Course Specification
(Bachelor)

Course Title:	PRODCUT DESIGN AND DEVELOPMENT
Course Code:	INE 5212
Program:	Bachelor of Industrial Engineering
Department:	Industrial Engineering
College:	Engineering
Institution:	King Khalid University
Version:	2
Last Revision Date:	15-12-2025

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: (Fifth level/third Year)					
4. Course General Description:					
Introduction to engineering design and structured design methods. Topics include Product design process; design specifications, concept generation and selection; detailed design, design simulation, design for manufacturing and assembly, design for product safety; principles of life-cycle engineering.					
5. Pre-requirements for this course (if any)**:**					
INE 3311					
6. Co-requisites for this course (if any)**:**					
NIL					
7. Course Main Objective(s):					
CLO1. State a problem, establish design constraints, and justify design decisions CLO2. Compare and maintain appropriate design documentation CLO3. Plan a design project considering impact of engineering solution CLO4. Create, evaluate and select work as a design team CLO5. Establish proficiency in Design modelling techniques CLO6. Recognize issues of product safety, risk, and reliability					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	30	100%
2	E-learning		
3	Hybrid ● Traditional classroom ● E-learning		

No	Mode of Instruction	Contact Hours	Percentage
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	30
2.	**Laboratory/Studio**	0
3.	**Field**	0
4.	**Tutorial**	0
5.	**Others (specify)**	0
Total		36

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 Product safety, design constraints, and justify design decisions	K2	Traditional teaching method using board	Designated questions from the mid-term and final exam, quizzes
1.2	Recognize Personal and environmental risk identification	K3	Traditional teaching method using board	Homework, quizzes
1.3	List of consumer Product Safety Acts. The safety standards	K3	Traditional teaching method using board	mid-term and final exam,
2.0	Skills			
2.1	List environmental issues related to product safety	S3	Traditional teaching method using board	Surprise tests to know the level of student for further

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
				proactive solution like special hours for the weak students
2.2	Identify the product team & techniques adopted	S6	Traditional teaching method using board	Designated questions from EXAM
3	**Values, autonomy, and responsibility**			
3.2	Demonstrate Ethics, Legal issues, Product safety	V1	Traditional teaching method using board	Surprise tests, quizzes
3.1	Develop a Plan for sustainable product design	V2	Traditional teaching method using board	Surprise tests, quizzes

C. Course Content

No	List of Topics	Contact Hours
1.	Management strategy in product safety. Reducing product design risks through design reviewing systems.	2
2.	Personal and environmental risk identification of the whole product life from manufacturing to end of services disposal.	4
3.	The consumer Product Safety Acts. The safety standards used in different countries such as Underwriters Laboratories Inc.	4
4.	Fault Tree Analysis (FTA), Failure Mode and Effect Analysis (FMEA). Hazard and Operability	4
5.	Product Risk Management - Product Risk transfer through insurance and contract conditions.	4
6.	The use of quantitative and statistical methods in assessing product risks and design optimization	4
7.	Overview of the application and testing procedures in obtaining product safety markings for new products. Planning, implementation and control in product test and assurance.	4
8.	sustainable Environmental design for product making	4
Total		**60**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Assignments	Every Week	25
2.	Midterm exam 1	5TH week	15
3.	Midterm exam 2	10th week	15
4.	Discussions / Attendance / Participation	All week	5
5.	Final Exam	16th 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	• Product Design and Development, Ulrich, K.T and. Eppinger,S.D. McGraw –Hill International Edns.2012, **ISBN 978-0-07-340477-6, MHID 0-07-340477-2** • Effective Product Design and Development, Rosenthal, S. Business One Orwin, Homewood, 2014, **ISBN-13:** 978-1556236037, **ISBN-10**: 1556236034 3.
Address	Tool Design: Integrated Methods for successful Product Engineering, Pugh,S. Addison- Wesley; 1st edition, 1991, **ISBN-13:** 978-0201416398, **ISBN-10**: 0201416395
Electronic Materials	
Other Learning Materials	

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.
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)

Assessment Areas/Issues	Assessor	Assessment Methods
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**