## Schedule

Subject to change, so check this page frequently.

<table>
<thead>
<tr>
<th>Week 1:</th>
<th>Meeting</th>
<th>Reading</th>
<th>Topic</th>
<th>Work Due</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wednesday</td>
<td></td>
<td>Chapanis Chapter 2</td>
<td>Systems and Systems Engineering, Project Kickoff Meetings</td>
<td>Study Question Answers</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Week 2:</th>
<th>Meeting</th>
<th>Reading</th>
<th>Topic</th>
<th>Work Due</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td></td>
<td>Chapanis 3</td>
<td>Human Factors Standards, Codes, Specifications, and Other Work Products</td>
<td>Study Question Answers</td>
</tr>
<tr>
<td>Wednesday</td>
<td></td>
<td>Schneider &amp; Shiffrin paper</td>
<td>Human Cognition: The Stage Model, Automatic &amp; Control Processing</td>
<td>Study Question Answers</td>
</tr>
</tbody>
</table>

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<thead>
<tr>
<th>Week 3:</th>
<th>Meeting</th>
<th>Reading</th>
<th>Topic</th>
<th>Work Due</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td></td>
<td>Rasmussen paper</td>
<td>Skill-, Rule-, and Knowledge-Based Processing</td>
<td>Study Question Answers, Progress Report 1</td>
</tr>
<tr>
<td>Wednesday</td>
<td></td>
<td>Tversky &amp; Kahneman paper</td>
<td>System 1/System 2, Cognitive Heuristics and Biases</td>
<td>Study Question Answers</td>
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<tr>
<th>Week 4:</th>
<th>Meeting</th>
<th>Reading</th>
<th>Topic</th>
<th>Work Due</th>
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<tbody>
<tr>
<td>Monday</td>
<td></td>
<td>Crandall et al 1-2</td>
<td>Introduction to Cognitive Task Analysis</td>
<td>Study Question Answers</td>
</tr>
<tr>
<td>Wednesday</td>
<td></td>
<td>Crandall 4</td>
<td>Concept Maps</td>
<td>Study Question Answers</td>
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<td>Week 5:</td>
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<tr>
<td>Meeting</td>
<td>Reading</td>
<td>Topic</td>
<td>Work Due</td>
<td></td>
</tr>
<tr>
<td>Monday</td>
<td>Crandall 5</td>
<td>Incident-Based CTA</td>
<td>Study Question Answers, Progress Report 2</td>
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<tr>
<td>Wednesday</td>
<td></td>
<td>Midterm Examination</td>
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<th>Week 6:</th>
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<tbody>
<tr>
<td>Meeting</td>
<td>Reading</td>
<td>Topic</td>
<td>Work Due</td>
</tr>
<tr>
<td>Monday</td>
<td>Moray paper</td>
<td>Mental Models</td>
<td>Study Question Answers</td>
</tr>
<tr>
<td>Wednesday</td>
<td>Cairns paper</td>
<td>Intuitive User Interfaces</td>
<td>Study Question Answers</td>
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<th>Week 7:</th>
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<tbody>
<tr>
<td>Meeting</td>
<td>Reading</td>
<td>Topic</td>
<td>Work Due</td>
</tr>
<tr>
<td>Monday</td>
<td>Wickens 15</td>
<td>Human Factors In Transportation Systems</td>
<td>Study Question Answers, Progress Report 3</td>
</tr>
<tr>
<td>Wednesday</td>
<td>Wickens 16</td>
<td>Human Factors Of Automation</td>
<td>Study Question Answers</td>
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<th>Week 8: 19 - 23 May</th>
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<tbody>
<tr>
<td>Meeting</td>
<td>Reading</td>
<td>Topic</td>
<td>Work Due</td>
</tr>
<tr>
<td>Monday</td>
<td>Reason paper</td>
<td>Human Error</td>
<td>Study Question Answers</td>
</tr>
<tr>
<td>Wednesday</td>
<td>Shappell &amp; Wiegmann paper</td>
<td>Human Error Frameworks</td>
<td>Study Question Answers</td>
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<th>Week 9:</th>
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<tbody>
<tr>
<td>Meeting</td>
<td>Reading</td>
<td>Topic</td>
<td>Work Due</td>
</tr>
<tr>
<td>Monday</td>
<td>Paper TBD</td>
<td>Attention, Distraction, and Task Management</td>
<td>Study Question Answers, Progress Report 4</td>
</tr>
<tr>
<td>Wednesday</td>
<td>Funk, Chou papers</td>
<td>Cockpit Task Management</td>
<td>Study Question Answers</td>
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<th>Week 10:</th>
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<tbody>
<tr>
<td>Meeting</td>
<td>Reading</td>
<td>Topic/Activity</td>
<td>Work Due</td>
</tr>
<tr>
<td>Monday</td>
<td>Wickens 18</td>
<td>Selection and Training</td>
<td>Study Question Answers</td>
</tr>
<tr>
<td>Wednesday</td>
<td>Wickens 19</td>
<td>Social Factors and Crew Performance</td>
<td>Study Question Answers</td>
</tr>
</tbody>
</table>

| Finals Week: |  |  |
|---|---|
| Day | Activity |
| TBD       | Final examination at time TBD in room TBD |

**Resources**

This section provides links to course resources, which will be published as they become available.

- [Slides](#)
- [Other Resources](#)

Last update: 14 September 2015
Oregon State University
College of Public Health and Human Sciences
KIN 523: Biomechanics of Motor Activities
Fall 2015

Credit Hours: 3
Room: MLM 159
Schedule: T-R 2:00 pm – 3:20

Course Instructor: Mike Pavol, Ph.D.  Teaching Assistant: None
Office Location: Langton 230  Office Location:
Office Phone: 541-737-5928  Office Phone:
E-Mail: mike.pavol@oregonstate.edu  E-Mail:
Office Hours: M 1:30 pm – 2:50,
F 10:30 am – 11:20,
or by appointment

COURSE DESCRIPTION:
Kinematic and kinetic analysis of volitional human movement with emphasis on analytical techniques
and quantitative problem solving.

Prerequisites: EXSS 323 or EXSS/KIN 321 or PH 201  Co-requisites: None

LEARNING RESOURCES:
Textbook (Optional):
Human Kinetics.

STUDENT LEARNING OUTCOMES:
On successful completion of this course, students will be able to:
1. Understand the basic instrumentation, techniques, and variables used in measuring and
analyzing the kinematics and kinetics of human movement;
2. Apply these techniques to solving quantitative problems in human movement;
3. Interpret the results of a quantitative analysis of human movement.

PROGRAM COMPETENCIES IN KINESIOLOGY:
Upon satisfactory completion of the degree in Kinesiology, the students will have met the program
competencies found at http://health.oregonstate.edu/degrees/competencies

COURSE CONTENT:
- Introduction & Math Review (Weeks 0-1)
- Describing Human Motion (Week 1)
- Motion Capture (Weeks 1-2)
- Signal Processing (Weeks 2-3)
- Planar and 3D Kinematics (Weeks 3-6)
- Anthropometry (Week 6)
- Force Measurement (Week 7)
- Kinetics (Weeks 8-9)
- Work, Power, & Energy (Week 10)
- Estimating Internal Forces (Week 10)
EVALUATION OF STUDENT PERFORMANCE:

Homework 80% (8 assignments, each worth 10% of your grade)
Final Exam 20%
Total 100%

Grading scale for final grades:
- 93.0-100% = A
- 83.0-86.9% = B
- 73.0-76.9% = C
- 63.0-66.9% = D
- 90.0-92.9% = A−
- 80.0-82.9% = B−
- 70.0-72.9% = C−
- 60.0-62.9% = D−
- 87.0-89.9% = B+
- 77.0-79.9% = C+
- 67.0-69.9% = D+
- 0-59.9% = F

Note: Graded items will be returned in class. Grades will not be posted to Canvas.

LECTURE NOTES:
- Lecture notes for each lecture will be provided as an aid to learning. They are not a substitute for coming to class.
- Notes will be posted to Canvas by 10 am on the day of the lecture.
- It is highly recommended that you bring a copy of the notes to class.

HOMEWORK:
- There will be 8 sets of assigned homework, with due dates as noted in the course schedule below.
  - Homework due dates are subject to change.
- Each homework assignment will be posted to Canvas about 1 week before its due date.
- Solutions to the homework are to be submitted to the instructor in person, by e-mail, to his office, and/or to his mailbox in Langton 221 by 7 pm on the due date.
  - If you submit your homework to the instructor’s mailbox, you remain responsible for the homework while it is in the mailbox.
- There will be a penalty of 10% per weekday for late homework. Homework will not be accepted more than 2 weekdays after the due date.
- Homework will be graded for both correctness and completeness.
  - You must show all work (i.e. equations used, numbers substituted, answers with units);
  - If Excel was used, submit a copy of the workbook by e-mail;
  - If a program was used, attach or e-mail as a text document a copy of the program;
  - In the written part of your homework submission, you must indicate what equations are being used in the Excel workbook or program.
- You are allowed to discuss the homework with others. However, copying is not permitted. Each student is to derive his/her own solutions, even if consulting with others.
- Any help you receive from someone else (other than the instructor) must be documented in your submitted assignment. If you fail to do so:
  - On the first instance, you will receive a warning;
  - Subsequent instances may be considered a violation of the Student Conduct Code and dealt with accordingly.

