



## MODULE SPECIFICATION

### Faculty of Engineering

Last Updated (1<sup>st</sup> May 2018)

**1. Module Title**

Product Design and Development

**2. Module Code**

EM5106

**3. Number of credits**

10

**4. Level**

5

**5. Semester**

1

**6. Pre-requisites for admission to the module**

Normal entry requirements

**7. Module Coordinator**

Dr Hamid Ullah

**8. Aim**

Product Design and Development is a project-based course with a focus on the sequence of steps and activities required to conceive, design, develop, and commercialize a product. Students would be familiarized with modern tools and methods for creating a new product or developing an existing one. The module would develop students' confidence of their abilities as well as awareness of the role of multiple functions (e.g. marketing, finance, industrial design, and manufacturing) in creating a new product.

**9. Summary of Contents**

The module will cover the following topics:

- **Development Processes and Organizations:** product design process; product development process; types of product development process; product development organizations.
- **Customer Needs Identification:** needs vs. specifications; steps for identifying customer needs, the art of eliciting customer needs data; customer data template; example / case study.
- **Product Specifications:** target specifications; refined specifications; steps for establishing target and refined specifications; example / case study.
- **Concept Generation:** input to the concept generation process; common mistakes during concept generation; steps for concept generation process; example / case study.
- **Concept Selection:** methods of choosing a concept; two-stage concept selection methodology; benefits of structured concept selection methodology; example / case study.
- **Product Architecture:** modular and integral architectures; influence factors for product architecture; four-step methodology for establishing the architecture.

- **Industrial Design:** importance assessment of industrial design; management of industrial design process; involvement of industrial design in product design & development; assessing the quality of industrial design.
- **Design for Manufacturing:** design for manufacturing methodologies; impact of DFM decisions on other factors; manufacturing improvement method.
- **Prototyping:** basics of prototyping; types of prototypes; principles of prototyping; basic steps of rapid prototyping Processes.
- **Product Development Economics:** elements of economic analysis; four-step methodology for economic analysis for product development.
- **Product Development Projects Management:** understanding and presenting tasks; baseline project planning; accelerating the project, executing the project.

#### 10. Module Intended Learning Outcomes (MILOs)

Upon successful completion of this module, students will be able to:

No.	MILOs	Weightage (%)
1	Discuss a range of product development processes and organizations.	15
2	Evaluate various design and development concepts used for product development.	30
3	Determine methods and tools used for product development.	25
4	Appraise product architecture as well as industrial design in product design and development.	15
5	Explain economics and management of product development projects.	15

#### 11. Teaching and Learning Activities (TLAs)

MILO No.	TLAs	Functions	Hours/Week
1 - 5	Lecture	Present and convey critical information, history, background and theories	2
1 - 5	Tutorial	Tutorial sessions would be conducted in workshop mode with a focus on case studies and hands-on exercises to enforce the key ideas of product design and development	2

#### 12. Assessment Tasks/Activities

MILO No.	Type of Assessment Tasks/Activities	Weightage (%)
1 – 5	University Examination	50
2, 3	2 Assignments	20
2 – 5	Group Project	30

##### Assessment Criteria:

Assessment components of the module shall be University Examination and Coursework. To achieve a pass in the module students must obtain a minimum overall mark of 50% and a minimum of 40% in each assessment component.

**Resit:** Students eligible for resit shall be assessed according to the programme area Examination Board recommendation.

#### 13. Attendance Requirements

Students are expected to attend all Lectures and Tutorials.

#### 14. Contribution to Programme Intended Learning Outcomes

PILO		MILO No.				
		1	2	3	4	5
1	Science & Mathematics	✓	✓			✓
2	Engineering Analysis	✓	✓	✓	✓	✓
3	Design	✓	✓	✓	✓	✓
4	Advanced Design		✓	✓	✓	
5	Engineering Practice Knowledge		✓	✓	✓	
6	Engineering Practice			✓	✓	
7	Ethical, Economic & Social		✓			✓
8	Management, Legal & Environmental	✓				✓
9	General Skills	✓	✓	✓	✓	✓

## 15. Grading of Student Achievement

Marks (%)	Grades	Grade Definition
85-100	A+	Excellent
75-84	A	
70-74	B+	Very Good
65-69	B	
60-64	C+	Good
55-59	C	
50-54	D	Satisfactory
0-49	F	Fail

## 16. Resources

### Primary text

No	Name of Author(s)	Year of Publication	Title of Book	Edition	Publisher's Name	ISBN
1	K.T. Ulrich and S.D. Eppinger	2015	Product Design and Development	6 <sup>th</sup>	McGraw-Hill/Irwin	978-0078029066