UNIT CODE AND TITLE **EK670 OCCUPATIONAL HEALTH AND SAFETY**

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SCHOOL Science and Engineering

COURSE Bachelor of Engineering Science

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SEMESTER 2

PREREQUISITE(S) Nil.

EXCLUSION(S) Nil.

CREDIT POINTS 15

This unit aims to introduce undergraduate students to the theory and application of occupational health and safety management and the control of hazards.

ORGANISATION

STAFF

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Contact anytime by phone or email.
Consultation in person at UB on Thursdays: for consultation time please make request by email at least one day in advance.

OBJECTIVES

Knowledge;
- Determine the size of the occupational health and safety problem.
- Appreciate the history of occupational health and safety.
- Determine how the legal system deals with occupational health and safety problems.
- Design information (e.g. for anthropometry and manual handling).

Skills;
- Tackle health and safety problems at their source.
- Find and use design information for specific hazards.
- Apply management system concepts to occupational health and safety case studies.
- Use the hierarchy of hazard controls to control hazards.

Values/attitudes.
- Appreciate that social problems have an historical and legal context.
- Prefer the "safe-place" over the "safe-person" approach to control hazards.

CONTENT

Key Questions:
- How significant is the injury and disease problem in our workplaces?
- What legislation governs workplace health and safety? What is its history?
- How can we identify workplace hazards in general?
- How can we identify common problems such as user interface misconceptions, plant hazards and manual handling?
- What does safe design mean?
- How can we think more creatively?
- How can we investigate/understand an accident or work system?

Topics :
- OHS concepts
- OHS law
- Safe design issues
- Plant hazards
- Manual handling, anthropometry
- Creative skills
- OHS systems
- Accident investigation

SUMMARY OF LEARNING & ASSESSMENT TASKS

Learning Task	Assessment Task	Weighting
User interface design misconceptions OR Recognizing guarding features	Report and oral	10
Fit the task to the person OR Manual handling	Report and oral	10
Investigation	Report and oral	20
Attendance at each field visit[1]	Attendance	10x2
Class test	Test	40

SEQUENCE

***** Subject to change pending availability of field visits *****

Week	Date	Topics
1	28 February 2008	- Introduction, survey, OHS concepts
2	6 March 2008	- Unit description/assessment discussion, OHS law
3	13 March 2008	- Design misconceptions - Task 1A discussion, start task 1A
4	20 March 2008	- Plant hazards and case studies - Task 1B discussion, start task 1B
Lecture break	27 March 2008	
Lecture break	3 April 2008	
5	10 April 2008	- Manual handling, anthropometry and case studies - Task 2 discussion, start task 2A or 2 B
6	17 April 2008	- OHS systems, spheres of influence, accident investigation and case study - Task 1 Presentations - Task 3 discussion, start Task 3
7	24 April 2008	- Possible site visit
8	1 May 2008	- Private study
9	8 May 2008	- Task 2 Presentations - Possible site visit follow up
10	15 May 2008	- Creative skills for task 3 – de Bono's Six Thinking Hats, Mind Maps, Breaking assumptions
11	22 May 2008	- Task3 private study time/lecturer consultation
12	29 May 2008	- Task 3 presentations and discussion of systems/accident investigation - SET and SEU process
13	5 June 2008	- Semester summary Q&A - End of unit survey - Class test

[1] If only one or no site visit is possible then the other scores then factored up accordingly.

LEARNING / ASSESSMENT TASK 1 CHOOSE 1A OR 1B

1A USER INTERFACE DESIGN –INSTRUCTIONS, SYMBOLS, ETC

Purpose:

The purpose of this task is to provide an opportunity for students to examine user interface design misconceptions.

Description:
Organize into a group of up to 5 people.

Take a photo of something that you think is not error proof. Look for an example where the design does not make the operation obvious to the user. For example:
- A sign that can be misunderstood
- An instruction that is difficult to follow
- A control that does not make sense

Write a summary including:
- Description of the product, situation, etc.
- List of the hazards (e.g. energies).
- List the kinds of people that use this thing.
- Photograph.
- Explain what you think the designer meant the user to do – 'put your self in the designer's shoes'.
- Explain what mistake you think the user might make – 'put yourself in the user's shoes'.
- Identify an improvement.
- About 2 pages.

Submit a written copy at the Engineering office.
Be prepared to talk about your case study at the tutorial.
Email the report (max 1Mb) to the lecturer.
Individuals in a group must attend tutorial to gain individual marks.

Assessment Expectation:
Items in summary provided in written form and presented.
Work reflects the content of the unit.

