

VEERMATA JIJABAI TECHNOLOGICAL INSTITUTE
(VJTI)
MATUNGA, MUMBAI 400 019

(Autonomous Institute affiliated to University of Mumbai)



Curriculum
(Scheme of Instruction & Evaluation and Course contents)

For
Multi-Disciplinary Minor
in
Innovation and Entrepreneurship

Implemented for the batch admitted in Academic Year 2023-24



V J T I Veermata Jijabai Technological Institute
(Central Technological Institute, Maharashtra State, INDIA)
H. R. Mahajani Marg, Matunga, Mumbai 400019
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Curriculum

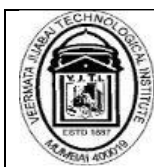
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Credit Framework for
Multi-Disciplinary Minor
in

Innovation and Entrepreneurship

Sr.	Semester	Course Code	Course Name	L	T	P	Hr	Cr	Examination Weightage in %		
									TA	MST	ESE
1	III	R5CE2201T	Understanding Incubation and Entrepreneurship	2	0	0	2	2	20	30	50
2	IV	R5CE2204T	Entrepreneurship Essentials	2	0	0	2	2	20	30	50
3	V	R5CE3201T	Product Design and Manufacturing	3	0	0	3	3	20	30	50
4	VI	R5CE3204T	Six Sigma	3	0	0	3	3	20	30	50
5	VII	R5CE4201T	Management Information System	3	1	0	4	4	20	30	50
Total								14			

Abbreviations: **L** Lecture, **T** Tutorial, **P** Practical, **TA** Teacher Assessment / Term work Assessment, **MST** Mid Semester Test, **ESE** End Semester Written Examination,

Programme Name	Bachelor of Technology in Civil Engineering	Semester – III
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Semester – III		Multidisciplinary Minor (Innovation and Entrepreneurship)						
SN	Course Code	Course Title	L-T-P (Hours/Week)	Credit	TA	MST	ES E	ESE hours
1	R5CE2201T	Understanding Incubation and Entrepreneurship	2-0-0 = 2	2	20	30	50	3
Course Outcome: 1. Acquire knowledge of entrepreneurship, incubation and business principles. 2. Understand Indian environment for entrepreneurship 3. Explore entrepreneurship funding options and investments 4. Understand the key concepts and theories of innovation 5. Analyse legal and ethical implications of business decisions								

Module	Course Content:
1	Introduction to Entrepreneurship Definition and importance of entrepreneurship, characteristics of successful entrepreneurs, entrepreneurial mindset and motivation. identifying business opportunities, types of entrepreneurship, Lean Start-ups. Case studies and success stories of start-ups.
2	Introduction to Business Incubation Importance of incubation in the entrepreneurial ecosystem, Types of incubators: technology, social, corporate, etc. Organisational structure of Incubators, Management and Operations, Collaboration and partnership, Funding, Networking , Mentoring, Challenges, Measuring success and KPI's
3	Innovation & Business development Creativity and innovation in business ideas, principles and processes of innovation. analysing the current business scenario, application of design thinking in product design, role of technology and sustainability in product design, brainstorming, mind mapping, and other

	ideation methods, Challenges in Innovation, From Idea to Proof of Concept, Problem statement presentation
4	Indian Environment for Entrepreneurship Overview of entrepreneurship in India, historical perspectives and evolution of Indian start up ecosystem, Key sectors and industries driving entrepreneurship in India. Case studies of famous entrepreneurs and their impact, social norms and their impact on entrepreneurial activities.
5	Exploring funding options Overview of Entrepreneurial Investment, Types of Investors (Angels, VCs, etc.), Funding stages-seed funding, series A,B,C etc. debt vs equity financing , alternative funding sources (crowdfunding ,grants), Role of Angel Investors, Role of VC's, Role of financial institutions and banks in supporting start ups
6	Government Policies and Support in India Overview of government policies supporting entrepreneurship (Startup India, Make in India, Atmanirbhar Bharat), Regulatory environment and ease of doing business, Government grants, subsidies, and schemes for startups. Oligopolies and Public Policy
7	Legal and Ethical Issues Business law basics,, Ethical Issues in Business; Moral Responsibility and Blame; Utilitarianism: Weighing Social Costs and Benefits; Rights and Duties of Business. Perfect Competition; Monopoly Competition; Oligopolistic Competition; Oligopolies and Public Policy. Intellectual property protection , creation & types of IPR, Patents and Copyrights- Patents in India
	Recommended Reading: 1) Entrepreneurship by Robert D. Hisrich, Michael P. Peters, Dean A. Shepherd, Sabyasachi Sinha, latest edition, The McGraw Hill Company. 2) Dr T N Chhabra, Entrepreneurship Development, Sun India Publications, New Delhi. 3) Entrepreneurship- Principles and Practices by Donald Kurakto, Thomson Publication. 4) Disciplined Entrepreneurship: 24 Steps to a Successful Startup by Bill Aulet 5) India as Global Start-up Hub: Mission with Passion by C B Rao 6) Innovation and Entrepreneurship: Practice and Principles by Peter F Drucke

