SAFE20017 *Human Factors in Complex Systems*
Term 2 - 2020

Profile information current as at 14/12/2025 06:35 am

General Information

Overview
This advanced level unit introduces you to the practices and principles of Human Factors and examines the ways that humans function in complex socio-technical environments and organisational safety systems. This unit discusses the core principles of physical, cognitive, organisational and environmental ergonomics and provides the foundational knowledge required for the discipline of Human Factors. You will learn and apply knowledge in the area of anthropometric variation of the human body to end-user design enhancements as well as discussing concepts of job design in relation to psychological considerations including mental workloads, fatigue management, teamwork and job-fit concepts.

Details
Career Level: *Postgraduate*
Unit Level: *Level 8*
Credit Points: *6*
Student Contribution Band: *8*
Fraction of Full-Time Student Load: *0.125*

Pre-requisites or Co-requisites
There are no requisites for this unit.
Important note: Students enrolled in a subsequent unit who failed their pre-requisite unit, should drop the subsequent unit before the census date or within 10 working days of Fail grade notification. Students who do not drop the unit in this timeframe cannot later drop the unit without academic and financial liability. See details in the Assessment Policy and Procedure (Higher Education Coursework).

Offerings For Term 2 - 2020

- Online

Attendance Requirements
All on-campus students are expected to attend scheduled classes – in some units, these classes are identified as a mandatory (pass/fail) component and attendance is compulsory. International students, on a student visa, must maintain a full time study load and meet both attendance and academic progress requirements in each study period (satisfactory attendance for International students is defined as maintaining at least an 80% attendance record).

Website
This unit has a website, within the Moodle system, which is available two weeks before the start of term. It is important that you visit your Moodle site throughout the term. Please visit Moodle for more information.

Class and Assessment Overview

Recommended Student Time Commitment

Each 6-credit Postgraduate unit at CQUniversity requires an overall time commitment of an average of 12.5 hours of study per week, making a total of 150 hours for the unit.

Class Timetable

Regional Campuses
Bundaberg, Cairns, Emerald, Gladstone, Mackay, Rockhampton, Townsville

Metropolitan Campuses
Adelaide, Brisbane, Melbourne, Perth, Sydney

Assessment Overview

1. **Group Discussion**
Weighting: 20%
2. **Written Assessment**
Weighting: 40%
3. **Written Assessment**
Weighting: 40%

Assessment Grading

This is a graded unit: your overall grade will be calculated from the marks or grades for each assessment task, based on the relative weightings shown in the table above. You must obtain an overall mark for the unit of at least 50%, or an overall grade of 'pass' in order to pass the unit. If any 'pass/fail' tasks are shown in the table above they must also be completed successfully ('pass' grade). You must also meet any minimum mark requirements specified for a particular assessment task, as detailed in the 'assessment task' section (note that in some instances, the minimum mark for a task may be greater than 50%). Consult the University's Grades and Results Policy for more details of interim results and final grades.

CQUniversity Policies

All University policies are available on the CQUniversity Policy site.
You may wish to view these policies:

- Grades and Results Policy
- Assessment Policy and Procedure (Higher Education Coursework)
- Review of Grade Procedure
- Student Academic Integrity Policy and Procedure
- Monitoring Academic Progress (MAP) Policy and Procedure – Domestic Students
- Monitoring Academic Progress (MAP) Policy and Procedure – International Students
- Student Refund and Credit Balance Policy and Procedure
- Student Feedback – Compliments and Complaints Policy and Procedure
- Information and Communications Technology Acceptable Use Policy and Procedure

This list is not an exhaustive list of all University policies. The full list of University policies are available on the CQUniversity Policy site.

Previous Student Feedback

Feedback, Recommendations and Responses

Every unit is reviewed for enhancement each year. At the most recent review, the following staff and student feedback items were identified and recommendations were made.

Feedback from Have Your Say feedback

Feedback

More Guidance for Assessment 2 would be helpful

Recommendation

More guidance for Assessment 2 will be provided through Moodle.

Unit Learning Outcomes

On successful completion of this unit, you will be able to:

1. Demonstrate an advanced level knowledge of Human Factors principles and practices across the domains of physical, cognitive, environmental and organisational ergonomics in complex systems
2. Apply knowledge of Human Factors to analyse the appropriateness of fit between end user design in relation to equipment and tasks
3. Evaluate the contribution of cognitive ergonomics in the assessment of equipment design and the introduction of new technology in complex systems
4. Discuss how the concepts of organisational job design relate to psychological considerations including mental workloads, fatigue management, team work and job-fit concepts in systems theory and its relationship to safety
5. Critique contemporary theories of human performance in complex systems.

