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The Hong Kong University of Science and Technology

Department of Industrial Engineering
and Decisions Analytics

[Syllabus in Standardized Format]

IEDA 3130: ERGONOMICS AND SAFETY MANAGEMENT
(Fall Semester 2025   Course Vector: 2-0-3:3)
Syllabus is evolving (last updated on 23 July 2025)

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Lectures: Tue, 14:30 - 16:20, Rm4579

Labs: Tue, 09:00 - 11:50, IS Lab. (Rm3207)

IEDA 3130: ERGONOMICS AND SAFETY MANAGEMENT

3 credits

Prerequisites: IEDA 2520 AND IEDA 2540

Name: Prof. Richard So

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Office Hours: by email appointment (rhyso@ust.hk)

Course Description

Aims:

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

Intended Learning Outcomes (ILOs)

By the end of this course, students should be able to:

1. the ability to identify workplace and work process in which further optimization can be performed using knowledge about the users and the task(s) (ILO1);
2. the ability to know what ergonomic data are available; where to find them; and how to use them to improve safety (ILO2); and
3. the ability to use knowledge and research technique in ergonomics to help industry to response to the Noise at Work regulation, Manual Handling Operation regulation, and Display Screen regulation in HKSAR (ILO3).

Assessment and Grading

This course will be assessed using criterion-referencing and grades will not be assigned using a curve. Detailed rubrics for each assignment are provided below, outlining the criteria used for evaluation.

Course Grading:

Mid-Term Exam	30%	(Open-book exam.)
Final Exam	40%	(Open-book exam.)
Lab. work	25%	(**NO copying ***)
Class & Lab Participation	5%	

100%   * Heavy penalty for copying!!

Assessments:

 [List specific assessed tasks, exams, quizzes, their weightage, and due dates; perhaps, add a summary table as below, to precede the details for each assessment.]

Assessment Task	Contribution to Overall Course grade (%)	Due date
Mid-Term	30%	29/10/2024 *
Final Exam	40%	TBC: see ARR's table time *
Lab. work	25% (No Copying)	Weeks 2 to week 12 *
Class Participation	5%	Week 1 to Week 13

 * Assessment marks for individual assessed tasks will be released within two weeks of the due date.

Course Syllabus

Week	Topic	Corresponding Labs
Wk1	**Tue 2/9: Topic 1: Introduction to Ergonomics**	Tue 2/9: No lab.
Wk2	**Tue 9/9: Topic 2: Environment design I - Noise at work** - noise measurement - human hearing - noise at work regulation - noise assessment	Tue 9/9: No lab.
Wk3	**Tue 16/9: Topic 2 continued**	Tue 16/9: Lab#1 – Noise at Work in Wk 3,4,5 (see rota)
Wk4	**Tue 23/9: Special Industrial Speaker** **Special Topic A - Smart Vital Sign Apps (PanopticAI)**	Tue 23/9: Lab#1-Noise at Work in Wk 3,4,5 (see rota)
Wk5	**Tue 30/9: Special Industrial Speaker** **Special Topic B - Smart Hearing Aids (INCUS)**	Tue 30/9: Lab#1-Noise at Work in Wk 3,4,5 (see rota)
Wk6	**Tue 7/10: Day after Mid-Autumn Festival**	Tue: 7/10 No Lab
Wk7	**Tue 14/10: Topic 3: Workstation design – anthropometry** - static and dynamic anthropometry - data representation - risks and criteria - some practical tips	No Lab
Wk8	**Tue 21/10: Topic 3 continued.**	Tue 21/10: Lab#2-Workstation Design – Part I
Wk9	**Tue 28/10: Topic 4: Task design I – workload on muscle** - manual handling operations regulations in HK - muscle metabolism - physiological strain	Tue 28/10 Lab#2-Workstation Design – Part II
Wk10	**Tue 4/11: Topic 4: Continued** **Tue 4/11: Midterm (Details to be confirmed)**	Tue 4/11: voluntary revision session (Rm3207)

Week	Topics	Corresponding Labs
Wk11	**Tue 11/11: Topic 5: Task design II – workload assessment** - work load assessment - work-rest cycle	Tue 11/11: Lab#3-Workload assessment in Wks 11, 12, 13 (see rota)
Wk12	**Tue 18/11: Topic 5: Continued**	Mon 18/11: Lab#3-Workload assessment in Wks 11, 12, 13 (see rota)
Wk13	**Tue 25/11: Topic 6: Six-Sigma approach on Safety Management** - Intro to DMAIC - Process flow reconstruction - Data extraction & analyses - Case studies	Mon 25/11: Lab#3-Workload assessment in Wks 11, 12, 13 (see rota)
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 8)
Lab#2b: Anthropometry: workstation design – Part II (Wk 9)
Lab#3: Safety with physical work (see schedule – in Wks 11,12,13)

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IMPORTANT NOTE

NB: **Although you may not have lab. scheduled for some weeks (see rota),**
      please <u>do NOT</u> 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 downloaded from CANVAS