EXAMS:
- The final exam will be held on Monday, 12/07, from 6:00 pm – 7:50 in Milam 159.
- The exam will be comprehensive and may include a mixture of matching, multiple-choice, true-false, and short-answer questions.
- No books, notes, or other resources may be used during the exam.
- The exam is to be taken at the assigned time and date, unless other arrangements are made with the instructor at least 2 weeks beforehand.
# COURSE SCHEDULE AND ASSIGNED READING:

(may change slightly as the course progresses)

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Topic</th>
<th>Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>9/24</td>
<td>Introduction; Math Review</td>
<td>Introduction, Appendix D &amp; Appendix E (pp 361-362), Chapter 2 (pp 36-38)</td>
</tr>
<tr>
<td>1</td>
<td>9/29</td>
<td>Describing Human Motion</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10/01</td>
<td>Motion Capture</td>
<td>Chapter 1 (pp 9-18, 21-22, 30-31)</td>
</tr>
<tr>
<td>2</td>
<td>10/06</td>
<td>Motion Capture</td>
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<td>10/08</td>
<td>Data Collection - Class in WB 15 Signal Processing</td>
<td>Chapter 12</td>
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<tr>
<td>3</td>
<td>10/13</td>
<td>Signal Processing</td>
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<tr>
<td></td>
<td>10/15</td>
<td>Planar Kinematics</td>
<td>Chapter 1 (pp 18-21, 23-30, 32), Chapter 14 (pp 317-327)</td>
</tr>
<tr>
<td>4</td>
<td>10/20</td>
<td>Planar Kinematics</td>
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<td>Planar Kinematics</td>
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<td>10/27</td>
<td>3D Kinematics</td>
<td>Chapter 2 (pp 38-59)</td>
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<td>10/29</td>
<td>3D Kinematics</td>
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</tr>
<tr>
<td>6</td>
<td>11/03</td>
<td>Anthropometry</td>
<td>Chapter 3</td>
</tr>
<tr>
<td></td>
<td>11/05</td>
<td>Anthropometry</td>
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<tr>
<td>7</td>
<td>11/10</td>
<td>Force Measurement</td>
<td>Chapter 4 (pp 92-103)</td>
</tr>
<tr>
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<td>11/12</td>
<td>Force Measurement</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>11/17</td>
<td>Kinetics</td>
<td>Chapter 4 (pp 79-92), Chapter 5 (pp 109-122), Chapter 7 (pp 151-167, 175)</td>
</tr>
<tr>
<td></td>
<td>11/19</td>
<td>Kinetics</td>
<td></td>
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<tr>
<td>9</td>
<td>11/24</td>
<td>Kinetics</td>
<td>Chapter 4 (pp 79-92), Chapter 5 (pp 109-122), Chapter 7 (pp 151-167, 175)</td>
</tr>
<tr>
<td></td>
<td>11/26</td>
<td>No class (Thanksgiving)</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>12/01</td>
<td>Work, Power, &amp; Energy</td>
<td>Chapter 6, Chapter 7 (pp 168-169)</td>
</tr>
<tr>
<td></td>
<td>12/03</td>
<td>Estimating Internal Forces</td>
<td>Chapter 9 (pp 203-208, 216-223), Chapter 11 (pp 247-266)</td>
</tr>
</tbody>
</table>

- All assigned reading is from the optional textbook (Robertson et al., 2014).
- The assigned reading will complement and expand on the lecture material to aid in gaining a fuller understanding. The reading is recommended but not required.
GENERAL GUIDELINES:
- Students are expected to attend all lectures.
- It is recommended that you read all of the assigned textbook sections, either before or after class, as an aid to learning.
- You are responsible for all material presented in lecture.
- Given that this course is 3 credit hours, you should expect to spend at least 9 hours per week on this course in order to do well.
- If you are having difficulty with any of the material, ask questions in class or see the instructor for help, either during office hours or by appointment. Questions are encouraged.
- Don’t wait until the last minute to seek help!
- Accommodations will be made for documented medical/family emergency situations.

E-MAIL:
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DIVERSITY STATEMENT
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EXPECTATIONS FOR STUDENT CONDUCT
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Academic or Scholarly Dishonesty is prohibited and considered a serious violation of the Student Conduct Code. It is defined as an act of deception in which a Student seeks to claim credit for the work or effort of another person, or uses unauthorized materials or fabricated information in any academic work or research, either through the Student's own efforts or the efforts of another. For specifics related to offenses proscribed by the University see: http://oregonstate.edu/studentconduct/offenses-0

RELIGIOUS HOLIDAY STATEMENT
Oregon State University strives to respect all religious practices. If you have religious holidays that are in conflict with any of the requirements of this class, please see me immediately so that we can make alternative arrangements.

STUDENTS WITH DOCUMENTED DISABILITIES
"Accommodations are collaborative efforts between students, faculty, and Disability Access Services (DAS). Student with accommodations approved through DAS are responsible for contacting the faculty member in charge of the course prior to or during the first week of the term to discuss accommodations. Students who believe they are eligible for accommodations but who have not yet obtained approval through DAS should contact DAS immediately at 737-4098."
COURSE DESCRIPTION:
Mechanical causes and effects of forces applied to the musculoskeletal system, material properties of human tissues, pathomechanics of injury, and degenerative changes across the lifespan.

Prerequisites: None  Co-requisites: None

LEARNING RESOURCES:
Required:
- Articles from the literature will constitute the primary learning resources for this course.
  - Lists of assigned reading will be posted on Blackboard.
  - It is the student's responsibility to access all assigned articles through either the library or the library website.

Optional:
- The following textbooks are recommended as additional resources:

STUDENT LEARNING OUTCOMES:
On successful completion of this course, students will be able to:
1. Explain the basic mechanical behavior of tissues and structures that comprise the musculoskeletal system, common degenerative changes to these, and how injury occurs;
2. Describe the biomechanics of musculoskeletal degeneration and/or injury in relation to different activities and parts of the body;
3. Summarize common methods used to investigate the biomechanics of injury;
4. Critically review and discuss current literature related to the biomechanics of injury;
5. Integrate research findings to answer questions related to the biomechanics of injury and injury prevention;
6. Prepare and deliver presentations related to biomechanics research.
PROGRAM COMPETENCIES IN EXERCISE AND SPORT SCIENCE:
Upon satisfactory completion of the degree in Exercise and Sport Science, the students will have met the program competencies found at http://health.oregonstate.edu/degrees/competencies

COURSE CONTENT:
- Tissue Mechanics: Mechanics of Materials; Mechanics of Connective Tissue; Muscle Mechanics (Weeks 1-2)
- Research Methods in Injury Biomechanics (Week 2)
- Locomotor Pathology & Injury: Gait Disorders; Falls (Weeks 3-5)
- Lower Extremity Injury: Running Injuries; Cutting & Landing Tasks (Weeks 5-7)
- Upper Extremity Injury: Shoulder & Elbow Injury; Hand & Wrist Injury (Weeks 7-9)
- Head & Torso Injury: Impact Biomechanics; Low Back Pain (Weeks 9-10)

EVALUATION OF STUDENT PERFORMANCE:
| Article Presentations | 36% | (3 presentations, each worth 12% of your grade) |
| Article Summaries    | 12% | (4 summaries, each worth 3% of your grade)     |
| Class Participation  | 14% | (7 presentation sessions, each worth 2% of your grade) |
| Research Paper       | 14% |
| Final Exam           | 24% |
| Total                | 100% |

Grading scale for final grades:
- 93.0-100% = A
- 83.0-86.9% = B
- 73.0-76.9% = C
- 63.0-66.9% = D
- 90.0-92.9% = A−
- 80.0-82.9% = B−
- 70.0-72.9% = C−
- 60.0-62.9% = D−
- 87.0-89.9% = B+
- 77.0-79.9% = C+
- 67.0-69.9% = D+
- 0-59.9% = F

COURSE FORMAT:
- The course will include:
  - 12 lecture sessions (80 min each), in which the instructor will provide basic content knowledge related to the course topics;
  - 7 presentation sessions, in which students will present research articles from the literature (13 min each), followed by a class discussion (12 min each).

READING ASSIGNMENTS:
- Students are expected to read all of the assigned review articles.
- For each of the 7 article presentation sessions, students are expected to read:
  - Any 1 of the 3 articles being presented and discussed;
  - The Abstract and Introduction of the other 2 articles being presented and discussed.
- Students are expected to read the assigned articles for a class session prior to the session.

LECTURE NOTES:
- Lecture notes will accompany each of the 12 lecture sessions.
- Notes will be posted to Blackboard by 10 am on the day of the lecture.
- It is recommended that you bring a copy of the notes to class.
- Lecture notes are not a substitute for coming to class!

ARTICLE PRESENTATIONS:
- Each student will make 3 presentations in class.
  - Each presentation will be of one of the articles being discussed;
  - Each presentation will be on a separate day and topic;
  - Students will be allowed to choose which article they will present.
ARTICLE PRESENTATIONS (cont.):
- The duration of the presentation will be 13 min, followed by 12 min of questions from the class and class discussion. **Time limits will be enforced.**
- The expected format – content of the presentation (with the approximate number of slides and time to be spent on each section) is:
  - Title Slide – title, list of authors, author affiliations (1 slide; 0 min);
  - Introduction – general issue being addressed, important background (2 slides, 2.5 min);
  - Purpose – specific purpose(s) of the study (1 slide, 0.5 min);
  - Methods – briefly, what was done (4-6 slides, 3.5 min);
  - Results – the “important” results (3-5 slides, 3.5 min);
  - Discussion – implications of the results, major limitations of the study (1-2 slides, 2 min);
  - Conclusion – **your** take-home message from the paper (1 slide, 1 min).
- Most articles will contain more material than is typical for a conference presentation. **It is your responsibility to identify the “most important” material and to clearly present that material within the 13 min time limit.**
- Grading will be based on:
  - The ability to extract and assess the important aspects of the study;
  - Clear, complete, and correct presentation these aspects, following the expected format;
  - The ability to provide clear, correct, and well-reasoned answers to questions;
  - Demonstrated familiarity with the most relevant background studies;
  - The use of effective presentation techniques and visual aids;
  - Finishing within the allotted time.
- A copy of the presentation grading rubric will be posted to Blackboard.
- The instructor is available to answer questions that arise when preparing the presentations.
- These presentations may take considerable time to prepare. Do not wait until the last minute!

