

Subject Description Form

Subject Code	ME42007
Subject Title	Design for Product Safety and Reliability
Credit Value	3
Level	4
Pre-requisite/ Co-requisite/ Exclusion	Pre-requisite: ME22002 Integrated Product Development Fundamentals or ME32002 Engineering Design Fundamentals
Objectives	To provide students an overview of the product liability and legal aspects in launching of new consumer products and develop their understanding of the management strategy in achieving product safety.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: <ul style="list-style-type: none"> a. Identify problems related to liability, safety and reliability for an existing product design and apply their knowledge in reliability engineering to devise a technically and economically feasible solution. b. Apply knowledge of mathematics and engineering sciences via analytical and computational approaches to assess the risks of a product design and development project, and to assess the impacts of various key elements in achieving product safety. c. Develop systematically a safer and more reliable design for an existing product via a group project and present in a professional manner their ideas using multimedia and written reports.
Subject Synopsis/ Indicative Syllabus	<p><i>Product Reliability</i> – Definition of product reliability, reliability programme plan, reliability requirements, parameters, modeling, prediction, test requirement, and design for reliability.</p> <p><i>Product Liability</i> - Meaning of product liability. Definition of defective product. Product liability in Hong Kong. Product liability law in Hong Kong. Product liability law in other Jurisdictions.</p> <p><i>The Management of Design Risks</i> - Management strategy in product safety. Reducing product design risks through design reviewing systems. Personal and environmental risk identification of the whole product life from manufacturing to end of services disposal.</p> <p><i>Product Safety Standards</i> - The consumer Product Safety Acts. The safety standards used in different countries such as Underwriters Laboratories Inc. (UL) in USA, British Standards in United Kingdom and International Electro-technical Commission (IEC) in Europe. Overview of the application and testing procedures in obtaining product safety markings for new products. Planning, implementation and control in product test and assurance.</p>

	<p>Product Risk Identification Methods - Fault Tree Analysis (FTA). Failure Mode and Effect Analysis(FMEA). Hazard and Operability Study (HAZOP) and Hazard Analysis Critical Control Point (HACCP). The use of quantitative and statistical methods in assessing product risks and design optimisation.</p> <p>Product Risk Management - Product Risk transfer through insurance and contract conditions.</p>																																	
<p>Teaching/Learning Methodology</p>	<ol style="list-style-type: none"> 1. Lectures give coverage and exposure and arouse interest. (Outcomes a to c) 2. Group discussions and tutorials help students consolidate lecture materials. (Outcomes a to c) 3. Assignments, through which students learn to compile, assimilate, assess and analyze. (Outcomes a to c) 4. Through thematic projects students would keep abreast of current product liability law and strategies for management of design risks. The presentation of reports allows students develop communication skills. (Outcomes a to c) <table border="1" data-bbox="443 741 1406 1055"> <thead> <tr> <th rowspan="2">Teaching/Learning Methodology</th> <th colspan="3">Outcomes</th> </tr> <tr> <th>a</th> <th>b</th> <th>c</th> </tr> </thead> <tbody> <tr> <td>Lecture</td> <td>√</td> <td>√</td> <td>√</td> </tr> <tr> <td>Tutorial</td> <td>√</td> <td>√</td> <td>√</td> </tr> <tr> <td>Assignment</td> <td>√</td> <td>√</td> <td>√</td> </tr> <tr> <td>Project</td> <td>√</td> <td>√</td> <td>√</td> </tr> </tbody> </table>	Teaching/Learning Methodology	Outcomes			a	b	c	Lecture	√	√	√	Tutorial	√	√	√	Assignment	√	√	√	Project	√	√	√										
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	<p>Class presentation and participation in discussions will be assessed.</p> <ol style="list-style-type: none"> 2. To achieve the intended learning outcomes, it is considered that more emphasis on formative assessment would be appropriate as students' performance will be improved via written and verbal feedback. 3. Marked assignments provide feedback and reinforcement on learning key concepts and outcomes. 4. Through presentations/discussions, students will learn how to: <ol style="list-style-type: none"> i. Work effectively with diverse group of people; ii. Persuasively explain in both oral and written form their product safety concepts; iii. Tackle diverse and unstructured questions; iv. Tell thoughts, feelings, ideas so that others may understand; v. Supports and leads others in discussion. 5. The examination will be used to assess the knowledge acquired by the students to deal with product design risks in a strategic manner. It provides a reference of standards with which the learning outcomes are measured. 	
Student Study Effort Expected	Class contact:	
	<ul style="list-style-type: none"> ▪ Lecture and seminar 	33 Hrs.
	<ul style="list-style-type: none"> ▪ Tutorial and group discussion 	6 Hrs.
	Other student study effort:	
	<ul style="list-style-type: none"> ▪ Performing group project 	25 Hrs.
	<ul style="list-style-type: none"> ▪ Conducting case study and assignment 	23 Hrs.
	<ul style="list-style-type: none"> ▪ Literature search and private study 	18 Hrs.
Total student study effort	105 Hrs.	
Reading List and References	<ol style="list-style-type: none"> 1. Abbot, Howard: Safer by design: a guide to the management and law of designing for product safety, Gower, latest edition. 2. Hammer, Willie: Product Safety management and engineering, American Society for Safety Engineers, latest edition. 3. The Law Reform Commission of Hong Kong: Report on Civil Liability for Unsafe Products, latest edition. 	

Revised July 2018