

**Department of Industrial Engineering  
and Decision Analytics**

**IEDA 3130: ERGONOMICS AND SAFETY MANAGEMENT  
(Fall Semester 2024 Course Vector: 2-0-3:3)**

**Prof. Richard H.Y. So  
Rm5597, Tel: 2358 7105,  
E-mail: rhyso@ust.hk**

**Aims:**

To examine how knowledge about humans and their capabilities will (i) assist the design of workplace; (ii) optimize the health, safety and well being of workers; and (iii) improve productivity.

**After this course, students should have the following learning outcomes:**

- (i) the ability to identify workplace and work process in which further optimization can be performed using knowledge about the users and the task(s);
- (ii) the ability to know what ergonomic data are available; where to find them; and how to use them to improve safety; and
- (iii) the ability to use knowledge and research technique in ergonomics to help industry to respond to the Noise at Work regulation, Manual Handling Operation regulation, and Display Screen regulation in HKSAR

**Lectures:** Tue, 14:30 - 16:20, Rm2504

**Labs:** Mon, 13:30 - 16:20, IS Lab. (Rm3207)

**Office hours:** appointments via email ([rhyso@ust.hk](mailto:rhyso@ust.hk))

**Reference Text:**

Full lecture notes will be put in the course Web site and library reserve. The following two books will be used as reference texts (1 copy each will be put in the reserve collection):

Human Factors in Engineering and Design by Sanders, M.S. and McCormick, E.J. 7th Edition (International), McGraw-Hill, Inc. 790 pages [in library]  
(HKUST bookstore - about HK\$170.0).

A Guide to the Ergonomics of Manufacturing by Martin Helander. 1995 Edition. Taylor & Francis, 205 pages (HKUST bookstore – about HK\$280.0) [in library]

**Supplementary Reading:**

Chaffin, D.B. and Andersson, G.B. (1991) Occupational Biomechanics. John Wiley & Sons, ISBN 0-471-60134-9. (QP301.C525 1991) [in library]

Pheasant, S. (1986) Bodyspace: anthropometry, ergonomics. Taylor & Francis, ISBN 0-85066-352-0. (TA166.P49 1988) [in library]

Berger, E.H. (1986) Noise and hearing conservation manual. American Industrial Hygiene Association. ISBN 0932627-21-8. (TD892.N64 1986) [in library]

**Course Grading:**

Mid-Term Exam	30%	(Open-book exam.)
Final Exam	40%	(Open-book exam.)
Lab assignments	25%	<b>(NO copying)</b>
Class & Lab Participation	5%	
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Total:	100%	

**Course Syllabus**

Week	Topic	Corresponding Labs
Wk1	<b>Tue 3/9: Topic 1: Introduction to Ergonomics</b>	Mon 2/9: No lab.
Wk2	<b>Tue 10/9: Topic 2: Environment design I - Noise at work</b> <ul style="list-style-type: none"> <li>- noise measurement</li> <li>- human hearing</li> <li>- noise at work regulation</li> <li>- noise assessment</li> </ul>	Mon 9/9: No lab.
Wk3	<b>Tue 17/9: Topic 2 continued</b>	Mon 16/9: Lab#1 – Noise at Work in Wk 3,4,5 (see rota)
Wk4	<b>Tue 24/9: Topic 2 continued</b>  <b>Topic 3: Six-Sigma approach on Safety Management</b> <ul style="list-style-type: none"> <li>- Intro to DMAIC</li> <li>- Process flow reconstruction</li> <li>- Data extraction &amp; analyses</li> <li>- Case studies</li> </ul>	Mon 23/9: Lab#1-Noise at Work in Wk 3,4,5 (see rota)
Wk5	<b>Tue 1/10: National Day</b>	Mon 30/9: Lab#1-Noise at Work in Wk 3,4,5 (see rota)
Wk6	<b>Tue 8/10: Topic 4: Workstation design – anthropometry</b> <ul style="list-style-type: none"> <li>- static and dynamic anthropometry</li> <li>- data representation</li> <li>- risks and criteria</li> <li>- some practical tips</li> </ul>	No Lab
Wk7	<b>Tue 15/10: Topic 4 continued.</b>	Mon 16/10: Lab#2- Workstation Design – Part I
Wk8	<b>Tue 22/10: Topic 5: Task design I – workload on muscle</b> <ul style="list-style-type: none"> <li>- manual handling operations regulations in HK</li> <li>- muscle metabolism</li> <li>- physiological strain</li> </ul>	Mon 21/10 Lab#2- Workstation Design – Part II
Wk9	<hr/> <hr/> <b>Tue 29/10: Midterm (Details to be confirmed)</b> <hr/> <hr/>	Mon 28/10: voluntary revision session (Rm3207)

Week	Topics	Corresponding Labs
Wk10	<b>Tue 5/11: Topic 5: Continued</b>	Mon 4/11: Lab#3-Workload assessment in Wks 10, 11, 12 (see rota)
Wk11	<b>Tue 12/11: Topic 6: Task design II – workload assessment</b> - work load assessment - work-rest cycle	Mon 11/11: Lab#3-Workload assessment in Wks 10, 11, 12 (see rota)
Wk12	<b>Tue 19/11: Topic 6: Continued</b>	Mon 18/11: Lab#3-Workload assessment in Wks 10, 11, 12 (see rota)
Wk13	<b>Tue 26/11: Topic 7: AI for work safety</b>	Mon 25/11: No lab
Wk14	Study Break and Final Examination (See ARR's time table)	

**Lab sessions (Detailed Lab schedule will be announced by TAs):**

(No lab in Week 1)

(No lab in Week 2)

Lab#1: Noise at work assessment (see schedule – in Wks 3,4,5)

Lab#2a: Anthropometry: workstation design – Part I (Wk 7)

Lab#2b: Anthropometry: workstation design – Part II (Wk 8)

Lab#3: Safety with physical work (see schedule – in Wks 10,11,12)

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**IMPORTANT NOTE**

**NB:** Although you may not have lab. scheduled for some weeks (see rota), please do NOT pre-booked yourselves with other activities during your lab. time as these time slots are scheduled for IEDA3130. As the course progresses, the lab schedule may need to be changed (e.g., due to typhoon) and you are expected to be available for the lab timeslots that you are currently registered in.

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**NB:** Lecture notes and lab instructions can be download from CANVAS