ARTICLE SUMMARIES:
- Each student will write 4 article summaries.
  - A summary is due at the start of each class session in which articles are being presented, except for the 3 sessions in which the student is presenting;
  - The article summarized must be one of the 3 articles being presented that class session;
  - The student may choose which of the 3 articles to summarize.
- Each article summary should consist of 6 sentences, as follows:
  1. The specific purpose of the study;
  2. The conclusion of the study in relation to its purpose;
  3. The primary basis for this conclusion (i.e. what findings led to the conclusion);
  4. A major strength of the article, in your opinion;
  5. A major weakness of the article, in your opinion;
  6. A major implication of the findings, in your opinion.
- Grading will be based on the extents to which all required aspects are present, the summary accurately reflects the article content, and the opinions expressed are judged to be valid.

CLASS PARTICIPATION:
- Students are expected to attend all lectures and to participate in the discussions during the 7 article presentation sessions of weeks 4-10.
- Each of these 7 sessions will count equally towards the final class participation grade.
- Class participation will be graded based on the level of contribution made to the discussion.
  - To receive full credit for participation, students must contribute at least one question or comment that is nontrivial in nature.
RESEARCH PAPER:
- Each student will write and submit a paper (7-10 pages, double-spaced) that critically reviews the current knowledge related to the biomechanics of a specific type of musculoskeletal injury/condition (e.g. patellofemoral pain) or an aspect thereof (e.g. patient transfers and low-back injury).
- The student may choose the topic of the paper, subject to the approval of the instructor.
  - Note: The paper must be written specifically for this course. The topic may not be identical to that of a previous paper or a student’s thesis/dissertation.
- The expected content of the paper includes:
  - A general introduction to the topic and its clinical relevance;
  - A synthesis of current literature related to the topic:
    - What is known (or is thought to be known);
    - What is not known (i.e. contrasting findings, competing hypotheses and the support for each hypothesis, gaps in our current knowledge);
  - What you conclude and/or believe to be true based on the evidence;
  - The next research steps that should be taken.
- References (at least 15, of which at least 10 must be primary sources) and a bibliography must be provided.
- The proposed topic must be submitted to the instructor for approval no later than Friday, 2/13.
- The paper is due by 11:59 pm on Friday, 3/13. Late papers will not be accepted.

FINAL EXAM:
- The final exam will be held on Wednesday, 3/18, 12:00 pm – 1:50 in WNGR 287
- The exam will consist of essay questions that require students to integrate and synthesize material from throughout the course, with a primary focus on mechanisms of injury and factors influencing the risk of injury.
- The exam is to be taken at the assigned time and date, unless other arrangements are made with the instructor at least 2 weeks beforehand.

GENERAL GUIDELINES:
- Given that this course is 3 credit hours, you should expect to spend about 9 hours per week outside of class on this course in order to do well.
- If you are having difficulty with any of the material, ask questions in class or see the instructor for help, either during office hours or by appointment. Questions are encouraged.
- Do not wait until the last minute to ask for help!
- In an effort to promote student success, faculty may contact the student’s advisor if there are concerns about student well-being and/or class progress.
- Accommodations will be made for documented time-conflicts that are out of the student’s control or documented medical/family emergency situations.

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COURSE DESCRIPTION:
Investigation and evaluation of research methods applicable to human movement study and professional physical education.

Prerequisites: EXSS 471 and ST 511  Co-requisites: None

LEARNING RESOURCES:
Required Textbook:

STUDENT LEARNING OUTCOMES:
On successful completion of this course, students will be able to:
1. Define research and explain the scientific method;
2. Demonstrate an awareness of ethical issues in research;
3. Perform a literature search and compile a literature review;
4. Comprehend and critically evaluate different research approaches and designs;
5. Explain statistical concepts and choose an appropriate statistical analysis technique;
6. Formulate the problem statement, aims, hypotheses, and methodology for a research study;
7. Write and orally present a research proposal.

PROGRAM COMPETENCIES IN EXERCISE AND SPORT SCIENCE:
Upon satisfactory completion of the degree in Exercise and Sport Science, the students will have met the program competencies found at http://health.oregonstate.edu/degrees/competencies

COURSE CONTENT:
Developing a Research Topic (Weeks 1-3)
- Introduction to research; identifying & introducing a research problem; writing a literature review
Ethical Issues in Research (Week 3)
Research Approaches (Weeks 4-7)
- Developing the research methods; experimental & quasi-experimental, descriptive, survey-based, epidemiological, qualitative, and mixed-methods research
Statistical Concepts in Research (Weeks 7-10)
- Statistical considerations; analyzing differences; analyzing relationships
Reporting of Research (Weeks 9-10)
EVALUATION OF STUDENT PERFORMANCE:

<table>
<thead>
<tr>
<th>Component</th>
<th>Weightage</th>
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<tbody>
<tr>
<td>Midterm Exam</td>
<td>20%</td>
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<tr>
<td>Final Exam</td>
<td>23%</td>
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<tr>
<td>Research Proposal</td>
<td>45%</td>
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<tr>
<td>Proposal Presentation</td>
<td>12%</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Grading scale for final grades:

- 93.0-100% = A
- 83.0-86.9% = B
- 73.0-76.9% = C
- 63.0-66.9% = D
- 90.0-92.9% = A−
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- 60.0-62.9% = D−
- 87.0-89.9% = B+
- 77.0-79.9% = C+
- 67.0-69.9% = D+
- 0-59.9% = F

READING ASSIGNMENTS:
- Students are expected to read all of the assigned materials/textbook chapters (see page 4).
- Students are encouraged to complete the assigned reading before class.

LECTURE NOTES:
- Lecture notes will be provided as an aid to learning. They are not a substitute for attendance!
- Notes will be posted to Canvas by 9 pm the day before each lecture.
- It is recommended that you bring a copy of the notes to class.

EXAMS:
- Exam Dates:
  - Midterm Exam: Wednesday, 5/06, 2:30 pm – 3:20, GRAF 306
  - Final Exam: Monday, 6/08, 12:00 pm – 1:50, GRAF 306
- Exams will include a mixture of short answer, multiple choice, and/or essay questions.
- Exams are to be taken at the assigned time and date, unless other arrangements are made with the instructor at least 1 week beforehand. No make-up exams will be given, except under medical/family emergency situations.

RESEARCH PROPOSAL:
- You are required to develop a research proposal.
- Your proposal may be for a study that you are planning to conduct as your thesis, dissertation, or independent study or it may be for a purely hypothetical study.
- The study must be original. It cannot duplicate an existing study.
- The proposed research study must be one that you would be capable of completing within 2 years given resources that would reasonably be available to you as an OSU graduate student.
- You may discuss the proposed research topic and specific aims with your advisor; he/she is allowed to point out flaws in the proposed methods, and he/she may suggest useful resources, but the design of the study methodology must be your own. Assistance received must be acknowledged in your proposal.
- Students will submit the following preliminary materials for review:
  - Statement of research topic (due: 4/13)
  - Problem statement, specific aims, hypotheses, and significance (due: 4/20)
  - Outline of the literature review (due: 4/27)
  - Literature review; revised problem statement, specific aims, and hypotheses (due: 5/04)
  - Methods, without the data analysis plan (due: 5/11)
  - Introduction (due: 5/18)
  - Data analysis plan (due: 5/27)
  - Abstract (due: 6/01)
- The development and expected content of these sections will be discussed in class.
- The final research proposal will be due by 11:59 pm on Friday, 6/05.
RESEARCH PROPOSAL (cont.):

- Required content of the final written proposal:
  - Title page
  - Abstract (120-150 words)
  - Statement of the contributions of others
  - Chapter 1 – Introduction
  - Chapter 2 – Literature Review
  - Chapter 3 – Methods
  - Bibliography

- All preliminary materials and the final written proposal are to be submitted to the instructor by e-mail. Microsoft Word is the preferred format, but pdf files are also acceptable.

- The instructor will try to provide constructive feedback regarding all submitted materials. Regardless of the feedback received, students are expected to critically review and edit their proposal between submitting the preliminary materials and submitting the final version.

- Grading will be based on:
  - The quality and feasibility of the research design (40%)
  - The quality and completeness of the proposal document (40%)
  - The timely submission and completeness of all preliminary materials (20%)

- Students are strongly encouraged to consult with either the Writing Center in Waldo 123 (http://writingcenter.oregonstate.edu/) or the Online Writing Lab (http://cwl.oregonstate.edu/owl.php) for help with the writing of their proposal.

PROPOSAL PRESENTATION:

- Each student will present her or his research proposal to the class during Week 10.
- The presentation will be 10 min in length, followed by 5 min of questions from the class. *Time limits will be strictly enforced.*

- The expected components of the presentation are:
  - Introduction – general question being addressed; important background information; gap in knowledge to be addressed
  - Specific Aims and Hypotheses
  - Methods
  - Discussion – limitations of the study; significance/implications of the expected results

- Grading will be based on:
  - Clear, complete, well-organized, and correct presentation of the important aspects of each component
  - Use of effective presentation techniques and visual aids
  - The ability to provide clear, correct, and well-reasoned answers to questions, showing knowledge and understanding of material relevant to the proposed study
  - Finishing within the allotted time

GENERAL GUIDELINES:

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- If you are having difficulty with any of the material, ask questions in class or see the instructor for help, either during office hours or by appointment. Questions are encouraged.
- Do not wait until the last minute to work on the assignments or to ask for help!
- In an effort to promote student success, faculty may contact the student’s advisor if there are concerns about student wellbeing and/or class progress.