Written due by:	Presentation due on:	Returned to student by:
5pm Wednesday 16 April 2008	Thursday 17 April 2008	Thursday 1 May 2008

1B RECOGNIZING SAFETY FEATURES

Purpose:
The purpose of this task is to examine safety features of everyday products and activities.

Description:
Organize into a group of up to 4 people.

Find and take a photo of an example of:
- An interlock guard or other power shut off system

OR
- Fixed guard

This could be in a workplace if you have access or on an everyday product (e.g. a washing machine, or chain brake on a chain saw, kettle, double-insulated tool, pool fence) or in a public place (e.g. a bollard, pedestrian guide fence), etc.

Write a summary including:
- Description of the situation.
- List of the hazards (e.g. energies).
- List the users/people in danger.
- Photograph.
- Explain how you think the guard works.
- Explain how you think it could fail.
- Suggest another better control keeping the hierarchy of control in mind.
- About 2 pages.

Submit a written copy at the Engineering office.
Be prepared to talk about your case study at the tutorial.
Email the report (max 1Mb) to the lecturer.
Individuals in a group must attend tutorial to gain individual marks.

Assessment Expectation:
Items in summary provided in written form and presented.
Work reflects the content of the unit.

Written due by:	Presentation due on:	Returned to student by:
5pm Wednesday 16 April 2008	Thursday 17 April 2008	Thursday 1 May 2008

LEARNING / ASSESSMENT TASK 2 CHOOSE 2A OR 2B

2A FIT THE TASK TO THE PERSON

Purpose:
The purpose of this task is for students to gain knowledge of fitting tasks to the users' physical characteristics.

Description:
- Organize into a group of up to 4 people.
- Choose an item from the following list **or one of your own**.
- Take a photo of someone using the item (e.g. one of your group).
- Determine what body measures are important when people use/interact with this item (e.g. forward reach, sitting eye height, stature, etc).
- Measure these dimensions on the actual example.
- Use one of the three anthropometric data sources below[2] or another source to find out relevant body dimensions (e.g. 5% percentile, 95% percentile, female, male, children – depending on what is appropriate).
- How does your example compare?

Examples of items to investigate:
- supermarket shelf height
- handles on a shopping trolley, height, diameter, width
- toilet height, location of flush button, toilet paper, etc
- kitchen sink height, reach to taps, etc
- diameter and length of the handle on a cricket bat;
- rail height and gaps on a balcony
- **…one of your own**

Write a summary including:
- Description of the situation.
- List the users.
- Photograph.
- List important body dimensions.
- List anthropometric data and give source reference.
- Comment on the item – is it ok?
- About 2 pages.

- Submit a written copy at the Engineering office.
- Be prepared to talk about your case study at the tutorial.
- Email the report (max 1Mb) to the lecturer.
- Individuals in a group must attend tutorial to gain individual marks.

Assessment Expectation
Items in summary provided in written form and presented. Work reflects the content of the unit.

Written due by:	Presentation due on:	Returned to student by:
5pm Wednesday 7 May 2008	Thursday 8 May 2008	Thursday 22 May 2008

[2] E.g. Diffrient, N., Tilley, A.R. & Harman, D. 1981, *Humanscale Series*, MIT Press, Cambridge.

Pheasant, S. 1996, *Bodyspace: Anthropometry, Ergonomics and the Design of Work*, 2nd edn, CRC, Boca Raton.

US Department of Defense 1991, *Military Handbook: Anthropometry of US Military Personnel (Metric)*, DOD-HDBK-743A, http://assist.daps.dla.mil/docimages/0000/40/29/54083.PD0.

2B MANUAL HANDLING

Purpose
The purpose of this task is for students to gain knowledge of biomechanics/manual handling.

Description
- Organize into a group of up to 4 people.
- Choose a manual handling task that you know about (see examples below).
- Measure or estimate the force (e.g. weigh the object or use a spring balance to measure pushing/pulling).
- Measure the required distances.
- Estimate the frequency in a work situation.
- Use the **on-line** Liberty Mutual Manual Materials Handling Tables[3] (based on Snook & Ciriello[4]).
- Work out the "percentage capable" for men and women.
- What would the force and/or frequency need to be to get the female percentage capable to 90%?

Note: instead of the on-line tables you can use a biomechanical model if you have access to software

Example tasks
- Supermarket/warehouse worker stacking boxes
- Farmer lifting bales of hay onto a truck
- Roadside mechanic lifting a spare tires into the car boot
- Service station worker lifting gas bottles into a car boot
- Child care worker lifting children in and out of cots
- Factory, supermarket, catering, hospital worker, etc pushing trolleys
- Opening a heavy sliding door
- Etc

Write a summary including:
- Description of the task.
- List the users.
- Photograph.
- Force, frequency measured/estimated.
- Percentage capable.
- Comment – is it ok?
- Acceptable force/frequency for 90% female population.
- About 2 pages.

