

**INDIAN INSTITUTE OF TECHNOLOGY ROORKEE**

**NAME OF DEPARTMENT/CENTRE/SCHOOL:** DEPARTMENT OF DESIGN

**Subject Code:** DEC-501

**Course Title:** Introduction to Design and Prototyping

**L-T-P:** 15-5-10

**Credits:** Audit

**Subject Area:** PCC

**Course Outlines:**

Design definitions; Industrial design chronology; Interrelationship of design to engineering, architecture, arts and social sciences; Scientific and engineering considerations in design, impact of design on society; Aesthetics; Interaction Design; Introduction to human computer interaction, Ergonomics; Rapid Prototyping; Working principles and types of rapid prototyping machines, contact and non-contact type digitizers such as coordinate measuring machines, laser and white light scanners; Introduction to Automation; CNC machines, CAD, CAM; Product modeling using CAD software and rapid prototyping machine.

**INDIAN INSTITUTE OF TECHNOLOGY ROORKEE**

**NAME OF DEPARTMENT/CENTRE/SCHOOL:** DEPARTMENT OF DESIGN

**Subject Code:** DEC-503

**Course Title:** Design Methodology

**L-T-P:** 2-0-2

**Credits:** 3

**Subject Area:** PCC

**Course Outlines:**

Design; Definitions, history and modern practices; Design and the product life cycle; Design and society; Societal aspects; Impact of design on society and vice-versa; Introduction to creativity, creativity methods; Methodology for problem solving in engineering design; Various models, recognition, concept generation; Methodology of conceptual design; Definition, analysis, synthesis, communication and presentation; Hands-on projects; Specializations in the field of design; Design as a creative professional career.

**INDIAN INSTITUTE OF TECHNOLOGY ROORKEE**

**NAME OF DEPARTMENT/CENTRE/SCHOOL:** DEPARTMENT OF DESIGN

**Subject Code:** DEC-505

**Course Title:** Design Thinking

**L-T-P:** 1-0-4

**Credits:** 3

**Subject Area:** PCC

**Course Outlines:**

Building creative confidence, Introduction to key design concepts and terminologies, Design thinking as a process, Empathy based thinking, Defining problems, Ideation techniques, Prototyping, Design validation.

**INDIAN INSTITUTE OF TECHNOLOGY ROORKEE**

**NAME OF DEPARTMENT/CENTRE/SCHOOL:** DEPARTMENT OF DESIGN

**Subject Code:** DEC-507

**Course Title:** Elements and Principles of Visual Design

**L-T-P:** 2-0-2

**Credits:** 3

**Subject Area:** PCC

**Course Outlines:**

Visual elements and principles; Spatial and visual relationship; Gestalts principles; Colour classification, colour theories; Form, graphic compositions, grid structure, spatial analysis and organization; Perspective drawing; Rendering techniques.

**INDIAN INSTITUTE OF TECHNOLOGY ROORKEE**

**NAME OF DEPARTMENT/CENTRE/SCHOOL: DEPARTMENT OF DESIGN**

**Subject Code: DEC-509**

**Course Title: Human Factor Design**

**L-T-P: 1-2-0**

**Credits: 3**

**Subject Area: PCC**

**Course Outlines:**

Definition and origin of ergonomics and its applications in design; Data collection techniques; Types of data from humans at physical, physiological, cognitive and effective levels; Application of mean, median, mode and percentile in anthropometry and the design of workspaces; Human physiological potential and limitations - force, repetitive injury, stress; Cognitive load in complex tasks and applications in design.

**INDIAN INSTITUTE OF TECHNOLOGY ROORKEE**

**NAME OF DEPARTMENT/CENTRE/SCHOOL:** DEPARTMENT OF DESIGN

**Subject Code:** DEC-511

**Course Title:** Materials and Manufacturing

**L-T-P:** 1-0-2

**Credits:** 2

**Subject Area:** PCC

**Course Outlines:**

Engineering materials; Classification, properties, selection and applications; Introduction to manufacturing; Need, classifications, selection of processes, advantages and limitations, applications, capabilities of manufacturing processes; Manufacturing processes; Shaping, deformative, joining, material removal, powder processing, additive processes; Design for environment; Selection of eco-friendly materials and manufacturing processes.