E-MAIL:

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## Assigned Reading: (subject to change as the course progresses)

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Topic</th>
<th>Reading/Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>M 3/30</td>
<td>Introduction to Research in Human Movement</td>
<td>Chapter 1</td>
</tr>
<tr>
<td></td>
<td>W 4/01</td>
<td>Identifying the Research Problem</td>
<td>Chapter 2</td>
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<td><em>Class from 2:20 pm – 3:20</em></td>
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<tr>
<td>2</td>
<td>M 4/06</td>
<td>Introducing the Research Problem</td>
<td>Chapter 3</td>
</tr>
<tr>
<td></td>
<td>W 4/08</td>
<td>Introducing the Research Problem (cont.)</td>
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<tr>
<td>3</td>
<td>M 4/13</td>
<td>Ethical Issues in Research</td>
<td>Chapter 5</td>
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<td></td>
<td>W 4/15</td>
<td>Developing the Research Methods</td>
<td>Research topic due</td>
</tr>
<tr>
<td>4</td>
<td>M 4/20</td>
<td>Developing the Research Methods (cont.)</td>
<td>Problem statement due</td>
</tr>
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<td></td>
<td>W 4/22</td>
<td>Experimental &amp; Quasi-Experimental Research</td>
<td>Chapter 18</td>
</tr>
<tr>
<td>5</td>
<td>M 4/27</td>
<td>Experimental Research (cont.)</td>
<td>Outline of lit. review due</td>
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<td></td>
<td>W 4/29</td>
<td>Descriptive Research</td>
<td>Chapter 16</td>
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<td></td>
<td>Survey-Based Research</td>
<td>Chapter 15</td>
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<td>6</td>
<td>M 5/04</td>
<td>Epidemiological Research</td>
<td>Chapter 17</td>
</tr>
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<td></td>
<td>W 5/06</td>
<td>Epidemiological Research (cont.)</td>
<td><em>Literature review &amp; revised problem statement due</em></td>
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<td></td>
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<td><strong>Midterm Exam</strong></td>
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<td>7</td>
<td>M 5/11</td>
<td>Qualitative and Mixed-Methods Research Statistical Considerations</td>
<td>Chapters 19 &amp; 20</td>
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<td></td>
<td>W 5/13</td>
<td>Statistical Considerations (cont.)</td>
<td>Chapter 6</td>
</tr>
<tr>
<td>8</td>
<td>M 5/18</td>
<td>Analyzing Differences Between Groups</td>
<td>Chapters 9 &amp; 10</td>
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<tr>
<td></td>
<td>W 5/20</td>
<td>Analyzing Differences (cont.)</td>
<td><em>Introduction due</em></td>
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<td>9</td>
<td>M 5/25</td>
<td>No class (Memorial Day)</td>
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<tr>
<td></td>
<td>W 5/27</td>
<td>Analyzing Relationships Between Variables Effective Slide Presentations</td>
<td>Chapter 8</td>
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<td></td>
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<td></td>
<td><em>Data analysis plan due</em></td>
</tr>
<tr>
<td>10</td>
<td>M 6/01</td>
<td>Reporting of Research</td>
<td>Chapters 21 &amp; 22</td>
</tr>
<tr>
<td></td>
<td>W 6/03</td>
<td>Presentations</td>
<td><em>Abstract due</em></td>
</tr>
</tbody>
</table>

All assigned reading is from Thomas et al. (2011).
DIVERSITY STATEMENT
The College of Public Health and Human Sciences strives to create an affirming climate for all students including underrepresented and marginalized individuals and groups. Diversity encompasses differences in age, color, ethnicity, national origin, gender, physical or mental ability, religion, socioeconomic background, veteran status, sexual orientation, and marginalized groups. We believe diversity is the synergy, connection, acceptance, and mutual learning fostered by the interaction of different human characteristics.

EXPECTATIONS FOR STUDENT CONDUCT
The Student Conduct Code establishes community standards and procedures necessary to maintain and protect an environment conducive to learning, in keeping with the educational objectives of Oregon State University. This code is based on the assumption that all persons must treat one another with dignity and respect in order for scholarship to thrive. For the full Student Conduct Code see http://oregonstate.edu/studentconduct/

Academic or Scholarly Dishonesty is prohibited and considered a serious violation of the Student Conduct Code. It is defined as an act of deception in which a Student seeks to claim credit for the work or effort of another person, or uses unauthorized materials or fabricated information in any academic work or research, either through the Student's own efforts or the efforts of another. For specifics related to offenses proscribed by the University see: http://oregonstate.edu/studentconduct/offenses-0

RELIGIOUS HOLIDAY STATEMENT
Oregon State University strives to respect all religious practices. If you have religious holidays that are in conflict with any of the requirements of this class, please see me immediately so that we can make alternative arrangements.

STUDENTS WITH DOCUMENTED DISABILITIES
"Accommodations are collaborative efforts between students, faculty, and Disability Access Services (DAS). Student with accommodations approved through DAS are responsible for contacting the faculty member in charge of the course prior to or during the first week of the term to discuss accommodations. Students who believe they are eligible for accommodations but who have not yet obtained approval through DAS should contact DAS immediately at 737-4098."
Psychology 542
Perception
Winter, 2014

Professor: Dr. Kristen Macuga
Office hours: TBA
229 Reed Lodge
Email: Kristen.Macuga@oregonstate.edu

Prerequisites: PSY 330 or PSY 340 and PSY 301  Course Credits: 4

Class Time and Location: Wednesday/Friday 10-11:50am, Nash 214

Class Description: In this course, we will examine how the sensory systems work. Through a variety of demonstrations and discussions, you will experience perceptual phenomena and also learn to appreciate the complexity of the psychological and biological mechanisms underlying such experiences. Current hypotheses and theories will be covered. We will also talk about how the different approaches and techniques for studying perception highlight the ways in which our sensory systems both limit and enhance perception.

Class Materials:

Required Reading:
• Sensation and Perception by Goldstein (with Virtual Lab Manual CD), 8th edition
  The readings for each lecture will come from the textbook, Virtual Lab Manual, and/or supplementary readings (available on Canvas).

Learning Outcomes:
By the end of the course, students should be able to:
1. Summarize concepts, theories, experimental findings, and present them to others
2. Critically evaluate research in the literature or media
3. Understand and use psychological methods to examine perceptual processes
4. Apply knowledge to examine everyday perceptual experience

My Expectations:
1. Attendance is important since we will have many interesting demonstrations and discussions, and some lecture material is not in the textbook.
2. Complete assigned readings and test yourself after each section.
3. Seek assistance if you need it. I am here to help.
4. Ask questions and participate in class. I’m happy to present information in different ways, and your contributions will make class more fun and enjoyable.
**Academic Honesty:** All of the work you turn in must be your own, in your own words (unless citations are used), and your exams must be completed without help from others. Deviating from these standards will be considered academic dishonesty, and may result in an "F" grade for the course. Academic dishonesty is subject to the disciplinary process outlined in the OSU Student Conduct Code. University policies are detailed here: [oregonstate.edu/studentconduct/feature-stories/student-conduct-code](http://oregonstate.edu/studentconduct/feature-stories/student-conduct-code)

**Students with Disabilities:** "Accommodations are collaborative efforts between students, faculty and Services for Students with Disabilities (SSD). Students with accommodations approved through SSD are responsible for contacting the faculty member in charge of the course prior to or during the first week of the term to discuss accommodations. Students who believe they are eligible for accommodations but who have not yet obtained approval through SSD should contact SSD immediately at 541-737-4098."

**Make-up Policy:** Make-up exams will only be granted under exceptional circumstances (e.g., serious illness, accident, family emergency, or university-approved function) and proof is required. Please give me as much advance notice as possible. Make-up exams are proctored through the main Psychology office, and must be scheduled sometime between the hours of 10:30am – 2:30pm. After you have provided documentation of your need and have received my permission via email, please call 541-737-2311 to make an appointment for a make-up exam session. The make-up exam must be taken within 48 hours (before or after) of the in-class test. After you have scheduled a make-up exam, please email me the time and date of your scheduled exam so that I can make sure an exam is ready for you when you arrive for your appointment.

**Evaluation:** Your grade will be based on three exams (20% each), a virtual lab report class presentation (10%), and a paper (30%). The exams will not be cumulative (but may include earlier concepts to the extent that they are used in lecture). You will need to bring a Scantron Form No. 95677 and #2 pencils for each exam.

**Virtual Lab Presentation:** Each student will give a 12 min slide-based presentation + 3 min Q and A on an assigned Virtual Lab (see schedule for your presentation date). You will need to give a background literature review for the Intro, describe the Methods, use the questions from the Virtual Lab Manual to frame your Results & Discussion, and list limitations and possible extensions in your Conclusion. A digital copy of your slides is due by 11pm the night before your presentation (email the file to me).

**Extra Credit:** You may submit a one-page paper on a recent (within the past 3 months) perceptual finding (from the news or a published journal). It must be in your own words and should include a printout or link to the original source. You must clearly relate the finding to information presented in lecture. Only two of these may be submitted, and each is worth up to 1% added to your final grade. Turn in before Friday of Week 10.
Lecture Schedule and Readings (subject to revision): Chapter assignments are from the Goldstein textbook. Readings (.pdfs) will be available on Canvas. The Virtual Lab Manual and Media can be found on the CD bundled with your textbook.