Submit a written copy at the Engineering office.
Be prepared to talk about your case study at the tutorial.
Email the report (max 1Mb) to the lecturer.
Individuals in a group must attend tutorial to gain individual marks.

Assessment Expectation
Items in summary provided in written form and presented.
Work reflects the content of the unit.

Written due by:	Presentation due on:	Returned to student by:
5pm Wednesday 7 May 2008	Thursday 8 May 2008	Thursday 22 May 2008

[3] www.libertymutual.com. Direct link http://libertymmhtables.libertymutual.com/CM_LMTablesWeb/taskSelection.do?action=initTaskSelection

[4] Snook, S.H. & Ciriello, V.M. 1991, 'The Design of Manual Handling Tasks: Revised tables of maximum acceptable weights and forces', *Ergonomics*, vol. 34, no. 9, pp. 1197-1213.

LEARNING / ASSESSMENT TASK 3: INVESTIGATION

Purpose
The purpose of this task is for students to consider the broad aspects of a system.

Description
Organize into a group of up to 4 people.

Select an accident in the news or one that you know about such as:
- workplace accident
- car, train, aircraft, shipping accident
- fire
- accident in the home
- sporting accident
- etc

1. Re-write the accident in your own words including some diagrams, photos or sketches if possible (1-2 pages)
2. List the issues under headings:
    a. plant and equipment;
    b. physical environment;
    c. people and skills; and
    d. systems/methods (1-2 pages).
3. Draw a diagram of the timeline of events (1 page)
4. Identify all the people and organizations involved (perhaps use a diagram) (1 page)
5. Show some of the parties in the "spheres of influence" including the workplaces that are involved (1 page)
6. Think of solutions (1-2 pages).
    a. Use the **hierarchy of control.** List at least one idea under each heading:
        i. Elimination
        ii. Substitution
        iii. Engineering
        iv. Administration
        v. Personal protective equipment
    b. What is your best solution for the **short term**?
    c. What is your best solution for the **long term**?
7. Who should make the changes? (1 page).
    a. Who should put in place the short-term solution? Why?
    b. Who should put in place your long-term solution? Why?

Submit a written copy at the Engineering office.
Be prepared to talk about your case study at the tutorial.
Email your report (max 1Mb) to the lecturer.
Individuals in a group must attend tutorial to gain individual marks.

Assessment Expectation
Items in summary provided in written form and presented.
Work reflects the content of the unit.

Written due by:	Presentation due on:	Returned to student by:
5pm Wednesday 21 May 2008	Thursday 22 May 2008	Thursday 5 June 2008

LEARNING / ASSESSMENT TASK 4: FIELD VISIT/S

Purpose
Expose students to OHS in a workplace.

Description
A field visit/s will be organized if possible. A site visit must be organized around the host site's availability hence a site visit may not be possible.

Assessment Expectation
To achieve full marks a student must book and attend. There will be a booking system for any field visit arranged so that numbers of attendees can be confirmed. Booking will be necessary in order to attend. Once a place is booked then non-attendance without medical or other similar justification will result not only in zero marks but a penalty (*see below). The reason for this is that arranging a site visit to an industrial site demands a significant effort on the part of the hosting organization. Attendance by only a small proportion of those expected is an abuse of the host's time and effort and reflects very poorly on the University. However, attendance is not compulsory, therefore there is no penalty if a student chooses to not book and not attend.

Date: To be advised. The visit/s could be during class time or during the lecture break. If a field visit is not arranged the remaining assessment proportions will be increased in proportion.

Action	Result
1. Book and attend.	Full marks.
2. Don't book and don't attend.	Zero marks.
3. Book and fail to attend but provide notification as soon as possible (in advance if possible) if a medical or similar unavoidable problem occurs. As soon as is possible thereafter a medical certificate or similar documentation as evidence must be provided.	Other grades will be factored up in proportion.
4. Book but fail to attend without complying with condition 3.	Zero marks. *A penalty of 10% will be applied. Ten percent will be deducted from your final grade.

LEARNING / ASSESSMENT TASK 5: CLASS TEST – MULTIPLE CHOICE

Purpose
The purpose of this task is to individually assess student's knowledge of topics covered during the semester.

Description
A class test will take place in the final week. The question content will be drawn from the content of the non-assessed quizzes but the questions will necessarily not be exactly the same. Questions may be included based on the optional site visits. These will constitute no more than 10% of the quiz (if there is one site visit), 20% (if thee is two), etc.

Assessment Expectation
Responding correctly to multiple choice questions.

Date: 5 June 2008

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