Product Design and Development (Open Elective Course)			
Course Code	**21ME754**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	2:0:2:0	SEE Marks	50
Total Hours of Pedagogy	--	Total Marks	100
Credits	03	Exam Hours	03

Course objectives:
1. To prepare students to excel in new product design and development through application of knowledge and practical skills.
2. To provide students with a solid foundation in mathematical modeling of engineering problems required for bringing new products fast into the market.

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

Module-1	8 Hours

Introduction: Characteristics of successful product development, Design and development of products, duration and cost of product development, the challenges of product development.

Development Processes and Organizations: A generic development process, concept development: the front-end process, adopting the generic product development process, the AMF development process, product development organizations, the AMF organization.

Teaching-Learning Process	Chalk and talk method / PowerPoint Presentation

Module-2	8 Hours

Product Planning:

The product planning process, identify opportunities. Evaluate and prioritize projects, allocate resources and plan timing, complete pre project planning, reflect all the results and the process.

Teaching-Learning Process	Chalk and talk method / PowerPoint Presentation

Module-3	8 Hours

Identifying Customer Needs:

Gather raw data from customers, interpret raw data in terms of customer needs, organize the needs into a hierarchy, establish the relative importance of the needs and reflect on the results and the process. Product Specifications: What are specifications, when are specifications established, establishing target specifications, setting the final specifications. Concept Generation: The activity of concept generation, clarifies the problem, search externally, search internally, explore systematically, reflect on the results and the process.

Teaching-Learning Process	Chalk and talk method / PowerPoint Presentation

Module-4	8 Hours

Concept Selection: Overview of methodology, concept screening, and concept scoring,

Concept Testing: Define the purpose of concept test, choose a survey population, choose a survey format, communicate the concept, measure customer response, interpret the result, reflect on the results and the process.

Teaching-Learning Process	Chalk and talk method / PowerPoint Presentation

Module-5	8 Hours

Product Architecture: What is product architecture, implications of the architecture, establishing the architecture, variety and supply chain considerations, platform planning, related system level design issues.

Teaching-Learning Process	Chalk and talk method / PowerPoint Presentation

Course outcome (Course Skill Set)

At the end of the course the student will be able to :

Assessment Details (both CIE and SEE)
The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 35% (18 Marks out of 50)in the semester-end examination(SEE), and a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together

Continuous Internal Evaluation:
Three Unit Tests each of **20 Marks (duration 01 hour**)
- First test at the end of 5th week of the semester
- Second test at the end of the 10th week of the semester
- Third test at the end of the 15th week of the semester

Two assignments each of **10 Marks**
- First assignment at the end of 4th week of the semester
- Second assignment at the end of 9th week of the semester

Group discussion/Seminar/quiz any one of three suitably planned to attain the COs and POs for **20 Marks** (**duration 01 hours**)
- At the end of the 13th week of the semester

The sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks and will be **scaled down to 50 marks**

 (to have less stressed CIE, the portion of the syllabus should not be common /repeated for any of the methods of the CIE. Each method of CIE should have a different syllabus portion of the course).

CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester End Examination:
Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the subject (**duration 03 hours)**
- The question paper will have ten questions. Each question is set for 20 marks.
- There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.

The students have to answer 5 full questions, selecting one full question from each module.

Suggested Learning Resources:
Text Book:
1. Product Design and Development - Karl.T.Ulrich, Steven D Eppinger - Irwin McGrawHill - 2000.

Reference books:
1. Product Design and Manufacturing - A C Chitale and R C Gupta, PH1, - 3rd Edition, 2003.
2. New Product Development - Timjones. Butterworth Heinmann -Oxford. UCI -1997
3. Product Design for Manufacture and Assembly - GeofferyBoothroyd, Peter Dewhurst and Winston Knight - 2002

Web links and Video Lectures (e-Resources):