<table>
<thead>
<tr>
<th>DATE</th>
<th>LECTURE TOPIC</th>
<th>READINGS</th>
<th>VIRTUAL LAB PRESENTATION</th>
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<tbody>
<tr>
<td></td>
<td><strong>Week 1</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/6</td>
<td>Introduction, approaches, methods</td>
<td>Chapter 1, Appendix</td>
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<tr>
<td>1/8</td>
<td>Light and the eye</td>
<td>Chapter 2</td>
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<td><strong>Week 2</strong></td>
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<tr>
<td>1/13</td>
<td>Light and the eye</td>
<td>Chapter 2</td>
<td>VL Ch2: 11,12</td>
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<tr>
<td>1/15</td>
<td>Receptive fields, sensitivity, adaptation</td>
<td>Chapter 3</td>
<td>VL Ch3: 3</td>
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<tr>
<td></td>
<td><strong>Week 3</strong></td>
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<tr>
<td>1/20</td>
<td>The visual pathway</td>
<td>Chapter 4</td>
<td>VL Ch4: 5, 6, 7</td>
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<td>1/22</td>
<td>Attention and change blindness</td>
<td>Chapter 6</td>
<td>VL Ch6: 5, 12</td>
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<td><strong>Week 4</strong></td>
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<tr>
<td>1/27</td>
<td>Midterm Exam 1</td>
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<tr>
<td>1/29</td>
<td>Object perception, illusions</td>
<td>Chapter 5</td>
<td>VL Ch 5: 2, 21</td>
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<td><strong>Week 5</strong></td>
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<tr>
<td>2/3</td>
<td>Color perception, <strong>Hypothesis due</strong></td>
<td>Chapter 9</td>
<td>VL Ch 9: 1, 4, 17</td>
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<tr>
<td>2/5</td>
<td>Space perception</td>
<td>Chapter 10</td>
<td>VL Ch 10: 7, 9</td>
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<td></td>
<td><strong>Week 6</strong></td>
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<tr>
<td>2/10</td>
<td>Space perception</td>
<td>Chapter 10</td>
<td>VL Ch 10: 10, 12</td>
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<tr>
<td>2/12</td>
<td>Movement perception</td>
<td>Chapter 8</td>
<td>VL Ch 8: 13, 16, 21</td>
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<td><strong>Week 7</strong></td>
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<tr>
<td>2/17</td>
<td>Perception and action</td>
<td>Chapter 7</td>
<td>VL Ch 7: 2</td>
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<tr>
<td>2/19</td>
<td>Midterm Exam 2</td>
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<td></td>
<td><strong>Week 8</strong></td>
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<tr>
<td>2/24</td>
<td>Hearing</td>
<td>Chapter 11</td>
<td>VL Ch 11: 2, 6, 12</td>
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<tr>
<td>2/26</td>
<td>Auditory space perception, <strong>Draft due</strong></td>
<td>Chapter 12</td>
<td>VL Ch 12: 1, 10</td>
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<td></td>
<td><strong>Week 9</strong></td>
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<tr>
<td>3/2</td>
<td>Touch</td>
<td>Chapter 14</td>
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<td>3/4</td>
<td>Pain, vestibular perception, virtual reality</td>
<td>Chapter 14, Reading</td>
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<td></td>
<td><strong>Week 10</strong></td>
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<tr>
<td>3/9</td>
<td>Smell and taste</td>
<td>Ch. 15</td>
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<tr>
<td>3/11</td>
<td>Multisensory interactions, <strong>Paper due</strong></td>
<td>Reading</td>
<td>VL Ch 13: 2</td>
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<tr>
<td>3/15</td>
<td><strong>Final Exam 9:30-11:20am</strong></td>
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</table>
**Paper:** Design an experiment to test your own idea about some aspect of perception. Start generating potential ideas as early as possible and discuss them with me before settling on your hypothesis, which should be specific and tractable (due by 2/3). A complete first draft is due on 2/26. You will get feedback from me and also from your fellow classmates. Final paper (10-15 double-spaced pages) written in APA style with abstract, introduction containing background/relevant literature (at least 10 articles) and your hypothesis, methods section including your research design, participants, procedures, and how you plan to analyze your results is due on 3/11.
Course Descriptions: A well-designed device (whether it is a complex airplane cockpit display or a cell phone or a simple thermostat) is one that a person can use easily and effectively, with very little confusion and error. The same is true of computer software. If the device confuses and irritates the user, the product has failed to meet its objective. Eventually, although perhaps not immediately, the product will probably be a commercial failure, too – even if it is loaded with many powerful features. Even more importantly, poor design for the human user is at the root of many fatal disasters involving technology, ranging from airplane crashes to nuclear power station meltdowns. Nonetheless, the traditional engineering curriculum barely touches on the human user and human-device interaction. Many companies rely on the engineers who designed a system to use their own intuitions to determine whether a device will be usable and whether a manual is easy to understand. For reasons we will discuss in this course, this assumption is a serious error. The situation is gradually improving, however, as more companies hire Engineering Psychologists, Human Factors Psychologists or user interface specialists.

This course will provide an introduction to some of the psychological concepts and facts most useful for design. Topics will be culled from several of the more “experimental” branches of psychology, including sensory and perceptual psychology, cognitive psychology, motor control, and the fields of human-computer interaction and reliability analysis. Unlike a “typical” psychology course, psychological principles will not be discussed for their intrinsic interest or for the light they may shed on the biological underpinnings of the mind. Rather, ideas will be selected because they have important implications for design or training.

Prerequisites: Both PSY301 and PSY340 courses are prerequisites for this course. Some lectures will be a bit more technical than is the case in most psychology courses. Students should not take the course if they are not comfortable with “quantitative” presentation of ideas (e.g., probability distributions and some mathematical equations with basic calculations). It’s highly recommended that you bring your personal calculator (not the one from your cell phone) to class and exams. Although you do not need to know any advanced mathematics, you should be comfortable looking at graphs and thinking in terms of quantitative relationships and probabilistic concepts.


* This book is available in electronic format in the library (eISBN: 9781420063608)

Exams and Make-up Policy: There will be three non-cumulative exams. The exam dates are firm. Note that going home early, having doctors’ appointments, friends in town, a disabled car, vacation plans, hangovers, broken alarm clocks, and the like reasons of personal convenience do not constitute acceptable excuses for requesting make-up or early exams. You have prior warning! If you miss the exam, you will of course receive a score of zero for that exam. No make-up exams will be given unless
you: (1) have a serious medical problem, (2) participate in certain OSU-sanctioned events (e.g., a baseball
game), or (3) have a death in the family. In these cases, you must provide official documentation and you
must make your request before you miss the exam. After you have provided documentation of your need
and have received permission for a make-up test, you will then contact the main office to schedule a time
to take your exam. The make-up exam must be taken within 3 days (before or after) of the scheduled
exam listed in the class syllabus. No cell phone, iPad, computers, textbooks, notes, and other electronic
devices are allowed during the exams, except personal calculator (not the one from cell phones).

Class Attendance/In-Class Projects: Students are responsible for all materials covered in class.
Although the lecture outlines will be posted on Canvas, they are NOT understandable alone. Exams will
primarily cover these topics. There will be unscheduled in-class projects for which your participation is
required. These are designed to (1) assess your comprehension of class materials and (2) reward your
attendance. There will be a total of 11 in-class projects; however, only the 10 highest scores will count
toward your final grade. Each project is worth 15 points (a total of 150 points). Your project is due at the
end of the class. No exceptions will be given. Because you are allowed to drop one in-class project score
(out of 11), you can get away with missing one of the in-class assignments. Note that I will not provide
copies of the lecture materials (if you miss class, you may ask one of your classmates for help) and I will
not allow make-up in-class projects.

Office Hours: I encourage you to come to office hours if you need any assistance with course materials,
would like a clarification regarding computation of your grade, or if you would like to request a make-up
exam. I can also give you advice on how to do better in the course (e.g., attend lectures). Please do not
come to office hours or send emails simply to complain about doing poorly in the course or about a
particular exam being difficult. If you are not available during my scheduled office hours, you may make
an appointment for some other time. The best way to reach me is to come to my office, rather than
sending an email. If you must email me, please use an OSU email account and include your name and the
class title (e.g., PSY494-Engineering Psychology) in your email. Please be respectful in your email (for
details regarding how to write an appropriate email: http://liberalarts.oregonstate.edu/school-
psychological-science/psychology/students/student-etiquette).

Research Project: All graduate students will be expected to carry out an individual project. The focus
of the project will be to take an existing design (of a device, machine, software, or website), critique this
design from a human factors perspective, and offer suggestions for design improvements. During the
final class meetings (see schedule below), you will present a report of your project to the class. Your
research project is worth a total of 100 points. The grade will not hinge on whether the improved design
of a product (if any) actually turned out to be superior to the original interface or manual, but rather on
whether the project was thoughtfully conceived, carefully conducted, and clearly written up. Your
research project is due before 10am on March 8th (Tuesday of Week 10). The paper should be
submitted via the Assignments link on Canvas.

Presentation: You are required to make a 30-minute professional presentation of your project (as if you
were giving a talk at a conference) on Thursday of Week 10. Also, be prepared for questions from your
peers regarding your research project. Your presentation will be evaluated by your peers on two aspects
(the project itself and the quality of your presentation). This presentation is worth a total of 50 points.

Extra Credit: You can earn extra points by contributing examples of bad designs (i.e., that violate
Engineering Psychology or Human Factors principles, such as the ones discussed in class). Whenever
you see a product or sign that is poorly designed, take a picture of it. Insert the picture to the Microsoft
Word and write a paragraph explaining what’s wrong with it. You will need to submit your extra credit
(up to 2 examples) via the “Assignments” link on Canvas. Some of the submitted examples will later be discussed in class.

