Course Specification
(Bachelor)

Course Title:	Advanced ergonomics
Course Code:	INE 5363
Program:	Bachelor in Industrial Engineering
Department:	Industrial Engineering
College:	College of Engineering
Institution:	King Khalid University
Version:	Version 2
Last Revision Date:	11/12/2025

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours: (2)					
2. Course type					
A.	☐ University	☐ College	√☐ **Department**	☐ Track	☐ Others
B.	☐ Required		√☐ **Elective**		
3. Level/year at which this course is offered: (Tenth level/Fifth Year)					
4. Course General Description:					
The purpose of this course is to give students advanced study of ergonomics and ergonomic principles with particular attention given to ergonomic development in the workplace. Design and evaluation of ergonomic systems and ergonomic program design and development are given special attention					
5. Pre-requirements for this course (if any)**:**					
INE 3361- Human Factors and Ergonomics					
6. Co-requisites for this course (if any)**:**					
NIL					
7. Course Main Objective(s):					
CLO1. Evaluate the International regulatory environment with respect to workplace ergonomics. CLO2. Relate human biology to workplace ergonomics. CLO3. Explain the importance of considering human variability in workplace design decisions. CLO4. Describe common work-related musculoskeletal disorders. CLO5. Assess common workplace stressors. CLO6. Apply contemporary methods of conducting workplace evaluation to ergonomic-related hazards. CLO7. Apply the knowledge of bio-signal to be used in signal processing. CLO8. Discuss the effects of vibration intervention on muscular performance for different work task with respect to posture.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	2/week	100%
2	E-learning		
3	Hybrid		

No	Mode of Instruction	Contact Hours	Percentage
	• Traditional classroom • E-learning		
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	30
2.	**Laboratory/Studio**	30
3.	**Field**	0
4.	**Tutorial**	0
5.	**Others (specify)**	0
Total		60

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	Define Ergonomic methodology and measurement.	K1	Lecture Lab work	Mid-term Exam, Assignment and Final Exams
1.2	Ergonomic assessment tools, program implementation including cost benefit analysis	K3	Lecture Lab work	Mid-term Exam, Assignment and Final Exams
1.3	Understanding psychosocial factors	K4	Lecture Lab work	Mid-term Exam,

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
	that impact worker performance.			Assignment and Final Exams
2.0	Skills			
2.1	Human psychology and how humans process information and react to their environment.	S1	Lecture Lab work	Mid-term Exam, Assignment, Quizzes, Lab Exam, and Final Exams
2.2	Analyze the anthropometric design of a product and apply ergonomic assessment tools.	S2	Lecture Lab work	Mid-term Exam, Assignment, Quizzes, Lab Exam, and Final Exams
2.3	Statistical analysis will also be examined including ANOVA, t-tests, and post-hoc tests.	S4	Lecture Lab work	Mid-term Exam, Assignment, Quizzes, Lab Exam, and Final Exams
2.4	Program implementation including cost benefit analysis and psychosocial factors that impact worker performance.	S5	Lecture Lab work	Mid-term Exam, Assignment, Quizzes, Lab Exam, and Final Exams
3	Values, autonomy, and responsibility			
3.1	Work individually or within a team and communicate effectively to perform the assigned task (Homework/Group Project)	V3	Lecture Lab work	Assignment, Quizzes, Lab Exam, and Final Exams

C. Course Content

No	List of Topics	Contact Hours
1.	Ergonomic methodology and measurement, ergonomic assessment tools, program implementation including cost benefit analysis and psychosocial factors that impact worker performance. The course includes practical application of assessment tools and theory through laboratory assignments. The final project will allow the students to demonstrate their understanding of the course content through application to a real-world problem in the workplace.	6
2.	The foundations of statistical analysis will also be examined including ANOVA, t-tests, and post-hoc tests. Importance of sample sizes, power, and the corresponding effects on research outcomes. Design a study, interpret research findings, and critically examine technical reports. Use of statistical software to solve the research problems, and present data in an effective and efficient manner.	6
3.	Methodologies and principles for designing user interfaces, as well as the importance of program layout and suitability. Human psychology and how humans process information and react to their environment.	6
4.	Ergonomic methodology and measurement, ergonomic assessment tools, program implementation including cost benefit analysis and psychosocial factors that impact worker performance.	6
5.	The course includes practical application of assessment tools and theory through laboratory assignments. Demonstrate the understanding of the course content through application to a real-world problem in the workplace. Apply the knowledge of bio-signal to be used in signal processing. Discuss the effects of vibration intervention on muscular performance for different work task with respect to posture.	6
Total		**30**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	E-learning based activities (On-line Quizzes, Assignments)	Every Week	20%
2.	Mid Exam- I	6TH week	15%
3.	Mid Exam- II	11th week	15%
4.	Group Discussions / Lab work	All week	10%

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
5.	Final Exam	18th week	40%

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	• Ergonomics: how to design for ease and efficiency / Katrin E. Kroemer Elbert, Henrike B. Kroemer, Anne D. Kroemer Hoffman. ISBN: 9780128132975, 012813297. Third edition,2018 • Karwowski, W. and Marras, W.S., 2003. Occupational ergonomics: engineering and administrative controls. CRC Press. • Shouqian, S., Xu, J., Xianwei, Z. and Zenggui, G., 2016. Advanced Ergonomics and Design-From Ergonomics to Human-Machine Integration. • Work Design: Industrial Ergonomics, Konz, S.A. and Johnson, S. 2022 7th Edition, ISBN: ISBN 978-1-890871-79-6
Supportive References	1. Advances in Ergonomics in Design Proceedings of the AHFE 2021 Virtual Conference on Ergonomics in Design, July 25-29, 2021, USA https://link.springer.com/book/10.1007/978-3-030-79760-7 2 Bridger, R. S. (2018), Introduction to human factors and ergonomics (4th ed.). CRC Press.
Electronic Materials	Ergonomics https://www.tandfonline.com/journals/terg20
Other Learning Materials	Multimedia associated with textbooks and relevant websites. Customized program available with Software homepage

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	• Lecture room • Backboard facility for sharing lecture notes, • Submission of assignments and attempting Quizzes. • Details of recommended group profiles in the teacher manual
Technology equipment (projector, smart board, software)	• Every student requires access to a personal computer and the Internet. • On-site University access is provided through the University Central Library.

Items	Resources
Other equipment (depending on the nature of the specialty)	• Present Planned Resources takes care of the subject's needs.

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	**Students**	**Course Evaluation Survey (CES**
Effectiveness of Students assessment	**Students**	**Blackboard feedback**
Quality of learning resources	**Students**	**Course Evaluation Survey (CES)**
The extent to which CLOs have been achieved	**Course Evaluation Committee (CEC)**	**In-Situ Evaluation**
Other		

Assessors (Students, Faculty, Program Leaders, Peer Reviewers, Others (specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	**Reviewed by Curriculum Committee Approved by Quality Committee**
REFERENCE NO.	**9-6-47**
DATE	**25/06/1447**