

IE3001D DESIGN THINKING

Pre-requisites: Nil

Total Hours: 39

L	T	P	C
3	0	0	3

Introduction

This course is intended for students from any discipline who require an understanding of design thinking for brand, product, and service development. Students will learn a series of design thinking concepts, methods and techniques that are used to bring about innovation in business and in the social sector.

Pedagogical approach

The course will be a mix of lecture, case discussions, participative and immersive learning. It will be a predominantly student driven learning to acquire the requisite skills. Relevant case discussions drive the principles of arriving at an optimum solution through innovative approaches. A comprehensive group project will be a major outcome of the course

Course objectives

- To expose the student with state of the art perspectives, ideas, concepts, and solutions related to the design and execution of projects using design thinking principles
- To prepare the mindset and discipline of systemic inspiration driven by a desire to identify new sources of ideas, and new models especially outside their regular working atmosphere
- To propose a concrete, feasible, viable and relevant innovation project/challenge

Module 1

12 hours

What is Different About Design thinking? Design Thinking Skills Principles of Design Thinking, The Basis for Design Thinking, The Design Thinking Team, Design Thinking Workshops and Meetings – Exercises and case based discussions

Module 2

13 hours

Listening and Empathizing Techniques – observation – structured open ended approach - , Design Thinking Frameworks, Ideation tools – brainstorming, innovation heuristics, behaviour models, overcoming cognitive fixedness – Exercises and case based discussions

Module 3

14 hours

Use of Diagrams and Maps in Design Thinking – Empathy map. Affinity diagram, mind map, journey map, combining ideas into complex innovation concepts.

Story telling – improvisation, scenario planning, development of scenarios, evaluation tools, frog design and prototyping - – Exercises and case-based discussions
Assess developer and user perspectives for bias – apply frameworks to strengthen communication – sustain a culture of innovation.

References:

Roger Martin, "The Design of Business: Why Design Thinking is the Next Competitive Advantage", Harvard Business Press , 2009.

Hasso Plattner, Christoph Meinel and Larry Leifer (eds), "Design Thinking: Understand – Improve– Apply", Springer, 2011

Idris Mootee, "Design Thinking for Strategic Innovation: What They Can't Teach You at Business or Design School", John Wiley & Sons 2013

Jeanne Liedtka , Andrew King, Kevin Bennett , “Book - Solving Problems with Design Thinking - Ten Stories of What Works” (Columbia Business School Publishing), 2013

Maurício Vianna, Ysmar Vianna, Isabel K. Adler, Brenda Lucena, Beatriz Russo, “Design thinking: Business Innovation” MJV Press, 2011

Burgelman, Christensen, and Wheelwright, “Strategic Management of Technology and Innovation” 5th Edition, McGraw Hill Publications, 2017

Similar courses

Design thinking (iimb.ac.in)

Design thinking certification at MIT Sloan (Online program)

Design thinking | Systems Design Engineering | University of Waterloo (waterloo.ca)

IE 3001 Design Thinking

Brief syllabus:

This course offers a brief understanding of design thinking for brand, product and service development. Students will learn a series of design thinking concepts, methods and techniques that are used to bring about innovation in business and social sector. The course covers design thinking skills, principles of design thinking, the basis for design thinking, and development of a solution through exercises, case based discussions, and projects.

IE 3004D Intellectual Property, Value Creation and Value Capture

Pre-requisites: NIL

Total Hours: 39

L	T	P	C
3	0	0	3

Course Outcomes:

CO1: Interpret the relationship between R&D and innovation Strategies

CO2: Formulate pathways for New Product Development

CO3: Understand the different strategic alliances and firm's intellectual property rights.

CO4: Understand the types and models of innovation and the frameworks of innovation process

Module I (13 hours)

Intellectual Property Management. Market Capitalization, Intellectual Capital (IC), Components of Intellectual Capital, Tangible and Intangible Assets of Firms, Goodwill, Linkage between IC, Corporate Strategy, and Profits, Relationship between Intellectual Capital and Intellectual Property, Knowledge Economy and the need for Intellectual Property Management, Enforcement of IPRs – IP and constitution of India, World intellectual Property Organization (WIPO) – WTO/TRIPS Agreement – India and the TRIPS Agreement – Patent law in India- IP & Start up policies in India.