Alignment of Learning Outcomes, Assessment and Graduate Attributes

— N/A Level ◦ Introductory Level • Intermediate Level • Graduate Level ◦ Professional Level ◦ Advanced Level

Alignment of Assessment Tasks to Learning Outcomes

Assessment Tasks	Learning Outcomes				
	1	2	3	4	5
1 - Group Discussion - 20%	•				•
2 - Written Assessment - 40%	•	•			
3 - Written Assessment - 40%			•	•	

Alignment of Graduate Attributes to Learning Outcomes

Graduate Attributes	Learning Outcomes				
	1	2	3	4	5
1 - Knowledge	◦	◦	◦	◦	◦
2 - Communication	◦	◦	◦	◦	◦

Graduate Attributes	Learning Outcomes				
	1	2	3	4	5
3 - Cognitive, technical and creative skills	○	○	○	○	○
4 - Research	○	○	○	○	○
5 - Self-management	○	○	○	○	○
6 - Ethical and Professional Responsibility				○	○
7 - Leadership				○	○
8 - Aboriginal and Torres Strait Islander Cultures					

Alignment of Assessment Tasks to Graduate Attributes

Assessment Tasks	Graduate Attributes							
	1	2	3	4	5	6	7	8
1 - Group Discussion - 20%	○	○	○	○	○	○	○	
2 - Written Assessment - 40%	○	○	○	○	○			
3 - Written Assessment - 40%	○	○	○	○	○	○	○	

Textbooks and Resources

Textbooks

There are no required textbooks.

IT Resources

You will need access to the following IT resources:

- CQUniversity Student Email
- Internet
- Unit Website (Moodle)

Referencing Style

All submissions for this unit must use the referencing style: Harvard (author-date)
For further information, see the Assessment Tasks.

Teaching Contacts

Elise Crawford Unit Coordinator
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Schedule

Week 1 - 13 Jul 2020

Module/Topic	Chapter	Events and Submissions/Topic
Introduction to Human Factors / Ergonomics	Chapter 1: Introduction to Human Factors (Bridger 2018) Chapter 2: Research methods (Stone et al. 2017)	Online Classroom Session: About this unit (Tuesday 7:00 to 7:30 pm AEST)

Week 2 - 20 Jul 2020

Module/Topic	Chapter	Events and Submissions/Topic
Physical Ergonomics I • Anthropometrics • Hand tools • Workspace Design	Chapter 3: Anthropometry (Bridger 2018)	Online Classroom Session: Task Analysis (Tuesday 7:00 to 7:30 pm AEST)

Week 3 - 27 Jul 2020

Module/Topic	Chapter	Events and Submissions/Topic
Physical Ergonomics II • Work physiology • Posture • Manual handling	Chapter 7: Work capacity, stress, fatigue and recovery (Bridger 2018)	Online Classroom Session: REBA (Tuesday 7:00 to 8:00 pm AEST)

Week 4 - 03 Aug 2020

Module/Topic	Chapter	Events and Submissions/Topic
Physical Ergonomics • Biomechanics	Chapter 2: The body as a mechanical system (Bridger 2018)	Online Classroom Session: Rev NIOSH Lifting Eq. (Tuesday 7:00 to 8:00 pm AEST)

Week 5 - 10 Aug 2020

Module/Topic	Chapter	Events and Submissions/Topic
Cognitive Ergonomics 1 • Senses and perception • Attention • Memory • Human Information Processing	Chapter 10: Visual environment (Bridger 2018) Chapter 6: Attention, memory and multitasking (Stone et al. 2017)	Online Classroom Session: Bring your questions (Tuesday 7:00 to 7:30 pm AEST) **Human Factors Group Discussions** Due: Week 5 Friday (14 Aug 2020) 11:59 pm AEST

Vacation Week - 17 Aug 2020

Module/Topic	Chapter	Events and Submissions/Topic

Week 6 - 24 Aug 2020

Module/Topic	Chapter	Events and Submissions/Topic
Video lecture: Cognitive Ergonomics 2 • Displays • Mental Workload • Usability	Chapter 12: The mind at work (Bridger 2018) Chapter 13: Displays and controls (Bridger 2018)	Online Classroom Session: Usability (Tuesday 7:00 to 7:30 pm AEST)