Each acceptable (novel, interesting, etc.) example sent to Canvas Assignments by 10am on January 26th (before Exam 1) will be worth up to 15 points extra credit.

Each acceptable example sent after 10am on January 26th and before 10am on February 18th (between Exam 1 and Exam 2) will be worth up to 10 points extra credit.

Each acceptable example sent after 10am on February 18th and before 5pm on March 11th (between Exam 2 and Friday of Week 10) will be worth up to 5 points extra credit.

No extra credit will be given after 5pm on Friday of Week 10. When you submit your extra credit via the Assignments link, Canvas will also show your submission time. This is the time I will use to determine when the extra credit is submitted. Submit early in case you have internet connection problems. Each student can submit a maximum of two examples for a maximum of 30 points extra credit. (Note: send original examples only, not ones from the book or from human factors websites.)

**Grading:** Your grade will be determined as follows (NO curve):

Exam 1, Exam 2, and Exam 3 are worth a total of 300 points (100 points each)
In-Class Projects (ICP) are worth a total of 150 points (15 points each)*
Research paper is worth 100 points
Presentation is worth 50 points

Total Score (out of 600) = Exam 1 + Exam 2 + Exam 3 + ICP + Research Paper + Presentation

*There will be 11 lectures with ICPs. However, I will drop the lowest ICP and count only the 10 highest ICP scores toward to your final grade. If you miss one ICP, you will of course receive a zero for that ICP (and it will be the one that is dropped).

Note: The grading scale below is based on 600 points, which is the maximum possible point total, before adding extra credit points. However, with extra credit, it is actually possible for you to earn a total score of 630.

<table>
<thead>
<tr>
<th>Total Score</th>
<th>Grade</th>
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<tbody>
<tr>
<td>564 or above</td>
<td>A</td>
</tr>
<tr>
<td>540 – 563</td>
<td>A-</td>
</tr>
<tr>
<td>516 – 539</td>
<td>B+</td>
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<tr>
<td>504 – 515</td>
<td>B</td>
</tr>
<tr>
<td>480 – 503</td>
<td>B-</td>
</tr>
<tr>
<td>456 – 479</td>
<td>C+</td>
</tr>
<tr>
<td>444 – 455</td>
<td>C</td>
</tr>
<tr>
<td>420 – 443</td>
<td>C-</td>
</tr>
<tr>
<td>396 – 419</td>
<td>D+</td>
</tr>
<tr>
<td>384 – 395</td>
<td>D</td>
</tr>
<tr>
<td>360 – 383</td>
<td>D-</td>
</tr>
<tr>
<td>Below 360</td>
<td>F</td>
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</tbody>
</table>
Note: You will not be bumped up to the next grade just because you are only a few decimal points away (in other words, no rounding will be used). If you are concerned about your grade, I recommend that you take advantage of the generous extra credit opportunities.

Class Conduct and General Rules: These are the rules and regulations during class, which will be strictly enforced.

1. **Turn your cell phones OFF during class.** Not vibrate. Not silent. Off. If a cell phone rings during class, or you are sending a text message, I will ask you to leave the classroom. Cell phones that ring during class time are extremely disruptive to your fellow classmates and to me.

2. **Laptop use is NOT allowed during lectures,** unless required due to a medical condition. It has been shown that those who use laptops to acquire notes do worse overall than those who take notes by hand ([http://www.findingdulcinea.com/news/education/2009/march/Students-Using-Laptops-in-Class-Do-Worse-on-Tests.html](http://www.findingdulcinea.com/news/education/2009/march/Students-Using-Laptops-in-Class-Do-Worse-on-Tests.html)). Also see [http://pss.sagepub.com/content/25/6/1159.full.pdf+html](http://pss.sagepub.com/content/25/6/1159.full.pdf+html). Laptops, though an excellent achievement in technology, have also provided another avenue in which to be distracted during class time (and to distract others). However, those who have a medical condition may bring a laptop to class (except during exams) for the exclusive purpose of taking notes, with the wireless receiver turned OFF. Nevertheless, you will need to provide official documents requested for laptop use in class and get permission from me first. *If you are granted to use the laptop, you will need to sit in the front row during the lecture.* If you are found to have other applications open during class time (e.g., for sending email, web surfing, doing homework, etc.), you will be asked to leave the classroom.

3. Please be courteous and respectful towards your fellow students and the instructor:
   - Please be quiet during class. Even whispering can be extremely disruptive to those around you.
   - Do not come to class to sleep, read the newspaper, send a text message to your friends, etc. This kind of behavior is disrespectful.
   - Please arrive on time and don’t leave early. Either arriving late or leaving early are noisy and irritating activities.
   - Please turn off your cell phone and MP3 players before class.

4. Follow OSU’s Student Conduct Code regarding academic honesty. Cheating is a serious offense. You are cheating, for example, if you copy answers from another person’s exam or when you let someone else copy from you. If you have any doubts about the definitions of cheating, please review the OSU definitions at [http://studentlife.oregonstate.edu/sites/studentlife.oregonstate.edu/files/student_conduct_code_1.pdf](http://studentlife.oregonstate.edu/sites/studentlife.oregonstate.edu/files/student_conduct_code_1.pdf). Under university policies, penalties for academic dishonesty can be as severe as failing the entire course. *Therefore, if you are caught cheating on a test, you will receive an F for this course* and will be reported to the Student Conduct and Mediation program. Plagiarism on extra credit assignments will result in a failing grade for this course.

**Accommodations for Disabilities:** Accommodations are collaborative efforts between students, faculty and Services for Students with Disabilities (SSD). Students with accommodations approved through SSD are responsible for contacting the faculty member in charge of the course prior to or during the first week of the term to discuss accommodations. Students who believe they are eligible for accommodations but who have not yet obtained approval through SSD should contact SSD immediately at 737-4098.
**Tentative Class Schedule and Topic** (subject to revision – any changes will be announced in class and on Canvas).

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Topic</th>
<th>Reading Assignment</th>
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</table>
| 1    | 1/5; 1/7 | Introduction to Engineering Psychology/Human Factors  
                  Historical Foundations of Human Factors | Chapter 1            |
| 2    | 1/12; 1/14 | Research Methods  
                  Human Error and Human Reliability | Chapter 2  
                  Chapter 3            |
| 3    | 1/19  
|      | 1/21 | Human Information Processing  
                  Signal Detection Theory | Chapter 4  
                  Chapter 4            |
| 4    | 1/26 | **Exam 1 (Chapters 1-4)**  
|      | 1/28 | Visual Perception | Chapter 5            |
| 5    | 2/2; 2/4 | Perception of Objects in the World | Chapter 6            |
| 6    | 2/9; 2/11 | Visual and Auditory Displays | Chapter 8            |
| 7    | 2/16 | Attention and Mental Workload | Chapter 9            |
| 2/18 | **Exam 2 (Chapters 5-6, 8-9)**  
|      | 2/23; 2/25 | Retention and Comprehension of Information Response Selection | Chapter 10  
                  Chapter 13            |
| 9    | 3/2; 3/3 | Controls and Control Panels | Chapter 15            |
| 10   | 3/8; 3/10 | Anthropometrics and Workspace Design  
                  PSY594 Graduate Student Presentations | Chapter 16 |
| 11   | **Exam 3: March 14th (Monday), 9:30AM, NASH 214, Chapters 10-13, 15-16** | | |
PSY594 Graduate Student Project and Presentation

All graduate students will be expected to carry out an individual project and presentation. You will need to choose a product, display, or machine (e.g., cell phone, Canvas, U-Scan, website, etc.) and discuss the possible design flaws based on material discussed in class or in the textbook. You will then suggest an improved design and propose a research method to assess your new design. During the final class meetings (see schedule above), each student will present a report of their project to the class. All students will turn in a written report via the Assignments link on Canvas. Your research project is due before 10am on March 8th (Tuesday of Week 10).

The paper should be in an APA style (check Blackboard for APA Style Guide Links). I have posted an example of research project on Canvas.

Your project paper should include the following information:

**Cover page** (includes the title, your name, and project due date)
**Introduction** (includes overview, project goals, objectives, etc.)
**Current Design Problems** (what human factors principles should be taken into consideration)
**Proposal for an Improved Design** (after taking relevant human factors principles into account)
**Proposed Approach to Evaluate the New Design** (details of the experimental design, participants, etc.)
**Summary/Conclusions**
**References**
**Tables and/Figures (if there is any)**

* The total number of pages for your project paper (excluding cover and references) should be at least 15 but no more than 20 (double-spaced, 12-point Times New Roman font, 1-inch margins).

Your project paper will be graded on content criteria and writing criteria.

Content criteria:
(1) completeness – Does the paper meet all of the stated requirements?
(2) accuracy – Are the human factors principles cited and used correctly?
(3) logic – Are the conclusions reasonable and do they follow logically from the stated premises?
(4) creativity – Are the observations novel and insightful?

Writing criteria:
(1) organization – Are the ideas organized well (with proper subheadings)?
(2) clarity – Is the paper understandable to those without extensive prior knowledge?
(3) spelling – Are all the words spelled correctly? (use a spell-checker!)
(4) formatting – Is the paper visually appealing (appropriate use of headings, font, spacing, bullets, etc.)?