Module II (14 hours)

Various Types of Intellectual Property trademarks, Copyrights, Patents, Trade Secrets, and Industrial Design, International IP Treaties/Agreements on IP Rights, Types of Patents, Patenting Advantage, Offensive and Defensive IP Strategies, Case studies – Procedure for obtaining patent – Rights of a patentee – Limitations on Particular's Rights – Revocation of patent for Non – working Transfer of patent – Infringement of patent – Global Innovation Index and IP Management, Intellectual Property Strategies in Indian Context Universities, CSIR and Commercial Firms

Module III (12 hours)

Indian Designs Law – Meaning of Design Registration and Prohibitions – Copyright in Designs – Design and Penalties – Steps for filing an Application – Copyright law in India –Owner of the copyright – Rights of Broad Casters and Performers – Registration of Copyright – Assignment, Licensing and Transmission – Infringement – International Copyright and Copyright Societies - Trade Mark Law in India – Functions of a Trade Mark – Registration of Trade Mark Exploiting Trade Mark – Infringement – Offenses and Penalties

References

1. Tarek M. Khalil (2009). *Management of Technology: The Key to Competitiveness and Wealth Creation*, McGraw Hill Education India Private Limited
2. Prabuddha Ganguli (2017). *Intellectual Property Rights: Unleashing the knowledge economy*, McGraw Hill Education India (Pvt) Ltd.
3. Ryder, R. D., & Madhavan, A. (2014). *Intellectual property and business: The power of intangible assets*. SAGE Publications India Pvt Ltd, <https://dx.doi.org/10.4135/9789351508021>
4. Patrick H. Sullivan, *Value-Driven Intellectual Capital: How to Convert Intangible Corporate Assets into Market Value*, Wiley; 1st edition,2015
5. WIPO, *Enterprising Ideas: A Guide to Intellectual Property for Startups*, https://www.wipo.int/edocs/pubdocs/en/wipo_pub_961.pdf
6. WIPO, *Making intellectual property work for business A handbook for chambers of commerce and business associations setting up intellectual property services*, Vol 2, 2008

Similar courses:

<https://www.hss.iitb.ac.in/en/hs-438-intellectual-property-rights-technology-development-and-management>

<https://cde.nus.edu.sg/isem/graduate/coursework/masters-of-science-intellectual-property-management-programme/>

<https://ocw.mit.edu/courses/15-628j-patents-copyrights-and-the-law-of-intellectual-property-spring-2013/pages/syllabus/>

IE 3003D Leadership, Innovation & Business models

Pre-requisites: Nil

Total Hours: 39

L	T	P	C
3	0	0	3

Course Outcomes:

CO1: Demonstrate effective decision making

CO2: Appraise personal strengths and weaknesses for leadership effectiveness

CO3: Apply knowledge of change management

CO4: Development and application of business models

Module 1 (10 Hours)

Decision-Making Process, Decision making in innovation, The Creative Process for Making Decisions, Decision making in relation to problem solving, Utilization of cognitive technology, Predictive analytics, Critical thinking process in a business scenario

Module 2 (9 Hours)

Defining Leadership; Global Leadership Attributes; Practicing Leadership, Types of leadership, Exemplary practices of effective leadership, Case studies, Aligning values, skills, and job activities for optimal performance, Leadership actions audit, Marketing of Innovation, Technology Innovation Process, Technological Innovation Management Planning, Technological Innovation Management Strategies, Technology Forecasting

Module 3 (10 Hours)

Analyzing the Current Business Scenario, Leadership and Change, creating a vision, Challenges of Innovation, Steps of Innovation Management, Idea Management System, Divergent V/s Convergent Thinking, Design Thinking and Entrepreneurship

Module 4 (10 Hours)

What is a Business Model, who is an Entrepreneur, Social Entrepreneurship, Blue Ocean Strategy-I, Blue Ocean Strategy-II, Business Models and value proposition, Business Model Failure: Reasons and Remedies, Incubators: Business Vs Technology, Business Model canvas and tools, Managing Investor for Innovation, Future markets and Innovation needs for India..

Reference books:

Bennis, Warren G., and Joan Goldsmith. "Learning to lead: A workbook on becoming a leader". Basic Books, 2010.

Drucker, Peter. "Innovation and entrepreneurship". Routledge, 2014.

Lauer, Thomas. "Change management". Springer Berlin Heidelberg, 2010.

Paton, Robert A., and James McCalman. "Change management: A guide to effective implementation". Sage, 2008.

Chesbrough, Henry. "Open business models: How to thrive in the new innovation landscape." Harvard Business Press, 2006.

