

M6401 PRODUCT DESIGN AND DEVELOPMENT

[Lecture: 39 hours]

Introduction and product development processes and strategies. Needs identification and product specifications. Generation and evaluation of ideas and concepts. Product architecture. Product aesthetic and form creation. Product semantics and identity. Principles of Design. Mini Project.

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1. OBJECTIVE AND SCOPE

The commercial success of a manufacturing firm depends upon its ability to identify the needs of the customers and to quickly create products that satisfy these needs and these products can be produced effectively, efficiently and economically. To meet these goals, it requires the contributions of various different functions, including marketing, design, manufacturing, etc. in a multi-disciplinary and cross-functional approach. Product design and development will be such a subject to provide for an overview of this approach and describe the functional requirements that make this approach successful. Covered within this subject are the need for and what is a multi-disciplinary, cross-functional approach, the product development processes, the various product development strategies, e.g. total design approach, functional approach, etc., needs finding and identifications, establishing product specifications, generation of ideas and concepts, concepts evaluation and selection, product architecture, product aesthetics, form creation, semantics and languages, and corporate and product identity.

2. SUBJECT CONTENT

MODULE 1 : INTRODUCTION AND PRODUCT DEVELOPMENT PROCESSES AND STRATEGIES

9 hrs

Multi-disciplinary approach to product design and development. Characteristics of successful product design and development.. Challenges of product design and development. Generic product development process. Adaptation of the product development process. Case studies. Total design. Product design methodologies. The concept 'system', concept 'structure' and concept 'method.'

MODULE 2 : NEEDS IDENTIFICATION AND PRODUCT SPECIFICATIONS

3 hrs

Needs definition. Needs finding. Identifying needs. Gathering data. Interpretation of data in terms of customer needs. Establishing Product specifications. Definition of specifications. Establishing product specifications. Quality function deployment (QFD). Function needs and trees.

MODULE 3 : GENERATION AND EVALUATION OF IDEAS AND CONCEPTS

6 hrs

Task of concept and idea generation. Creative problem solving approaches. Problem identification and clarification. External searches. Internal searches. Systematic exploration. Reflection on solutions and processes. Concept Evaluation and Selection. Structured concept evaluation methodologies. Multi-attribute decision making. Concept screening. Concept scoring. Caveats on structured methods.

MODULE 4 : PRODUCT ARCHITECTURE 3 hrs

Definition. Implications of product architecture. Establishing product architecture. Related system-level design issues.

MODULE 5 : PRODUCT AESTHETIC AND FORM CREATION 6 hrs

Industrial design and importance of industrial design. The industrial design process. Product characteristics, function and meaning. Creating value in product. Management of industrial design. Designing interfaces.

MODULE 6 : PRODUCT SEMANTICS AND IDENTITY 3 hrs

Symbolism and metaphor of design. Emotional appeal of products. Creating and understand product languages. Case studies. Corporate and Product Identity. Elements of Identity. Developing corporate and product identity. Product differentiation.

MODULE 7 : PRINCIPLES OF DESIGN 9 hrs

Overview of principles of axiomatic design. Application of axiomatic design theory. Teaching cases and case studies. Theoretical foundation of axiomatic design. General design theory (GDT). Design Theory and Methodology (DTM) research.

MINI PROJECT

A mini project will be carried out within this subject and it will serve as the first exploratory phase of the 'smart' product design project that candidates are required to complete.

3 REFERENCES

1. Ulrich, K.T., Eppinger, S.D., Product Design and Development, McGraw Hill, 2nd Edition, 2000.
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4. Lorenz, C., The Design Dimension: Product Strategy and the Challenge of Global Marketing, Basil Blackwell Ltd., Oxford, UK, 1986..

5. Olins, W., Corporate Identity: Making Business Strategy Visible through Design, Harvard Business School Press, Boston, MA, 1989.
6. Pahl, G., Beitz, W., Engineering Design, Wallace K. (editor), The Design Council, London, 1984.
7. Nam P. Suh, Axiomatic Design: Advances and Applications, Oxford University Press, 2001