Presentation

You will make a 30-minute professional presentation of your project (as if you were trying to sell your new design and its evaluation to an employer). Be prepared for questions from your peers regarding your research project. Your presentation will be evaluated by your peers.
Psychology 599
Applied Cognition and Human Factors
Winter, 2015

Professor: Dr. Kristen Macuga
Office hours: Tuesday 12-2pm
229 Reed Lodge
Email: Kristen.Macuga@oregonstate.edu

Prerequisites: PSY 340, PSY 301 Course Credits: 4

Class Time and Location: Wednesday/Friday 12-1:50pm, FURM 105

Class Description: In this course, we will examine topics such as skill acquisition, sport psychology, spatial navigation, and virtual reality with a focus on the strengths and limitations of human performance, and an emphasis on real-world behavior. Cognitive, perceptual, and motor processes will be studied in the context of everyday actions. We will also explore issues related to human-computer interaction, such as usability, interface design, and automation.

Class Materials:

Required Reading: Readings for each week will be posted as pdfs on Blackboard. The purpose of these readings is to supplement the lecture material and to prepare you in advance for class discussions. You are responsible for knowing (can be tested on) information from these readings. Please check Blackboard frequently, since each journal article will be posted one week prior to the in-class discussion.

Learning Outcomes:
By the end of the course, students should be able to:
1. Summarize and synthesize concepts, theories, and experimental findings
2. Critically evaluate research in the literature or media and recognize implications
3. Understand and apply human factors methods
4. Communicate ideas to others in both written and oral presentation form
5. Develop a proposal for an independent research project

My Expectations:
1. Attendance is critical, since presentations and in-class discussions are an important part of the class.
2. Complete the readings before class. Stay on top of assignment due dates.
3. Seek assistance if you need it. I am here to help. Stop by during office hours, or if you have another class during office hours, you can make an appointment.
4. Participate in class and ask questions. I’m happy to present information in different ways, and your contributions will make class more fun and enjoyable.
5. Pick a topic that interests you. It’s easier to stay motivated that way.
6. Be respectful, enthusiastic, and prepared to learn.
**Academic Honesty:** All of the work you turn in must be your own, in your own words (unless citations are used), and your exams must be completed without help from others. Deviating from these standards will be considered academic dishonesty, and may result in an “F” grade for the course. Academic dishonesty is subject to the disciplinary process outlined in the OSU Student Conduct Code. University policies are detailed here: [oregonstate.edu/studentconduct/feature-stories/student-conduct-code](http://oregonstate.edu/studentconduct/feature-stories/student-conduct-code)

**Students with Disabilities:** "Accommodations are collaborative efforts between students, faculty and Services for Students with Disabilities (SSD). Students with accommodations approved through SSD are responsible for contacting the faculty member in charge of the course prior to or during the first week of the term to discuss accommodations. Students who believe they are eligible for accommodations but who have not yet obtained approval through SSD should contact SSD immediately at 541-737-4098."

**Make-up Policy:** Make-up exams will only be granted under exceptional circumstances (e.g., serious illness, accident, family emergency, or university-approved function) and proof is required beforehand. Please give me as much advance notice as possible. Make-up exams are proctored through the main Psychology office, and must be scheduled sometime between the hours of 10:30am – 2:30pm. After you have provided documentation of your need and have received my permission via email, please call 541-737-2311 to make an appointment for a make-up exam session. The make-up exam must be taken within 48 hours (before or after) of the in-class test. After you have scheduled a make-up exam, please email me the time and date of your scheduled exam so that I can make sure an exam is ready for you when you arrive for your appointment.

**Evaluation:** Your grade will be based on a midterm exam (20%), a final exam (20%), 4 brief one-page papers (15%), 4 journal article critiques (15%), a journal article group presentation (10%), as described on the next page, and a research proposal presentation (20%), as described below. The final exam will not be cumulative (but may include earlier concepts to the extent that they are used in lecture). You will need to bring a Scantron Form No. 95677 and a #2 pencil for exams.

**Research Proposal Presentation:** Design an experiment to test your own idea about an aspect of applied cognition. Start generating potential ideas as early as possible and discuss them with me before settling on your hypothesis, which should be specific and tractable (due by 1/23). The presentations will be given in class on 3/11, and slides are due by 2/27, so that you can get peer feedback by 3/6. The slides should include an introduction containing background/relevant literature (at least 8 articles) and your hypothesis, a methods section including your research design, participants, and procedures, a results section with how you plan to analyze your results, possible results or pilot results (if available), and a discussion including interpretations and implications. The presentation should be 20 min long + 5 min afterward for questions.

**Extra Credit Opportunities:** You may submit a one-paged paper on “a day in the life of” career profile for a specific type of applied cognitive psychologist. I gave some examples of these in Lecture 1. List job duties, skills/qualifications, and describe a typical day at the job. Up to 2 of these may be submitted, and each is worth up to 1% added to your grade. Turn in by Friday of Week 10.
Brief One-page Papers:
1. Virtual or augmented reality study: your idea for a virtual or augmented reality experiment to test one of the issues that we discussed in class. You will need to clearly identify the following: your hypothesis, how you plan to test your hypothesis (method), which course topic it relates to, and why virtual or augmented reality would be required (rather than some other method).
2. Example of a bad design and how to fix it: take a picture of a product that exemplifies bad human factors design. Paste the picture into your paper and explain what is wrong with it. Offer suggestions on how it could be improved according to the fundamental principles of interaction in your Ch. 1 reading.
3. Usability testing: Choose one of the standardized usability questionnaires, and describe how you would use it to perform user testing on a specific product. Write down your own answers to the test items, and comment on the usability of your chosen product. What is a potential disadvantage of using a questionnaire?
4. Automation: Describe one aspect of human performance that has been automated. How has this automation improved efficiency, enhanced safety, and reduced operator workload? How has it introduced new problems or led to incidents and accidents? What is the level of automation, according to the 8-point scale in Figure 16.1 of Ch. 16. Do you think that this level is appropriate or not and why? Would this automation likely lead to problems of over-trust or under-trust and why?

Journal Article Critiques: Journal articles will be posted on Blackboard one week before the critique is due. Critiques are due at the beginning of class. If you have to miss class, you must email it to me by that time. Here are the questions you must answer and submit for each critique:
- What was the main finding, in your own words?
- What is the real-world implication or application?
- What was a weakness/limitation of the study?
- What extension/future study idea would you suggest based on their results?
- What question or comment do you have for the presenters?
There will be a total of 4 journal article critiques.

Journal Article Group Presentation: Each group will give a 25 min slide-based presentation of a journal article on an assigned topic (see schedule for presentation date). You will pair up in groups of 5 according to your interests. You will be responsible for working together to choose and present a journal article to the class. Each group must email me the article to distribute to the class at least one week in advance. Each member will present one of the following sections: Introduction – give background information and go over hypothesis, Methods – describe the setup and procedure, Results and Discussion – go through the findings step by step and say what conclusions can be drawn from them, Limitations – list problems with the study or things that could be improved, Extensions – suggest follow-up experiment ideas or potential applications. After your group presentation, you will facilitate class discussion and field questions for 5 minutes. By 11am on the date of your scheduled presentation, your group must send me the slides for your presentation.
Lecture, Readings, Brief Papers (BP), Journal Article Critiques & Presentations (JA) Schedule (subject to revision): Brief one-page papers and journal article critiques must be turned in at the beginning of class on the day that they are due. Late completion (up to 24 hrs late) will only receive half credit, and submissions thereafter will not be counted.

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<th>DATE</th>
<th>LECTURE TOPIC</th>
<th>READ</th>
<th>PAPERS, CRITIQUES, &amp; PRESENTATIONS</th>
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<td>Introduction, examples, methods</td>
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<td>2/25</td>
<td>Usability testing – self report measures</td>
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<td>2/27</td>
<td>Usability testing – behavioral measures</td>
<td>MTUE:Ch7</td>
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<td>3/17</td>
<td>Final Exam at 9:30am</td>
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Psychology 599
Behavioral Research Methods
Fall, 2015

Professor: Dr. Kristen Macuga
Office hours: Wednesday/Friday 1-2pm
229 Reed Lodge
Email: Kristen.Macuga@oregonstate.edu

Class Time and Location: Monday/Wednesday 2-3:50pm, REED 111

Class Description: This course is a graduate-level seminar on behavioral research methods. You will learn how to utilize the valuable tools and methods that psychologists use to examine the processes that underlie human behavior. Most importantly, you will develop the skills to be able to propose and design an experiment on your own. This will be achieved through a combination of readings, discussions, class exercises, and an independent project. Lectures will focus on the skills necessary for completing a research study: hypothesis formulation, design criteria, data collection, analysis, interpretation, write-up, and presentation of results. This experience will provide essential building blocks for your graduate career development.

Class Materials:

Required Reading:

- Selections from APA Handbook of Research Methods in Psychology
- Readings (pdfs) posted on course website

Readings for each week come from the handbook and/or supplementary readings (available on course website). The purpose of these readings is to prepare you for class discussions and provide guidance for designing your own study. You’re responsible for knowing (can be tested on) information from these readings even if they aren’t covered in class.