Week 7 - 31 Aug 2020

Module/Topic	Chapter	Events and Submissions/Topic
Video lecture: Cognitive Ergonomics 3 • Decision Making • Skill Acquisition	Prescribed Readings supplied via Moodle Text book chapter 11, pp. 303-314 Text book chapter 12, pp. 315-337	Online Classroom Session: Bring your questions (Tuesday 7:00 to 7:30 pm AEST) **Physical Ergonomics Manual Task Analysis** Due: Week 7 Friday (4 Sept 2020) 11:59 pm AEST

Week 8 - 07 Sep 2020

Module/Topic	Chapter	Events and Submissions/Topic
Organisational Ergonomics 1 • Human Error and Reliability • Fatigue • Drugs	Chapter 11: Human Error (Stone et al. 2017)	Online Classroom Session: Cognitive Task Analysis (Tuesday 7:00 to 7:30 pm AEST)

Week 9 - 14 Sep 2020

Module/Topic	Chapter	Events and Submissions/Topic
Video lecture: Organisational Ergonomics 2 • Human-Machine Interaction • Designing for End Users	Chapter 5: Method of Evaluation (Stone et al. 2017)	Online Classroom Session: Design process (Tuesday 7:00 to 7:30 pm AEST)

Week 10 - 21 Sep 2020

Module/Topic	Chapter	Events and Submissions/Topic
Organisational Ergonomics 3 • Environmental Ergonomics	Chapter 10: Environmental Design (Stone et al. 2017)	Online Classroom Session: Bring your questions (Tuesday 7:00 to 7:30 pm AEST)

Week 11 - 28 Sep 2020

Module/Topic	Chapter	Events and Submissions/Topic
Human Factors Tools, Principles and Practice	Chapter 15: HFE in Accident Investigation and Safety Management (Bridger 2018)	Online Classroom Session: Bring your questions (Tuesday 7:00 to 7:30 pm AEST)

Week 12 - 05 Oct 2020

Module/Topic	Chapter	Events and Submissions/Topic
Future Trends in Human Factors	Chapter 12: Future Trends (Stone et al. 2017)	Online Classroom Session: Bring your questions (Tuesday 7:00 to 7:30 pm AEST) **Cognitive Ergonomics Equipment Analysis** Due: Week 12 Friday (9 Oct 2020) 11:59 pm AEST

Review/Exam Week - 12 Oct 2020

Module/Topic	Chapter	Events and Submissions/Topic

Exam Week - 19 Oct 2020

Module/Topic	Chapter	Events and Submissions/Topic

Term Specific Information

The prescribed readings listed in the Schedule are drawn from the following digit text books. These eBooks are freely available to you from our Moodle site within the eReading List. Publication details are as follows for those of you who wish to purchase a personal copy.
Introduction to Human Factors First edition (2017)

- Authors: Stone, Nancy J., Chaparro, Alex, Keebler, Joseph R., Chaparro, Barbara S., and Mcconnell, Daniel S
- CRC Press
- ISBN 9781315153704
- Binding: eBook

Introduction to Human Factors and Ergonomics Fourth Edition (2018)

- Authors: Bridger, Robert
- CRC Press
- ISBN 9781498796118
- Binding: eBook

Assessment Tasks

1 Human Factors Group Discussions

Assessment Type
Group Discussion

Task Description
You are required to contribute towards a Human Factors Research Database on the Moodle site which can then be used by all students as they complete assessments 2 and 3.
You are required to:
1. Review four (4) peer reviewed journal articles, one for each of the following four topic discussion groups which are headed:-

- The Discipline of Human Factors / Ergonomics
- Physical Ergonomics
- Cognitive Ergonomics
- Organisational or Environmental Ergonomics

In **150 words or less**, your review posts (that no other student has reviewed) should include:

- Topic header: citation of the article (e.g. Smith 2020)
- A brief review of the journal article (if a research article: study aim, participants, methodology and findings; if a discussion paper: content of the theoretical argument)
- A complete reference (in CQUni Harvard Reference Style, as located in the Unit Profile)
- The attached article (pdf) for easy access for the other students

2. Reply to a student review, one for each topic discussion group in **less than 100 word**s. Requirements include:

- Four (4) reply posts (one for each topic discussion group) to other students' journal article posts.
- Extend the discussion by offering your views about the research, relating information from another source, or highlighting points of interest.

This exercise is intended to give all students a brief overview of some of the research being conducted in the field of Human Factors/Ergonomics across these four areas. This collection of students serves as a useful starting point for the other assessments you will do.
The end result is that you will have made eight (8) contributions, two posts in each of the four discussion group areas listed above, being four (4) journal article posts and four (4) reply posts. Your contributions MUST pertain to the subject matter and ADD to the human factors area under discussion. Your posts must be completed by the due date.

