

Syllabus: Advanced Occupational Ergonomics

Course Number: GSLL 2030

Course Credits: Certificate of Completion in Occupational Ergonomics Awarded, Non-credit course. May be taken through your university as independent study credit or as CEUs through your professional organization / employer program.

Instructors

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Prerequisites

There are no prerequisites required for this course. All concepts and principles are explained through instructor designed video presentations, presentation notes, self-directed short application projects and suggested readings. **No textbook is required.**

Class Meetings and Location

This course is designed to be an off-campus, adult education class taken through the Canvas Learning Management System at Colorado State University. Students are not expected to come to Colorado State University. All course related communications and interactions occur through the instructor and teaching assistant via email. All video presentations, quizzes and projects are delivered and measured through the *Canvas Learning Management System*. Every student enrolled in the course will receive free access with instructions to the Canvas System.

Course Duration

This course is to be completed during the scheduled 6-month period (January 1 to June 15th or July 1 to December 15th). Students must complete all video modules, quizzes and short application projects exercises within the time allotted. Access will be closed at the end of the 6-month time period.

We recommend that students complete two modules each week. However, this course is self-paced allowing students to progress faster or slower depending on their schedules.

Materials

All course materials (video presentations, PowerPoint presentation notes, quizzes, application projects and selected readings) are provided through the Canvas Learning System. The course is divided into 26 video presentation modules covering the broad topics related to Occupational Ergonomics. Each video presentation is approximately 30 to 40 minutes in length. Each video presentation has PowerPoint presentation notes (in PDF) that follow along with the topics discussed. Some modules have suggested readings for additional information on that topic. At the end of each video module is a 15-item quiz to test your knowledge of the material covered.

The Certificate of Completion in Occupational Ergonomics

At the successful completion of this online course, the student will receive a signed Certificate of Completion in Advanced Occupational Ergonomics from Colorado State University. Successful completion is defined as a score of $\geq 80\%$ on the total points of the quizzes and short application projects.

Although this course is designed to address components of the core competencies outlined by the Board of Certification in Professional Ergonomics (BCPE) <http://www.bcpe.org/>, this course does not directly lead to certification in professional ergonomics from the BCPE. This course is designed to provide additional content in two of the four broad core competencies, specifically the BCPE competencies in *Ergonomic Analysis* and *Ergonomic Design* (see <http://www.bcpe.org/why-certify/core-competencies/>).

Course Content

The online Advanced Occupational Ergonomics course focuses on the human-work interaction. The curriculum provides beginning through advanced level knowledge, skills and competencies in occupational ergonomics (see Course Units and Modules below). This comprehensive course is appropriate for individuals with no experience in ergonomics and those looking for more advanced training and skills. Individuals completing the course will be able to apply concepts and principles of ergonomics to identify, develop, implement and evaluate design solutions to ergonomic challenges in the work environment.

Course Focus and Objectives

The course content is focused around four general goals of occupational ergonomics including:

- 1) improved work efficiency and productivity,
- 2) enhanced quality of products and or services,
- 3) reduced injuries and illnesses, and
- 4) enhanced quality of work life.

Course Objectives - At the completion of the course the student participant will be able to:

- Outline the historical contributions related to modern work processes.
- Prepare for an on-site ergonomics risk assessment of specific job tasks.
- Discuss how workstation organization and layout, equipment, and work processes influence the risk of musculoskeletal disorders and how to prevent them through ergonomics design.
- Analyze workplace design using the principles of anthropometry, occupational biomechanics, work physiology and epidemiology.
- Apply anthropometry tables for evaluation and design criteria.
- Identify engineering solutions to improve production efficiency and reduce the risk of musculoskeletal disorders.
- Analyze ergonomics design principles for manual materials handling tasks.
- Apply the NIOSH Lifting Equation for manual material handling tasks and develop interventions based on the Lifting Equation parameters.
- Identify the changing needs of the existing and future workforce.
- Apply the use of ergonomic risk assessment tools including: Rapid Entire Body Assessment (REBA), Rapid Upper Limb Assessment (RULA), Rodgers Muscle Fatigue Analysis, Hand Activity Level (HAL) and the Revised Strain Index.
- Identify the association or causation between occupational and non-occupational risk factors and musculoskeletal disorders.
- Apply ergonomic principles to office workstations and design the office layout to reduce the negative health effects of prolonged sitting.
- Apply the use of the OSHA computer workstation evaluation in an office environment.
- Discuss how telepressure, shift work and sleep issues affect and influence job performance as they relate to absenteeism and presenteeism.
- Define work stress and solutions to reduce related adverse health outcomes.
- **Diagram the essential elements of an ergonomic process.**
- Conduct the 5-step ergonomics problem solving process to develop successful solutions specific to the needs of the workplace environment.
- Conduct cost-benefit analyses and return on investment (ROI) calculations to justify proposed ergonomic solutions.
- Understand the certification process for professional ergonomists as outlined by the Board of Certification in Professional Ergonomists.
- Demonstrate competency through the successful completion of three applied work projects and 390 exam (quiz) questions.