Handbook: http://osulibrary.oregonstate.edu/research_db/nojs/1651
APA Style: http://www.apastyle.org/

My Expectations:
1. Complete the readings before class. Stay on top of assignment due dates.
2. Ask questions and seek assistance if you need it. I am here to help.
3. Attendance and active participation are critical, as class only meets once a week.
4. Pick a research question that interests you. It’s easier to stay motivated that way.
5. Work hard on the draft, since the feedback you get at this stage can really improve your proposal.
6. Be respectful, enthusiastic, and prepared to learn.
Learning Outcomes:
1. Understand psychological research methods involving research design, data analysis, and interpretation
2. Learn how to effectively search for relevant peer-reviewed journal articles using online databases and cite references in APA style using Endnote
3. Critically evaluate empirical evidence and understand implications of the findings
4. Become aware of ethical standards for conducting psychological research and OSU’s IRB policies
5. Develop a proposal for an independent research project
6. Employ the scientific approach to generate a testable experimental hypothesis, select an appropriate design/analysis, and discuss possible or actual results
7. Communicate ideas to others in both written (APA style) and oral (slide-based presentation) form

Academic Honesty: All of the work you turn in must be your own, in your own words (unless citations are used), and your exams must be completed without help from others. Deviating from these standards will be considered academic dishonesty, and may result in an "F" grade for the assignment or for the course. The OSU student conduct code is at http://studentlife.oregonstate.edu/sites/studentlife.oregonstate.edu/files/student_conduct_code_1.pdf

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Make-up Policy: Make-up exams will only be granted under exceptional circumstances (e.g., serious illness, accident, family emergency, or university-approved function) and proof is required. Please give me as much advance notice as possible. Make-up exams are proctored through the main Psychology office, and must be scheduled sometime between the hours of 10:30a – 2:30p. After you have provided documentation of your need and have received my permission via email, please call 541-737-2311 to make an appointment for a make-up exam session. The make-up exam must be taken within 48 hours (before or after) of the in-class test. After you have scheduled a make-up exam, please email me the time and date of your scheduled exam so that I can make sure an exam is ready for you when you arrive for your appointment.

Writing Center: Writing Center: The OSU Writing Center provides free in-person and online assistance with drafts of writing assignments. This service is available to all students: http://cwl.oregonstate.edu/

Evaluation: Your grade will be based on research summaries (10%), a research proposal written in APA style (40%), a class presentation of your research proposal (10%), a midterm (20%), and a final (20%). Final will not be cumulative. Participation and attendance are crucial, since we will have many in-class activities and discussions, and not all lecture material is in the readings. Late penalty is 10% deduction for up to 1 day late, 20% deduction for up to 2 days late, and a score of 0% will be given thereafter.
**Research Summaries:** Everyone must complete and turn in answers to the following research summary questions for each one of the assigned research articles. These exercises are intended to give you a sense of how behavioral research is structured, conducted and written up, and will serve as guidance as you proceed through the steps of your own research project. Summaries must be typed, printed, and brought to class on the days that they are due (labeled **RS 1 - 6** on syllabus). Direct quotes from the paper are not permitted. You must use your own words.

1) Purpose of the study  
2) Hypothesis  
3) Propose your own alternate hypothesis or modification to hypothesis  
4) Potential flaws in how hypothesis was tested  
5) Statistical test used  
6) Results in your own words  
7) How well do author’s interpretations explain results? Are there gaps in logic? Is there an alternative conclusion that could be drawn?  
8) Limitations of the study  
9) Broader implications or potential applications of the results

**Research Summary Presentations:** You will be responsible for choosing and presenting a research article to the group. You must email me the article to distribute to the class at least 1 week in advance. On the scheduled date of your presentation, you will present a summary to the class using the questions above and facilitate class discussion (25 minutes). These are intended to help prepare you for speaking in front of the group, so that you may feel more at ease during the class presentations of your own research proposal.

**Online Ethics Training (CITI Course):** OSU Institutional Review Board (IRB) requires education in the protection of human research participants. The CITI Course is online at [citiprogram.org](http://citiprogram.org). You will need to complete all required modules and one of the elective modules for “Group 1: Social/Behavioral Research Investigators and Key Personnel” and pass at a score of 80% or better. Once a passing score is obtained, the CITI system automatically generates a certificate of completion and forwards it to the OSU IRB. Please print this certificate and turn it in by **10/19**.

**Research Proposal:** Hopefully, this proposal will provide the basis for your thesis or other degree-related research. Your research question is due on **10/7**. A draft of the introduction and methods section is due on **11/16**. The final proposal is due on **12/4**. It should be written and referenced in APA style with an abstract, an introduction containing background/relevant literature (at least 8 articles) and your hypothesis, a methods section including your research design, participants, and procedures, a results section with how you plan to analyze your results, possible results or pilot results (if available), a discussion including interpretations and implications, and a reference list. More information about completing the proposal will be given in class.
Class Presentations:
During Week 10, on 11/30 or 12/2, you will each give a 20 minute slide-based presentation of your research proposal + a 5 minute Q and A. Consider this an opportunity to share your hard work with others, practice conveying science to an audience, and get valuable feedback for refining your proposal.

Lecture Schedule and Readings: Chapters are from the APA handbook. Readings (pdfs) will be available for download on the course website. RS = Research Summary Presentation. Any necessary changes to the syllabus and/or schedule will be posted online and announced in lecture. See next page for schedule.
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<td>Assessing the literature, Guest lecture - Stefanie Buck (Autzen room)</td>
<td>Vol1:Ch8, Research question due</td>
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<td><strong>Week 3</strong></td>
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<td>10/12</td>
<td>Citing references, Guest lecture - Stefanie Buck (Autzen room)</td>
<td>Complete tutorial: apastyle.org/learn/tutorials/basics-tutorial.aspx</td>
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<td>10/14</td>
<td>Ethics, Guest lecture - IRB Coordinators</td>
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<td>Vol1:Ch32, CITI certificate due</td>
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<td>Research design and experimental control</td>
<td>Vol2:Ch25, RS2(dropped)</td>
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<td>11/2</td>
<td>Research techniques</td>
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<td>Reporting results; Effect sizes</td>
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<td>11/16</td>
<td>Grad school resources and tips, Guest lecture - Brenda McComb</td>
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<td>Preparing a manuscript</td>
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<td>12/4</td>
<td>Research proposal due</td>
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<td>12/10</td>
<td>Final 9:30-11:20am</td>
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Psychology 599
Visual Perception
Spring, 2016

Professor: Dr. Kristen Macuga
Office hours: TBA
229 Reed Lodge
Email: Kristen.Macuga@oregonstate.edu

Class Time and Location: Monday/Friday 2-3:50pm, TBA

Class Description: In this graduate course, a variety of demonstrations, lectures, and class discussions will be used to allow you to appreciate the complexity of the visual system. We will look behind the scenes at the underlying psychological and biological processes that allow us to see and occasionally result in visual illusions. Research in neuroscience, neuropsychology, and psychophysics will be explored.

Class Materials:

Book Webpage: http://www.oup.com/uk/orc/bin/9780199572021/

Required Reading:

- Basic Vision: An Introduction to Visual Perception by Snowden, Thompson, & Troscianko, revised edition

The readings for each lecture will come from the textbook and/or supplementary readings (available on Canvas). The purpose of these readings is to strengthen your understanding of the material we discuss in class. You are responsible for knowing (i.e. can be tested on) information in the textbook and readings even if it is not covered in class.

Additional Reading (not required): 2 other textbooks (one by Goldstein and one by Sekuler and Blake) are available on reserve in the library if you feel that you need some review (especially for those of you who have not taken PSY 442).

Learning Outcomes:
By the end of the course, students should be able to:

1. Summarize concepts, theories, and experimental findings
2. Critically evaluate research in the literature or media
3. Understand and use psychological methods to examine cognitive processes
4. Apply knowledge to examine everyday experience
My Expectations:
1. Attendance is important since we will have many interesting demonstrations and discussions, and some lecture material is not in the textbook.
2. Complete assigned readings before class. Do not let yourself get behind!
3. Seek assistance if you need it. Come to office hours. I am here to help.
4. Participate in class and ask questions. Please don’t worry about asking a “stupid” question. Chances are that other students in the class have similar questions.

Academic Honesty: All of the work you turn in must be your own, in your own words (unless citations are used), and your exams must be completed without help from others. Deviating from these standards will be considered academic dishonesty, and may result in an "F" grade for the assignment or for the course. The OSU student conduct code is at http://studentlife.oregonstate.edu/sites/studentlife.oregonstate.edu/files/student_conduct_code_1.pdf

Students with Disabilities: "Accommodations are collaborative efforts between students, faculty and Services for Students with Disabilities (SSD). Students with accommodations approved through SSD are responsible for contacting the faculty member in charge of the course prior to or during the first week of the term to discuss accommodations. Students who believe they are eligible for accommodations but who have not yet obtained approval through SSD should contact SSD immediately at 541-737-4098."

Make-up Policy: Make-up exams will only be granted under exceptional circumstances (e.g., serious illness, accident, family emergency, or university-approved function) and proof is required. Please give me as much advance notice as possible. Make-up exams are proctored through the main Psychology office, and must be scheduled sometime between the hours of 10:30a – 2:30p. After you have provided documentation of your need and have received my permission via email, please call 541-737-2311 to make an appointment for a make-up exam session. The make-up exam must be taken within 48 hours (before or after) of the in-class test. After you have scheduled a make-up exam, please email me the time and date of your scheduled exam so that I can make sure an exam is ready for you when you arrive for your appointment.

Writing Center: Writing Center: The OSU Writing Center provides free in-person and online assistance with drafts of writing assignments. This service is available to all students: http://cwl.oregonstate.edu/

Evaluation: Your grade will be based on 2 midterm exams (15% each), a final exam (35%), 5 homework assignments (20%), and a class presentation (15%). The final exam will not be cumulative (but may include earlier concepts to the extent that they are used in lecture). You will need to bring a Scantron Form No. 95677 and #2 pencils for exams.

Lecture Schedule and Readings: Chapter assignments are from the Snowden et al. textbook. Readings (pdfs) will be available for download on Canvas. Any necessary changes to the syllabus and/or schedule will be announced in lecture and updated on Canvas. Check Canvas regularly for announcement, grade postings, and schedule changes.
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<td>Introduction, approaches, methods</td>
<td>Chapters 0 and 12</td>
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<td>4/22</td>
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<td>4/25</td>
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