Course Description

Review of the principles and practices of ergonomics as it applies to the industrial environment. Demonstrates how to collect data on users and operators and how to convert the data to good workplace design.

Prerequisites

None

Course Textbook


Course Learning Objectives

Upon completion of this course, students should be able to:

1. Specify and design ergonomically appropriate industrial workstations for the industrial and office work environment.
2. Identify information-centered human factors relating to visual, illumination, controls, displays and symbols.
3. Compare, contrast and assess human body-centered ergonomic designs for posture, material handling, repetitive motion factors, heat stress, noise and vibration.
4. Examine and evaluate organizational or management-centered ergonomic factors for training, skills and cognitive task analysis.
5. Define the ergonomic factors intrinsic in evaluating accidents, human errors and safety related incidents.
6. Illustrate and assess the ergonomic factors in computer work station design.
7. Discuss and identify key components of cost-benefit analysis in human factors and ergonomic design.
8. Summarize key components in conducting a human factors or ergonomics related investigation.

Credits

Upon completion of this course, the students will earn three (3) hours of college credit.

Course Structure

1. **Unit Learning Objectives:** Each unit contains Unit Learning Objectives that specify the measurable skills and knowledge students should gain upon completion of the unit.
2. **Written Lectures:** Each unit contains a Written Lecture, which discusses lesson material.
3. **Reading Assignments:** Each unit contains Reading Assignments from one or more chapters from the textbook. Supplemental Readings are provided in the unit study guides to aid students in their course of study.
4. **Learning Activities (Non-Graded):** These non-graded Learning Activities are provided to aid students in their course of study in Units I, III, V, VI, and VII.
5. **Key Terms:** Key Terms are intended to guide students in their course of study. Students should pay particular attention to Key Terms as they represent important concepts within the unit material and reading.
6. **Unit Assessments**: This course contains six Unit Assessments, one to be completed at the end of Units I-III and V-VII. Assessments are composed of multiple-choice questions and/or written response questions.

7. **Unit Assignments**: Students are required to submit for grading Unit Assignments in Units II, IV, V, and VIII. Specific information and instructions regarding these assignments are provided below.

8. **Final Exam (Proctored)**: Students are to complete a Final Exam in Unit VIII. All Final Exams are proctored—see below for additional information. You are permitted four (4) hours to complete this exam, in the presence of your approved proctor. This is an open book exam.

9. **Ask the Professor**: This communication forum provides you with an opportunity to ask your professor general or course content related questions.

10. **Student Break Room**: This communication forum allows for casual conversation with your classmates.

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**Unit Assignments**

**Unit II PowerPoint Presentation**

Create a 7-10 slide presentation on information processing and design. You may use various sources including your textbook. Be sure to cite any sources used in a reference slide with proper APA formatting. (Cover and reference slides do not count). You may also use the slide notes function to explain slide contents as necessary.

Be sure to include the following information in your presentation:
- Description of the structure and function of the eye
- How to measure illuminance and luminance
- Cost efficiency of illumination
- Information processing theories
- Capabilities and limitations of various information input mechanisms factors in the design of interfaces between humans and computers

**Unit IV Case Study**

Back Belts: You are the Safety Manager at a production manufacturing facility that has had a high number of recordable and reportable back injuries in the warehouse and production areas over the past year and half. The plant manager has assigned you the task of “doing something about it – YESTERDAY.”

Prepare a short paper on the subject of black belts and their use in preventing back injuries. The paper will review information from at least one manufacturer and you are to review the information available from NIOSH as well.

Discuss their use and describe the research on their effectiveness. Would you recommend the use of the belts and under what circumstances as part of your overall approach to the problem at your plant? Are there any requirements or instances where you would not permit the use of these devices? What other materials/ programs/training would you use to supplement the use, or non-use, of back belts?

**Instructions**

The Case Study assignment for this course is based on the material listed above for back belts, and should include the following components:

1. A brief introduction of the topic
2. Background information from at least one manufacturer of back belts
3. Background information from NIOSH
4. Analysis of the key points in the case study answering the key questions identified above
5. Summary of the case study's conclusions and your own opinions

The assignment should be a minimum of 2 pages to a maximum of 4 pages, and should be double-spaced. CSU requires that students use the APA format in writing course papers. Therefore, the APA rules for formatting, quoting, paraphrasing, citing, and listing of sources are to be followed. For comprehensive information on APA formatting, you are encouraged to use the Research Database found in the CSU Online Library located in the course menu.

The Ebsco Database (Business Source Complete) is the best source of journals for safety related articles. Students can access the CSU Online Library resources by clicking the My Library button on the Course Menu.

