Department of Industrial Engineering
and Decision Analytics

IEDA 3130: ERGONOMICS AND SAFETY MANAGEMENT (Fall Semester 2023)

Dr. CHIN Jing Wei (Nick)
Email: nickchin@ust.hk
Rm5584

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.

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 response to the Noise at Work regulation, Manual Handling Operation regulation, and Display Screen regulation in HKSAR

Lectures: We 01:00PM - 02:50PM, *Rm 4504, Lift 25-26*
Labs: We 09:30AM - 12:20PM, *IS Lab (Rm 3207)*
Office hours: Appointments via emails (nickchin@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].

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]

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. Work	25% (**NO Copying** ***Heavy Penalty for copying!**)
Class & Lab Participation	5%
	100%

Course Syllabus (Below is the schedule for lectures only, there will be another detailed lab schedule maintained by the TAs on CANVAS):

	LECTUREs	***LAB SESSIONS***
Week 1 [Add / Drop] L1: Wed, Sep 06 LA1: Wed, Sep 06	Topic 1: Introduction to Ergonomics	**NO Lab.**
Week 2 [Add / Drop] L1: Wed, Sep 13 LA1: Wed, Sep 13	Topic 2: Environment Design I – Noise at Work • Noise Measurement • Human Hearing • Noise at Work Regulation • Noise Assessment	**NO Lab.**
Week 3 L1: Wed, Sep 20 LA1: Wed, Sep 20	Continue Topic 2…	Lab 1: Noise at Work (see rota)
Week 4 L1: Wed, Sep 27 LA1: Wed, Sep 27	Topic 3: Six-Sigma Approach on Safety Management • Intro to DMAIC • Process Flow Reconstruction • Data Extraction & Analyses • Case Studies	Lab 1: Noise at Work (see rota)
Week 5 L1: Wed, Oct 04 LA1: Wed, Oct 04	Continue Topic 3…	Lab 1: Noise at Work (see rota)
Week 6 L1: Wed, Oct 11 LA1: Wed, Oct 11	Topic 4: Workstation design – anthropometry • Static and Dynamic Anthropometry • Data Representation • Risks and Criteria • Some Practical Tips	Lab 2a: Anthropometry: Workstation Design – Part I
Week 7 L1: Wed, Oct 18 LA1: Wed, Oct 18	Continue Topic 4…	Lab 2b: Anthropometry: Workstation Design – Part II

Week 8 L1: Wed, Oct 25 LA1: Wed, Oct 25	***Midterm Exam (Tentative Date)***	**NO Lab.**
Week 9 L1: Wed, Nov 01 LA1: Wed, Nov 01	Topic 5: Task Design I – Workload on Muscle • Manual Handling Operations Regulations in HK • Muscle Metabolism • Physiological Strain	Lab 3: Workload Assessment (see rota)
Week 10 L1: Wed, Nov 08 LA1: Wed, Nov 08	Continue Topic 5…	Lab 3: Workload Assessment (see rota)
Week 11 L1: Wed, Nov 15 LA1: Wed, Nov 15	Topic 6: Task Design II – Workload Assessment • Workload Assessment • Work-rest Cycle	Lab 3: Workload Assessment (see rota)
Week 12 L1: Wed, Nov 22 LA1: Wed, Nov 22	Continue Topic 6…	Lab 3: Workload Assessment (see rota)
Week 13 L1: Wed, Nov 29 LA1: Wed, Nov 29	Topic 7: Artificial Intelligence (AI) & Workplace Safety	**NO Lab.**

Lab Sessions (Detailed lab schedule will be announced by the TAs):

Lab 1: Noise at Work Assessment (see schedule – in Weeks 3, 4, 5)
Lab 2a: Anthropometry: workstation design – Part I (Week 6)
Lab 2b: Anthropometry: workstation design – Part II (Week 7)
Lab 3: Safety with Physical Work (see schedule – in Weeks 9, 10, 11, 12)

IMPORTANT NOTE

Although you may not have lab scheduled for some weeks (see rota), please **DO NOT** pre-book 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 and you are expected to be available for the lab time slots that you are currently registered in.

NB: Lecture notes and lab instructions can be downloaded from the CANVAS.