Assessment Due Date
Week 5 Friday (14 Aug 2020) 11:59 pm AEST

Complete all four research article reviews and all four reply posts.

Return Date to Students
Week 6 Friday (28 Aug 2020)

Weighting
20%

Assessment Criteria
Out of a possible score of 100, the marks awarded are as follows:

1. Your genuine participation and research ability demonstrated by your 4 journal article posts (80 marks); and
2. Your contribution to the students' body of knowledge in the area of Human Factors and Ergonomics demonstrated by your 4 meaningful HF replies to other students within the Moodle learning environment (20 marks).

A detailed marking rubric will be provided via the Moodle site during term.

Referencing Style

- Harvard (author-date)

Submission
Online

Submission Instructions
Once all posts have been completed in Moodle, you are to complete and submit the HF Group Discussion Template provided in Moodle.

Learning Outcomes Assessed

- Demonstrate an advanced level knowledge of Human Factors principles and practices across the domains of physical, cognitive, environmental and organisational ergonomics in complex systems
- Critique contemporary theories of human performance in complex systems.

Graduate Attributes

- Knowledge
- Communication
- Cognitive, technical and creative skills
- Research
- Self-management
- Ethical and Professional Responsibility
- Leadership

2 Physical Ergonomics Manual Task Analysis

Assessment Type
Written Assessment

Task Description
An important step in the overall Human Factors and Ergonomics discipline is the ability to identify work tasks which might result in Musculoskeletal Disorders (MSD) risks. This assessment is about developing your understanding of the principles of the assessment of these types of activities using human factors assessment tools.
You are required to choose a two-handed lift manual task activity that might result in a Musculoskeletal Disorder (MSD) being performed in your workplace or another environment, and which is suitable for analysis by the (1) Revised NIOSH Lifting Equation and then (2) either the Rapid Upper Limb Assessment (RULA) or the Rapid Entire Body Assessment (REBA) tool. A total of two tools will, therefore, be used one of which must be NIOSH. The other tool must be either RULA or REBA.
You are then required to prepare a written report which:-

1. Describes the context of the workplace or other setting and the role of the person involved;
2. Describes the actual task and physical movement being assessed;
3. Describes the MSD hazards pr issues, and potential effects which pose a problem;
4. Assesses the MSD risk score using two human factors assessment tools being (1) (NIOSH and (2) REBA or RULA (whichever is most appropriate to the task being assessed i.e. full body or upper body; and
5. Recommends changes to the task and workplace, or other environment,based on the assessment findings to improve the musculoskeletal functioning of the person performing the task.

Your report must consider the appropriateness of the fit between the end user (human) and the design of the equipment

and task being performed and contain at least five (5) peer-reviewed journal articles to support your writing (i.e.use the journal articles from the Assessment 1 Physical Ergonomics research repository and elsewhere).

Assessment Due Date
Week 7 Friday (4 Sept 2020) 11:59 pm AEST

Return Date to Students
Week 9 Friday (18 Sept 2020)

Weighting
40%

Assessment Criteria
Your assessment task will be assessed against the depth and accuracy to which you have addressed the following criteria:

1. Identifies the context of the workplace and/or setting and person involved (10 marks);
2. Describes the actual task and physical movement being assessed (10 marks);
3. Describes the MSD hazard or issues and potential effects which pose a problem (20 marks);
4. Assesses and interprets the MSD risk score using two human factors assessment tools being (1) (NIOSH and (2) REBA or RULA (whichever is most appropriate to the task being assessed i.e. full body or upper body (30 marks);
5. Recommends changes to the task or workplace based on the assessment findings to improve the musculoskeletal functioning of the person performing the task (20 marks);
6. Presentation, grammar, five journal articles and correct Harvard style referencing (10 marks)

A detailed assessment rubric will be supplied via the Moodle site during term.

