DISCIPLINE SPECIFIC ELECTIVE COURSES (DSE-4)

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course
		Lecture	Tutorial	Practical/ Practice		
POLYMER PRODUCT DESIGN	**4**	**2**	**0**	**2**	**Class 12th with Physics, Chemistry**	**---**

Learning objectives

The Learning Objectives of this course are as follows:

- To understand physical properties of polymers required for product design
- To learn about plastic parts such as static and dynamic loaded parts for electrical, optical and mechanical applications (gears, bearings, pipes, seals, couplings and vibration dampers)

Learning outcomes

After studying this paper, students will be able to

- Explain the terminology involved in product design
- Distinguish the moulded hole, insert and undercut
- Describe the processing limitation of product design and stress analysis for product
- Demonstrate the plastic products for load bearing applications
- To do cost estimation of a polymeric product

SYLLABUS OF DSE-4

THEORY COMPONENT-

UNIT-1 (7 Hours)

INTRODUCTION TO PRODUCT DEVELOPMENT

Introduction, challenges in development process, distinguishing features in polymer products, polymer product classification, Selection of the right product, Generic development process, Criteria for a successful product process flow chart, identifying customer need and its analysis, Material data bank, comparative analysis, Criterion for material selection, types of polymers and their characteristics

UNIT 2 (7 Hours)

STRUCTURAL DESIGN AND DYNAMIC LOADING ON PLASTIC PARTS

Structure and physical properties of polymers, Dynamic load response of polymers, effects of cyclic loading, other forms of stress applied to polymer parts, design for stiffness, stress analysis of polymers, structural design

UNIT 3 (10 Hours)

DESIGN PROCEDURE FOR PLASTIC PARTS

Design procedure for plastic parts- Tolerance-Moulded holes-threads-radius- moulded hinges, integral hinge-snap fits Design of plastic structural parts for static loads, design of dynamically loaded plastic parts, design of plastic parts for electrical applications, design of plastic parts for optical applications.

UNIT 4 (6 Hours)

ESTIMATING, COSTING AND ELEMENTS OF COST

Cost estimation, importance of estimation, Costing, importance of costing, Difference between costing and estimation, Importance of realistic estimates, Estimation procedure, Elements of cost, Material Cost, Determination of Material cost, Labour cost, Determination of Labour Cost, Expenses , Cost of Product (Ladder of cost) , Illustrative examples.

PRACTICAL COMPONENT (60 Hours)

- Design requirement of Gear: materials, Bearings: Self lubricated plastic materials rubber bearing,
- Design of PVC piping: Raw materials, pipe design, specification and test procedure, manufacturing process
- Product, material, and Process requirement of Car bumper
- Application of reverse engineering in Rubber product design
- To prepare open and closed cell foam.
- To prepare rubber - metal composite products
- To determine mechanical properties of designed products

ESSENTIAL/RECOMMENDED READINGS

- Ulrich, T. K. T. and Eppinger, D.S. (2004), Product design and development, Tata McGraw-Hill, 3rd edition.
- Mahajan, M. (2008) Industrial Engineering and Production Management, Dhanpat Rai Publication.
- Mollay, A.R. (1994) Plastic Part Design for Injection Moulding, Hanser Publishers, Munich Vienna, New York.

SUGGESTIVE READINGS

- Hollins, B. Pugh, S. (1990) Successful product design, Butterworth & Co.

Note: Examination scheme and mode shall be as prescribed by the Examination Branch, University of Delhi, from time to time.

DISCIPLINE SPECIFIC ELECTIVE COURSES (DSE-5)

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course
		Lecture	Tutorial	Practical/ Practice		
POLYMERS IN BIOMEDICAL APPLICATIONS	**4**	**2**	**0**	**2**	**Class 12th with Physics, Chemistry**	**---**

Learning objectives

The Learning Objectives of this course are as follows:

- To acquire knowledge of biocompatibility and biodegradation
- To learn about applications and testing of bio-compatible polymer in tissue engineering

Learning outcomes

After studying this paper, students will be able to

- Explain the basic concepts and requirement of biomedical applications and biocompatibility
- Apply the knowledge of various polymers in biomedical application

SYLLABUS OF DSE-5

THEORY COMPONENT-