Module Learning Objectives

Each video module (and accompanying presentation notes) begins with a set of specific learning objectives for the topic(s) covered.

Methods of Performance Evaluation

Each video presentation is followed by a quiz that must be completed. Additionally, there are six short application projects to complete within selected modules.

There are 15 questions per quiz (15 points total). Students have 2-hours to complete the quiz. Short application projects are worth 30 points each. You are required to complete at least three of the six application projects. You can choose which three to complete. If you choose to complete more than three projects, the points will be added to your total as extra credit.

Student participants are evaluated based on the quizzes and projects completed. There are 26 modules, each with a 15-question quiz.

Possible quiz points = 390.

Possible application project points = 90.

Course exit survey points = 10.

Total points (excluding extra credit) = 490

Letter Grading

A= >90% (441 points) and completion of at least three application projects

B= >80% (392-440 points) and completion of at least three application projects

C= >70% (343-391 points) and completion of at least three application projects

Pass / Fail Grading – Pass \geq 80% (\geq 392 points) and completion of at least three application projects

Each student participant that completes the course with a passing grade will receive a Certificate of Completion in Advanced Occupational Ergonomics from Colorado State University

Accommodations

Students with special needs or limitations will be accommodated by the University to the best of our ability given the resources available. Please notify the instructor of any special needs that you have relative to this course.

If your employer or academic institution needs a transcript or letter of verification of completion in addition to a copy of your certificate, please contact Professor Rosecrance. A letter will be provided at no charge but early planning is appreciated.

Outline of Course Units and Modules

UNIT A: Introduction to Ergonomics	
<i>Module #</i>	<i>Title</i>
1	Introduction to the Course and Instructor(s)
2	Introduction to Occupational Ergonomics
UNIT B: Principles of Occupational Ergonomics	
3	History and Contributors to Current Work Practices
4	Basics of Anthropometrics
5*	Application of Anthropometrics
6*	Work Physiology
7	Occupational Biomechanics
8	Epidemiology and Research Design in Ergonomics
9	Ergonomic Exposure Assessment Principles
UNIT C: Musculoskeletal Disorders and Risk Assessment	
10	Upper Extremity Anatomy and Musculoskeletal Disorders
11	Upper Extremity Disorders and Associated Risk Factors
12*	Upper Extremity Risk Assessment Tools
13	Back Anatomy and Structure
14	Back Disorders and Risk Factors
15*	Low Back Risk Assessment: The NIOSH Lifting Equation
UNIT D: Physical Human-Work Interface	
16*	Ergonomic Design of Computer Workstations
17	Design and Layout for Productive and Healthy Office Work
18	Organization and Layout of Manufacturing Workstations
19	Whole Body Risk Assessment Tools
20	Direct Ergonomic Exposure Assessment Tools
UNIT E: Organizational and Systems Approach	
21	Organizational Aspects of the Human-Work Interface to Enhance Safety: Introduction to Safety
22	Designing Work with Systematic Procedures to Enhance Safety
23	Occupational Health Psychology and Perspectives on Work Stress
24	Absenteeism, Presenteeism, Sleep and the Workplace
25*	Safety and Ergonomics Culture in the Workplace
26	Ergonomic Programs and Processes

* Indicates that module has an application project.