Creative Engineering Design - Web course

COURSE OUTLINE

This course provides a broad overview of the generic concepts of design, design thinking and design research, and within the backdrop of this understanding, focuses specifically on the processes and techniques for carrying out engineering design in a creative manner. The course should be useful for both undergraduate and postgraduate students of engineering and design.

COURSE DETAIL

Sl. No	Topic	Lecture
1.	Introduction: Example of different kinds of designs and designers, Good and bad designs, Design problems, Definition of Design, engineering design and design research; Their Importance	3
2.	Product life cycle, Morphology of design, Introduction to system design process, Stage models	3
3.	Introduction to Task Clarification: overall process and steps	2
4.	Methods for Data collection and collation including patent analysis	2
5.	Methods for identification of requirements: Role Playing, Checklists, Solution neutral problem statements, etc.	4
6.	Quantifying requirements and Assigning importance to requirements	2
7.	Linking Customer requirements to engineering requirements: Quality Function Deployment techniques	4
8.	Introduction to conceptual design: Identification of functions, Ideation, Simulation and Consolidation into solution proposals	2
9.	Methods for Identification of functions such as functional decomposition techniques	2
10.	Methods for Ideation, such as Brainstorming, Synectics, etc.	3

NP-TEL

NPTEL

http://nptel.iitm.ac.in

Engineering Design

Pre-requisites:

- Basic courses in engineering.

Additional Reading:

- Chakrabarti, A (ed.). Engineering Design Synthesis: Understandign, Approaches and Tools, Springer, 2002.
- Ulrich, K., and Eppinger, S. Product Design and Development, 4th Edition, McGraw-Hill/Irwin, 2007.
- Otto, K., and Wood, K. Product Design, Prentice Hall, 2000.

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11.	Methods for consolidation into solution proposals, such as Morphological charts, Morphological matrix, etc.	2
12.	Methods for simulation: analytical, virtual and physical simulations	3
13.	Methods for improvement of solution proposals, such as contradiction analysis, various other TRIZ techniques, etc,	4
14.	Systematic evaluation of concepts: ordinal methods and cardinal methods	4
	TOTAL	40

References:

- Pahl, G, and Beitz, W. Engineering Design: A Systematic Approach, 3rd Ed., Springer, 2007.
- Cross, N. Engineering Design Methods: Strategies for Product Design (4th edition), John Wiley and Sons Ltd., Chichester, 2008.
- Roozenburg, N.F.M., Eekels, J. Product Design, Fundamentals and Methods, Wiley, Chichester, 1995.
- Jones, J.C. Design Methods, 2nd Edition, John Wiley and Sons Ltd., Chichester, 1992.