Referencing Style

- Harvard (author-date)

Submission
Online

Learning Outcomes Assessed

- Demonstrate an advanced level knowledge of Human Factors principles and practices across the domains of physical, cognitive, environmental and organisational ergonomics in complex systems
- Apply knowledge of Human Factors to analyse the appropriateness of fit between end user design in relation to equipment and tasks

Graduate Attributes

- Knowledge
- Communication
- Cognitive, technical and creative skills
- Research
- Self-management

3 Cognitive Ergonomics Equipment Analysis

Assessment Type
Written Assessment

Task Description
Your task is to write a report which is an evaluation of an item of equipment or technology with regard to COGNITIVE ERGONOMICS. You are required to conduct an ergonomic evaluation of your chosen item of equipment using a Cognitive Task Analysis and prepare a formal report. The focus of the report will be on both problem identification and solution recommendations including:

1. How the equipment design/introduction does or does not match the cognitive characteristics of the users, including a discussion (key requirement) on the information processing model
2. How the equipment design/introduction of technology does or does not match organisational psychological system considerations i.e. mental workloads, fatigue management, teamwork, job-fit concepts and safety issues
3. Other identified problems (i.e. human error) identified from a cognitive task analysis and any other further issues for consideration
4. Design recommendations (solutions to problems) for improving the match between the cognitive characteristics of the users and the design of the equipment.

Your report should include at least ten (10) peer-reviewed journal articles to support your writing and analysis (i.e.use

the journal articles from the Assessment 1 Cognitive Ergonomics research repository and elsewhere). Your report should also cover the context in which the equipment is placed within the organisation.

Assessment Due Date
Week 12 Friday (9 Oct 2020) 11:59 pm AEST

Return Date to Students
Exam Week Friday (23 Oct 2020)

Weighting
40%

Assessment Criteria
Assessment is based on how well the report matches and addresses the following assessment criteria:

- How the equipment design/introduction does or does not match the cognitive characteristics of the users; and answers must include a discussion on the information processing model (10 marks)
- How the equipment design/introduction of technology does or does not match organisational psychological system considerations i.e. mental workloads, fatigue management, teamwork, job-fit concepts and safety issues (20 marks)
- Other problems (i.e. human error) identified from the task analysis or any other issues for consideration (10 marks)
- Design recommendations (solutions to problems) for improving the match between the cognitive characteristics of the users and the design of the equipment (30 marks)
- Professional report format, and accurate grammar, spelling and Harvard style referencing (10 marks).

A detailed marking rubric will be provided via the Moodle site during the term.

Referencing Style

- Harvard (author-date)

Submission
Online

Learning Outcomes Assessed

- Evaluate the contribution of cognitive ergonomics in the assessment of equipment design and the introduction of new technology in complex systems
- Discuss how the concepts of organisational job design relate to psychological considerations including mental workloads, fatigue management, team work and job-fit concepts in systems theory and its relationship to safety

Graduate Attributes

- Knowledge
- Communication
- Cognitive, technical and creative skills
- Research
- Self-management
- Ethical and Professional Responsibility
- Leadership

Academic Integrity Statement

As a CQUniversity student you are expected to act honestly in all aspects of your academic work.

Any assessable work undertaken or submitted for review or assessment must be your own work. Assessable work is any type of work you do to meet the assessment requirements in the unit, including draft work submitted for review and feedback and final work to be assessed.

When you use the ideas, words or data of others in your assessment, you must thoroughly and clearly acknowledge the source of this information by using the correct referencing style for your unit. Using others' work without proper acknowledgement may be considered a form of intellectual dishonesty.

Participating honestly, respectfully, responsibly, and fairly in your university study ensures the CQUniversity qualification you earn will be valued as a true indication of your individual academic achievement and will continue to receive the respect and recognition it deserves.

As a student, you are responsible for reading and following CQUniversity's policies, including the **Student Academic Integrity Policy and Procedure**. This policy sets out CQUniversity's expectations of you to act with integrity, examples of academic integrity breaches to avoid, the processes used to address alleged breaches of academic integrity, and potential penalties.

What is a breach of academic integrity?
A breach of academic integrity includes but is not limited to plagiarism, self-plagiarism, collusion, cheating, contract cheating, and academic misconduct. The Student Academic Integrity Policy and Procedure defines what these terms mean and gives examples.

Why is academic integrity important?
A breach of academic integrity may result in one or more penalties, including suspension or even expulsion from the University. It can also have negative implications for student visas and future enrolment at CQUniversity or elsewhere. Students who engage in contract cheating also risk being blackmailed by contract cheating services.

Where can I get assistance?
For academic advice and guidance, the Academic Learning Centre (ALC) can support you in becoming confident in completing assessments with integrity and of high standard.

What can you do to act with integrity?

Be Honest
If your assessment task is done by someone else, it would be dishonest of you to claim it as your own

Seek Help
If you are not sure about how to cite or reference in essays, reports etc, then seek help from your lecturer, the library or the Academic Learning Centre (ALC)

Produce Original Work
Originality comes from your ability to read widely, think critically, and apply your gained knowledge to address a question or problem