**INDIAN INSTITUTE OF TECHNOLOGY ROORKEE**

**NAME OF DEPARTMENT/CENTRE/SCHOOL:** DEPARTMENT OF DESIGN

**Subject Code:** DEC-513

**Course Title:** User Experience Design

**L-T-P:** 1-0-2

**Credits:** 2

**Subject Area:** PCC

**Course Outlines:**

Introduction to user experience; User experience approach and methodologies; Design thinking, double diamond method, lean user experience, agile user experience; Tools and techniques of user research; User study techniques, heuristic evaluation techniques; User experience design deliverables; Case studies, and best practices.

## INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

**NAME OF DEPARTMENT:** Department of Design

**Subject Code:** DEL-501

**Course Title:** Form Design

**L-T-P:** 2-1-2

**Credits:** 4

**Subject Area:** PEC

**Course Outlines:** Study and exploration of Form; Aesthetics; Detailing; Colour theory and colour trends; Product styling; Cultural context; Visual contrast, composition, and hierarchy; Materials; Structures; Geometric forms; Nature-inspired; Visual analysis of objects; Visual appeal.

**INDIAN INSTITUTE OF TECHNOLOGY ROORKEE**

**NAME OF DEPARTMENT:** Department of Design

**Subject Code:** DEL-506

**Course Title:** Interaction Design

**L-T-P:** 2-1-2

**Credits:** 4

**Subject Area:** PEC

**Course Outlines:** Introduction to interaction design, user experience and human-computer interaction; Divergent and convergent thinking; Principles and methods of idea generation and selection; User behaviour and their preferences; Accessibility and usability concepts; Methodology; Conceptual models; Theories; Framework and interaction types; Case studies and best practices.

**INDIAN INSTITUTE OF TECHNOLOGY ROORKEE**

**NAME OF DEPARTMENT:** Department of Design

**Subject Code:** DEL-508

**Course Title:** Inter-Disciplinary Design

**L-T-P:** 3-0-2/2

**Credits:** 4

**Subject Area:** PEC

**Course Outlines:** Design-led research and design; experimental ideas and designs; cross-disciplinary explorations; creative practices; emerging and complex challenges; collaborating with stakeholders; imagining futures serving as effective interventions; issues from multiple perspectives and scales; Bio-Inspired Design; Mobility Design; Culture, Curation and Narrative Design; storytelling; Craft-Design; Interdisciplinary Design; cross-pollination and interdisciplinary exchange.

## INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

**NAME OF DEPARTMENT:** Department of Design

**Subject Code:** DEL-513

**Course Title:** Business and Service Innovation

**L-T-P:** 3-0-0

**Credits:** 3

**Subject Area:** PEC

**Course Outlines:** Innovation vs Invention, innovation and entrepreneurship; Marketing innovation and value chain marketing for innovation; Marketing of innovation, difference between innovation in marketing and marketing of innovation, marketing research and marketing of innovation, branding of innovation; Strategy and strategic management, strategy and innovation, services and innovation, innovation in services, consumer behaviour and service innovation.

**INDIAN INSTITUTE OF TECHNOLOGY ROORKEE**

**NAME OF DEPARTMENT:** Department of Design

**Subject Code:** DEL-519

**Course Title:** Service Design

**L-T-P:** 2-1-0

**Credits:** 3

**Subject Area:** PEC

**Course Outlines:** Introduction to service design, empathising with service users; Design thinking in service design; Co-creation and stakeholder involvement in service design; Service blueprinting, prototyping and iteration; Implementing and evaluating service design.