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

5 January 2017

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. This listing is subject to change. Check the OSU Catalog and with the units offering the courses for the latest information.

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* Not offered 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

**CS 519. RESEARCH METHODS IN HCI.**

HCI is often the subject of these special topics courses. Consult the OSU catalog for upcoming offerings.

PREREQS: vary with topic

OFFERINGS: F every year

**CS 569. EMPIRICAL LAB STUDIES (4).**

This is a four-credit course graduate course. This course will cover how you go about designing, preparing for, running, analyzing, and writing-for-publication lab experiments of programming situations involving human subjects. This is an end-to-end coverage of the entire process, and will put you in a position to conduct lab studies of your own with human subjects and guidelines in how to analyze the study results.

PREREQS: Graduate standing and interest in the course

OFFERINGS: usually every other winter

**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: winter every year

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 599. ST/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

IE 599. ST/DESIGN OF HUMAN FACTORS/ERGONOMICS EXPERIMENTS (4).

This course is designed to provide graduate students with introductions to a broad range of methods appropriate for studying humans, tasks, environments and their interaction along with various topics in the area of Human Factors/Ergonomics. This course will have a reading/discussion format.
At the end of this course, students are expected to be able to:
• Learn knowledge of human factors/Ergonomics terminology, equipment, models and various research areas related to human factors.
• Become proficient in reviewing published research papers in the human factors area.
• Gain familiarity with the content and characteristics of different types of human factors journals.
• Design human factors/ergonomics experiments to solve research questions using proper methodologies.
• Select proper statistical methods to analyze data.
• Formulate research proposals in an appropriate format
PREREQS: IE 545
OFFERINGS: S 2017
NOTES: Course schedule is TBD

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: W 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 514 RESEARCH METHODS I (4).
An introduction to the tools and methods that psychologists use to examine the processes that underlie human behavior. Emphasis is on the skills necessary for completing a research study: hypothesis formulation, design criteria, data collection, analysis, interpretation, write-up, and presentation of results. Utilizes a combination of readings, discussions, and class exercises. Course culminates in an independent research project proposal.
PREREQS: Graduate standing
OFFERINGS: W every year
NOTES: Was PSY 599 BEHAVIORAL RESEARCH METHODS.

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 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.