Yukl, Gary. Leadership in Organizations, 9/e. Pearson Education India, 1981.

Similar courses:

Leading and Building a Culture of Innovation, Harvard Business School

Building Business Models | Stanford Online

The Innovative Technology Leader, Stanford Graduate School of Business

Business Model Analysis and Design – Stanford LEAD Online Business Program| Stanford Graduate School of Business

IE3003D Leadership, Innovation & Business models

Pre-requisites: Nil

Total Hours: 39

L	T	P	C
3	0	0	3

Brief syllabus:

This course addresses leadership in the business context to prepare you for a future of rapid change and increasing complexity. This course develops essential leadership skills such as project management, change management, critical thinking, effective decision-making, and work engagement. The modules cover Decision making, Leadership, Change management, Innovative mindset and Business models. The students will also cultivate an innovative mindset by learning how to test the feasibility of an idea, develop business models, and conduct an innovation audit.

IE 3002D PRODUCT DESIGN AND DEVELOPMENT

Pre-requisites: NIL

Total Hours: 52

Introduction:

L	T	P	C
2	0	2	3

This course is intended to empower students to assess, a need, develop a solutions to fulfill the need and to extend that to a workable product or prototype. The students will be trained convert the need to a function structure and come up with optimum solutions The course also deals with the methods to finalize the material, form and process in a systematic manner subjected to various optimization objectives. An overview about the different methodologies to prototype the designed product and evaluate the performance, and feasibility is also the scope of this course.

Pedagogical approach

The course will be a mix of lecture and case discussions. A group project will be undertaken by the students to achieve the course outcomes. The project will be progressed parallel with the corresponding theory for better reinforcement between theory and practical knowledge.

Course Outcomes:

1. Understand the engineering product design process
2. Conceptualize a product from the design requirements
3. Prototype the designs using suitable method
4. Evaluate the prototypes to validate the design specifications

Module 1: (8 hours)

Engineering Design Process: Opportunity identification-Product planning, Identification of customer needs, Target and final specifications, Concept generation- developing function structures, Development of working structures, selection and combination of working structures to concepts, Evaluation of concepts.

Module 2: (10 hours)

Selection of Material and Process: Properties of engineering materials, Ashby property charts, Derivation of material index, Material selection process, Material selection with single and multiple objectives, Shape factors, Systematic process selection, Effect of scale of production, Estimation of material and process costs. Economic batch size.

Module 3 (8 hours)

Prototyping Process: Purpose of prototyping, low and high fidelity prototypes. Minimum viable prototype, Digital prototyping methods, Physical prototyping methods, Concept of digital twin

Course Project (26 hours)

The objective of project is to develop a product from the conceived market need. In the first phase of the students are expected to conduct a thorough analysis and identify a need in the society. Various concepts to solve the problem may be evaluated and the suitable final concept to solve the problem may be selected. In the second phase of the problem, the students are requested to finalize the material, foam and manufacturing processes by optimizing to suitable objectives. The final phase of the work, the students may be prototype the product (digitally/physically) and evaluate the performance.

References:

Karl T. Ulrich and Steven D. Eppinger, Product Design and Development, 6th edition, Mc Graw Hill publication, 2016

G. Pahl et. al., Engineering Design-A Systematic Approach 3rd edition, Springer publication, 2007

Michael F. Ashby, Material Selection in Mechanical Design, 4th edition, Elsevier publication, 2011

David G Ullan, The Mechanical Design Process, 4th edition, Mc Graw Hill publication, 2010

Kathryn McElroy, Prototyping for Designers Developing the Best Digital and Physical Products, Oreilly publications, 2017

Ali Jamnia, Introduction to Product Design and Development for Engineers, CRC Press publication, 2018

IE 3002 PRODUCT DESIGN AND DEVELOPMENT

Pre-requisites: NIL

Total Hours: 52

L	T	P	C
2	0	2	3

Engineering Design Process: Opportunity identification, Product planning, Identification of customer needs, Target and final specifications, Concept generation, Evaluation of Concept, Selection of Material and Process: Properties of engineering materials, Ashby property charts, Material selection process, Material and shape selection, shape factors, systematic process selection, Estimation of material and process costs. Economic batch size. Prototyping Process: Purpose of prototyping, low and high fidelity prototypes. Minimum viable prototype, Digital prototyping methods, Physical prototyping methods, Concept of digital twin