

Sub.	Course Description – توصيف مقرر دراسي	الموضوع	 <b>كليات المعرفة</b> ALMAAREFA COLLEGES
Date		التاريخ	

Course Code & No	IE400		رقم المقرر ورمزه
Course Name	Product Design and Development		اسم المقرر
Credit Hours	3 (2+1+2)		عدد الساعات المعتمدة
Pre-requisite	IE 300, IE302		المتطلب السابق

<b>General Description</b>	توصيف عام
Introduction to manage innovation; Idea generation; Product specification and quality; Standardization of product; Product structure and components; Implementing prototype metrologies; Manufacturing product prototyping project.	

<b>Course Objectives</b>	أهداف المقرر
<p>The course aims to provide the knowledge and skills to design and develop a product emphasizing on process development, product planning, product specifications, customer needs identification, idea generation, and concept selection and testing, prototyping, robust design, design for manufacturing and assembly, and product development economics.</p> <p><b>By the end of the course, each student should be able To</b></p> <ul style="list-style-type: none"> <li>• Identify and Recognize the concept of innovation the product design phases and product strategic planning</li> <li>• Carry out data collection and analysis to determine and to develop product its scientific and technological ideas</li> <li>• Collect and analyze to define customer needs</li> <li>• Recognize product specification and specify the specification values and units using Quality deployment technique</li> <li>• Compose idea generating for developing product development ideas</li> <li>• Evaluate and test ideas for selection</li> <li>• Compose design of the product for manufacture and assembly</li> <li>• Evaluate design parameters using robust design technique</li> <li>• Analyze the economy of projects of product development</li> </ul>	

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Course Outlines	مفردات المقرر
<ul style="list-style-type: none"> <li>• Introduction to Process Development: Generic Development Process, Product Development Process Flows, Product Development Organizations</li> <li>• Product Planning: Identify Opportunities, Evaluate Projects, Allocate resources.</li> <li>• Customer Needs: Need Identification; Collecting Raw Data, Interpret and Transform Raw Data, Reflect on Results ,</li> <li>• Product Specification: Specification Establishment, Setting the Final Specifications. Quality function deployment analysis (QFD)</li> <li>• Idea Generation: Creativity Methods, Brainstorming, Theory of Inventive Problem Solving (TRIZ), Axiomatic Design.</li> <li>• Concept Selection and Testing: Concept Screening, Concept Scoring, Purpose of Testing, Survey Population, Communicate the Concept, Interpret the Results</li> <li>• Design for Manufacturing and Assembly: Basic Concept, Manufacturing Cost, Reduce the Cost of Components, Impact on Other Factors</li> <li>• Prototyping: Principles of Prototyping, Technologies, Planning for Prototypes.</li> <li>• Robust Design: Control and Noise Factors, Experimental Plan, Conduct Analysis, Reflect and Repeat</li> <li>• Product Development Economics: Elements of Economic Analysis, Base-Case Financial Model, Sensitivity Analysis</li> </ul>	

References	المراجع
<p><b>Required Textbooks</b></p> <ul style="list-style-type: none"> <li>• Product design and development; Ulrich, K.T., Eppinger, S.D., McGraw-Hill, ISBN-13: 978-0073101422, latest edition</li> <li>• Product design “techniques in reverse engineering and new product development”; Otto, Kevin, Wood, Kristin, Prentice Hall, ISBN-0-13-021271-7, latest edition</li> </ul> <p><b>Essential References Materials</b></p> <ul style="list-style-type: none"> <li>• Product design “techniques in reverse engineering and new product development”; Otto, K. and Wood, K.; Prentice Hall, 2001, ISBN0-13-021271-7, latest edition</li> <li>• Product design methods and practices; Stoll, Henri W.; Marcel Dekker, Inc. USA. (1999) ISBN-08247-7565-1, latest edition</li> <li>• Product design and manufacture; Lindbeck John R. , Wygan Robert M. t Prentice Hall, 1995, ISBN0130342572, 9780130342577, latest edition</li> <li>• Engineering design methods: strategies for product design; Nigel Cross; John Wiley &amp; Sons, 2008, ISBN 0470519266,</li> </ul>	

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<p>9780470519264, latest edition J.P.Elloy, R.Mezenecv, N.Munro</p> <ul style="list-style-type: none"> <li>• Modern Control Engineering (4th edition) by K. Ogata, 2002.</li> </ul>	
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