COURSE CONTENT

INNOVATION AND ENTREPRENEURSHIP								
IV Semester: CE								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
254EXL3	**Core**	2	0	0	2	40	60	100
Contact Classes: 30	**Tutorial Classes: Nil**	**Practical Classes: Nil**				**Total Classes: 30**		
Prerequisites: There are no prerequisites for this course.								

Course Objectives: The objective of this Course is to

- develop entrepreneurial mindset among civil engineering students
- encourage innovative thinking for solving real-world infrastructure problems
- equip students with the basics of business planning, startup creation, and IP rights
- bridge the gap between engineering solutions and market needs

Course Outcomes: At the end of the course, the student will be able to:

- Understand the fundamentals of innovation, creativity, and entrepreneurs
- Identify opportunities and develop innovative solutions in civil engineering
- Prepare business models and feasibility studies for civil-related startups
- Apply principles of intellectual property, prototyping, and product development
- Demonstrate leadership and teamwork in entrepreneurial projects

UNIT 1:

Introduction to Innovation & Entrepreneurship Innovation vs. Invention vs. Creativity Entrepreneurial traits and motivation Types of Entrepreneurs (Tech, Social, Green, Civil-focused) Successful startup case studies in infrastructure and civil engineering

UNIT 2:

Design Thinking & Ideation Empathy and user-centered design Problem identification in civil/environmental infrastructure Brainstorming and idea validation Rapid prototyping for construction materials, smart structures, etc.

UNIT 3:

Business Model & Start-Up Ecosystem Elements of a business model (Canvas model) Market analysis and feasibility Minimum Viable Product (MVP) Government schemes for startups (Startup India, Atal Innovation Mission) Incubators, accelerators, and funding options

UNIT 4:

Legal and Financial Aspects Basics of intellectual property rights (patents, copyrights, trademarks) Financial planning, budgeting, and cost estimation Funding options: Bootstrapping, Angel investors, VCs Civil engineering-specific legal compliance (construction, land use, etc.)

UNIT 5:

Innovation in Civil Engineering Smart city innovations Green building materials and sustainable design Entrepreneurship opportunities in construction tech, project management, surveying tech Automation in civil engineering – BIM, drones, 3D printing, etc.

TEXT BOOKS:

1. "Innovation and Entrepreneurship" by Peter F. Drucker
2. "Entrepreneurship Development" by S.S. Khanka
3. "Design Thinking" by Tim Brown

REFERENCE BOOKS:

1. AICTE Innovation Cell & Startup India Toolkit
2. Case studies on civil engineering startups (e.g., Katerra, Brick & Bolt, etc.).