Mapping of Course ILOs to Assessment Tasks

Assessed Task	Mapped ILOs	Explanation
[Lab1 – Lab3]	[ILO1, ILO2, ILO3]	[This lab assesses students' ability to (i) identify workplace and work process in which further optimization can be performed using knowledge about the users and the task(s) (ILO1); (ii) know what ergonomic data are available; where to find them; and how to use them to improve safety (ILO2); and (iii) use knowledge and research technique in ergonomics to help industry to response to the Noise at Work regulation, Manual Handling Operation regulation, and Display Screen regulation in HKSAR (ILO3).]
[Mid-term]	[ILO1, ILO2, ILO3]	[This examination assesses students' ability to (i) identify workplace and work process in which further optimization can be performed using knowledge about the users and the task(s) (ILO1); (ii) know what ergonomic data are available; where to find them; and how to use them to improve safety (ILO2); and (iii) use knowledge and research technique in ergonomics to help industry to response to the Noise at Work regulation and Display Screen regulation in HKSAR (ILO3).]
[Final]	[ILO1, ILO2, ILO3]	[This examination assesses students' ability to (i) identify workplace and work process in which further optimization can be performed using knowledge about the users and the task(s) (ILO1); (ii) know what ergonomic data are available; where to find them; and how to use them to improve safety (ILO2); and (iii) use knowledge and research technique in ergonomics to help industry to response to the Manual Handling Operation regulation, and Display Screen regulation in HKSAR (ILO3).]
Participations	[ILO1, ILO2, ILO3]	[Asking questions assesses students' ability to solve safety and ergonomics problems through self-learning (ILO1, ILO2, ILO3).]

Grading Rubrics

[Detailed rubrics for each assignment will be provided. These rubrics clearly outline the criteria used for evaluation. Students can refer to these rubrics to understand how their work will be assessed.]

Assessed Task	Grading Rubrics
[Lab1 to Lab3]	- Conscientiousness in team work as demonstrated by not showing up late for lab. - Ability to apply knowledge to practice as demonstrated by the experimental work required by the lab. - Skill level in applying course knowledge as demonstrated by the completion time of lab work.
[Mid-term]	- Ability to apply knowledge as demonstrated by correctly solving the easier short questions in the examination paper. - Ability to creatively apply and extend course knowledge as demonstrated by solving the long questions in the examination paper. - Skill level in applying course knowledge as demonstrated by completing the examination questions within the limited time period.
[Final]	- Ability to apply knowledge as demonstrated by correctly solving the easier short questions in the examination paper. - Ability to creatively apply and extend course knowledge as demonstrated by solving the long questions in the examination paper. - Skill level in applying course knowledge as demonstrated by completing the examination questions within the limited time period.
Participations	Asking any form of questions related to the course in class or via email or in CANVAS to the instructor.

Final Grade Descriptors:

[As appropriate to the course and aligned with university standards]

Grades	Short Description	Elaboration on subject grading description
A	Excellent Performance	[Demonstrates an excellent and comprehensive grasp of course matter; expertise in solving course-related ergonomics problems. Exhibits a high capacity for scholarship and team collaboration in lab work, going beyond core requirements to achieve learning goals.]
B	Good Performance	[Shows good knowledge and understanding of the main course matter, competence in solving course-related ergonomics problems. Displays high motivation to learn and the ability to work effectively lab teammate.]

C	Satisfactory Performance	[Possesses adequate knowledge of core subject matter, competence in dealing with familiar ergonomics problems, and some capacity for analysis course-related ergonomics problems. Shows persistence and effort to achieve broadly defined learning goals.]
D	Marginal Pass	[Has threshold knowledge of core subject matter, potential to deal with basic course-related ergonomics problems. Benefits from the course and has the potential to develop in the discipline.]
F	Fail	[Demonstrates insufficient understanding of the subject matter and lacks the necessary problem-solving skills. Exhibits minimal effort towards achieving learning goals. Does not meet the threshold requirements for professional practice or development in the discipline.]

Course AI Policy

For the lab work and general learning, students are free to use generative AI tools to enhance their learning experience without crossing the line of intended copying. For examinations, use of computing devices is prohibited.

Communication and Feedback

Assessment marks for individual assessed tasks will be communicated via Canvas within two weeks of submission. Feedback on assignments will include the mistakes made and the corresponding reductions of marks. Students who have further questions about the feedback including marks should consult the instructor within five working days after the feedback is received.

Resubmission Policy

Students who are absent for a lab can apply to the TAs for a make-up lab within 2 weeks. A -20% mark discount will be applied unless a valid medical certificate is provided.

Required Texts and Materials

Reference Text:

Full lecture notes will be put in the course CANVAS site. The following two books will be used as reference texts (1 copy each can be put in the reserve collection if needed):

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

A Guide to the Ergonomics of Manufacturing by Martin Helander. 1995 Edition. Taylor & Francis, 205 pages [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]

Academic Integrity

Students are expected to adhere to the university's academic integrity policy. Students are expected to uphold HKUST's Academic Honor Code and to maintain the highest standards of academic integrity. The University has zero tolerance of academic misconduct. Please refer to Academic Integrity | HKUST – Academic Registry for the University's definition of plagiarism and ways to avoid cheating and plagiarism.