To submit your completed Case Study, upload using the “View/Complete” link located in Unit IV.
Unit V Scholarly Activity

Work Related Injury/Stress Analysis

Submit Parts 1, 2, and 3 as one word document. Separate each part in the document with a page break.

Part 1: (30pts) (minimum of 200 words)

Complete the knife analysis exercise on p. 223 of the textbook. Describe the differences in the knives shown in Figure 11.8. Discuss the results of the analysis and provide reasons why it is important to have so many types of knives.

Part 2: (40pts) (minimum of 200 words)

Analyze the effect of each measure in the Equation for heat stress in Table 12.3 on p. 235 in the textbook: M-W=C+R+E

Discuss what measures would be practical to reduce heat stress, and why some measures would not be practical in the following environments:

- A deep underground metal mine where the temperature is 90 degrees with 99% humidity.
- An office at 90 degrees and 50% humidity.
- Outdoor tennis game at 90 degrees and 50% humidity.

Part 3: (30pts) (minimum of 200 words)

Discuss Poulton's and Broadbent's Theories on the effects of noise on performance.

Discuss the positive and negative effects of noise on:

- Repetitive assembly
- Performance in problem solving

Unit VIII Case Study

Select one of the three NIOSH Health Hazard Evaluations listed below, and perform a critical analysis of the report.


Discuss:

1. The ergonomic issues involved
2. The research conducted (and what type of study)
3. The findings and recommendations, and
4. Any other significant point

Please include comments on the following:

1. What did you learn in this review?
2. What more would you like to have seen discussed?

Instructions

Your answer to this assignment should be two to four pages, double-spaced, with one inch margins and no more than a 12 pitch font. It is suggested that you prepare your response in a word processor. This will allow you to better articulate and spell-check your answers. The assignment requires that you use your text and at least two other references and readings, which pertain to the topic in question.
CSU requires that students use the APA format in writing course papers. Therefore, the APA rules for formatting, quoting, paraphrasing, citing, and listing of sources are to be followed. For comprehensive information on APA formatting, you are encouraged to use the Research Database found in the CSU Online Library located in the course menu.

**Submitting Course Papers/Projects**

Once you have completed your papers/projects, submit your completed papers/projects by uploading through the "view/complete" link under the Assignment tab in each unit. **Do not e-mail your paper directly to your professor.** By using the Assignment tab, your university record will automatically be updated to indicate you have submitted your papers/projects and the assignment will be provided to your professor for grading. Instructions for submitting your assignment can be found under the Assignment tab in each unit.

**APA Guidelines**

CSU requires that students use the APA style for papers and projects. Therefore, the APA rules for formatting, quoting, paraphrasing, citing, and listing of sources are to be followed. A document titled “APA Guidelines Summary” is available for you to download from the APA Guide Link, found in the Learning Resources area of the myCSU Student Portal. It may also be accessed from the Student Resources link on the Course Menu. This document provides links to several internet sites that provide comprehensive information on APA formatting, including examples and sample papers.

**CSU Grading Rubric for Papers/Projects**

The course papers will be graded based on the CSU Grading Rubric for all types of papers. In addition, all papers will be submitted for electronic evaluation to rule out plagiarism. Course projects will contain project specific grading criteria defined in the project directions. To view the rubric, click the Academic Policies link on the Course Menu, or by accessing the CSU Grading Rubric link, found in the Learning Resources area of the myCSU Student Portal.

**Final Examination Guidelines**

Final Exams are to be administered to students by an approved Proctor. CSU approves two, flexible proctoring options: a standard Proctor, who is chosen by the student and approved by the university, or Remote Proctor Now (RP Now), an on-demand, third-party testing service that proctors examinations for a small fee.

A standard Proctor is an unbiased, qualified individual who is selected by the student and agrees to supervise an examination. You are responsible for selecting a qualified Proctor, and the Proctor must be pre-approved by CSU.

Students choosing RP Now must have an operational webcam/video with audio, a high-speed internet connection, and the appropriate system rights required to download and install software.

To review the complete Examination Proctor Policy, including a list of acceptable Proctors, Proctor responsibilities, Proctor approval procedures, and the Proctor Agreement Form, go to the myCSU Student Portal from the link below.

[http://mycsu.columbiasouthern.edu](http://mycsu.columbiasouthern.edu)

You are permitted four (4) hours to complete this exam, in the presence of your approved Proctor. This is an open book exam. Only course textbooks and a calculator, if necessary, are allowed when taking proctored exams.

**Communication Forums**

These are non-graded discussion forums that allow you to communicate with your professor and other students. Participation in these discussion forums is encouraged, but not required. You can access these forums with the buttons in the Course Menu. Instructions for subscribing/unsubscribing to these forums are provided below.

**Once you have completed Unit VIII, you MUST unsubscribe from the forum; otherwise, you will continue to receive e-mail updates from the forum. You will not be able to unsubscribe after your course end date.**
Ask the Professor

This communication forum provides you with an opportunity to ask your professor general or course content questions. Questions may focus on Blackboard locations of online course components, textbook or course content elaboration, additional guidance on assessment requirements, or general advice from other students.

Questions that are specific in nature, such as inquiries regarding assessment/assignment grades or personal accommodation requests, are NOT to be posted on this forum. If you have questions, comments, or concerns of a non-public nature, please feel free to email your professor. Responses to your post will be addressed or emailed by the professor within 48 hours.

Before posting, please ensure that you have read all relevant course documentation, including the syllabus, assessment/assignment instructions, faculty feedback, and other important information.

Student Break Room

This communication forum allows for casual conversation with your classmates. Communication on this forum should always maintain a standard of appropriateness and respect for your fellow classmates. This forum should NOT be used to share assessment answers.

Grading

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<th>Component</th>
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<tr>
<td>Unit Assessments (6 @ 5%)</td>
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<td>PowerPoint Presentation</td>
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<td>Case Studies (2 @ 10%)</td>
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<td>Scholarly Activity</td>
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<td><strong>Total</strong></td>
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Course Schedule/Checklist (PLEASE PRINT)

The following pages contain a printable Course Schedule to assist you through this course. By following this schedule, you will be assured that you will complete the course within the time allotted.
By following this schedule, you will be assured that you will complete the course within the time allotted. Please keep this schedule for reference as you progress through your course.

<table>
<thead>
<tr>
<th>Unit I</th>
<th>Introduction and Information-Centered Human Factors</th>
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| Review: | □ Unit Study Guide  
          □ **Learning Activities (Non-Graded):** See Study Guide |
| Read:   | □ Chapter 1: Introduction to Human Factors and Ergonomics  
          □ Chapter 2: Cost-Benefit Analysis of Improvements in the Human Factors Design  
          □ Chapter 3: Conducting a Human Factors Investigation  
          □ **Supplemental Reading:** See Study Guide |
| Submit: | □ Assessment |

Notes/Goals:

<table>
<thead>
<tr>
<th>Unit II</th>
<th>Visual Design, Processing, Controls and Computer Interaction</th>
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<td>□ Unit Study Guide</td>
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| Read:   | □ Chapter 4: Visual and Illumination Design  
          □ Chapter 5: Human Information Processing  
          □ Chapter 6: Design of Controls, Displays and Symbols  
          □ Chapter 7: Design of Human-Computer Interaction  
          □ **Supplemental Reading:** See Study Guide |
| Submit: | □ Assessment  
          □ PowerPoint Presentation  
          □ Proctor Approval Form |

Notes/Goals:

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<th>Unit III</th>
<th>Human-Body-Centered Ergonomics</th>
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| Review:  | □ Unit Study Guide  
          □ **Learning Activities (Non-Graded):** See Study Guide |
| Read:    | □ Chapter 8: Anthropometry in Workstation Design  
          □ Chapter 9: Work Posture  
          □ Chapter 10: Manual Materials Handling  
          □ **Supplemental Reading:** See Study Guide |
| Submit:  | □ Assessment |

Notes/Goals:
### Unit IV

**Case Study 1**

**Review:**
- Unit Study Guide

**Read:**
- **CSU Online Library:**
- **Supplemental Reading:** See Study Guide

**Submit:**
- Case Study

**Notes/Goals:**

### Unit V

**Repetitive Motion Injury, Hand Tool Design, Physical Workload, Heat Stress, Noise and Vibration**

**Review:**
- Unit Study Guide
- **Learning Activities (Non-Graded):** See Study Guide

**Read:**
- **Chapter 11:** Repetitive Motion Injury and Design of Hand Tools
- **Chapter 12:** Physical Workload and Heat Stress
- **Chapter 13:** Noise and Vibration
- **Supplemental Reading:** See Study Guide

**Submit:**
- Assessment
- Scholarly Activity

**Notes/Goals:**

### Unit VI

**Organizational and Management Centered Human Factors**

**Review:**
- Unit Study Guide
- **Learning Activities (Non-Graded):** See Study Guide

**Read:**
- **Chapter 14:** Ergonomics of Computer Workstations
- **Chapter 15:** Training, Skills, and Cognitive Task Analysis
- **Chapter 16:** Shift Work
- **Supplemental Reading:** See Study Guide

**Submit:**
- Assessment

**Notes/Goals:**
# BOS 3701, Industrial Ergonomics

## Unit VII
### Designing for Manufacture and Maintenance, Accidents and Safety

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### Notes/Goals:

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## Unit VIII
### Case Study 2

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