Programme Name	Bachelor of Technology in Civil Engineering	Semester – IV
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Semester – IV		Multidisciplinary Minor (Innovation and Entrepreneurship)						
SN	Course Code	Course Title	L-T-P (Hours/Week)	Credit	TA	MST	ES E	ESE hours
2	R5CE2204T	Entrepreneurship Essentials	2-0-0 = 2	2	20	30	50	3
	Course Outcome: 1. Develop skills to generate and evaluate innovative ideas and address business challenges 2. Identify role of team, technology and sustainability in businesses 3. Explore strategies for successfully launching and marketing new products. 4. Analyse financial health, risk management and contingency planning in businesses 5. Develop skills to build and maintain support networks and mentorship relationships							

Module	Course Content:
1	Business Model Development Identifying business opportunities, Creating a Business Model Canvas, Building proof of concept-developing a business model, Components of a business plan, Setting business goals and milestones, Drafting a business plan outline, Value Proposition Design, strategic planning, Intellectual Property, Business Registration and Licensing
2	Building & Managing a Team Understanding Employment Law, Team dynamics- assistance with administrative tasks such as accounting, legal issues, and HR., Leadership styles, Recruitment and hiring, benefits of diversity and inclusion, setting and achieving team goals, defining and developing company culture. Tools and technologies for virtual collaboration. Discussions on best practices. Team building activities and exercises
3	Market Research and Analysis Market research methods, Identifying Target Markets, Competitor Analysis- Perfect Competition; Monopoly Competition; Oligopolistic Competition. Customer Discovery, customer acquisition and retention, Marketing strategies, Branding and Positioning, Digital Marketing and social media, customer acquisition, budgeting and forecasting, analysis and performance measurement. Case studies on Developing a marketing plan.

4	Financial Planning and Management Funding and investment strategies. Creating a business budget, Understanding balance sheets, income statements, and cash flow statements, budgeting and forecasting, Choosing the right funding mix, cost -benefit analysis, break-even analysis, identifying financial risks, strategies for risk mitigation, contingency planning
5	Resources and Support Importance of networking in entrepreneurship, Finding and working with mentors and advisors, Investor Relations, Access to co-working spaces, Tools and technologies needed for product development, such as software licenses or lab equipment. Strategies for building professional networks, Building advisory boards
6	Failures, Resilience and Recovery Importance of studying failed start-ups , overview of common reasons for failures, Case studies: of Start-ups that failed : -due to poor market fit, due to flawed business models, due to financial mismanagement, due to team issues, due to operational issues, due to customer-related issues, due to competition etc, Building resilience in the face of failure, Overcoming business challenges in entrepreneurship, Case studies: Entrepreneurs who bounced back after failure
	Recommended Reading: 1) "Financial Intelligence for Entrepreneurs" by Karen Berman and Joe Knight 2) "Startup Failures: 10 Reasons Why Startups Fail" by B.J. Allen 3) Design Thinking: Integrating Innovation, Customer Experience, and Brand Value" by Thomas Lockwood 4) Stay Hungry Stay Foolish by Rashmi Bansal 5) The Entrepreneur's Guide to Financial Statements" by David Worrell 6) "The Lean Startup" by Eric Ries

Programme Name	Bachelor of Technology in Civil Engineering	Semester – V
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Semester - V		Multidisciplinary Minor	Innovation and Entrepreneurship					
SN	Course Code	Course Title	L-T-P (Hours/Week)	Credit	TA	MST	ESE	ESE hours
3	R5CE3201T	Product Design and Manufacturing	3-0-0=3	3	20	30	50	3
Course Outcome: After completion of course students will be able to 1. Understanding fundamentals of design and manufacturing, and computer aided tools 2. Apply visual and value engineering principles 3. Analyse material selection and manufacturing & maintenance processes 4. Develop and apply costing strategies								

Module	Course Contents
1	Introduction to Product Design Product -consumption cycle, product realization process, product -design and manufacturing, features, product characteristics, cost and duration of product development, Rapid prototyping process
2	Visual Design Elements of visual design, aesthetic design, design principles-proportion/ratio, contrast, variety etc, product message, translating customer needs-voice of customer, quality function deployment (QFD)- tools used, product design specifications-components
3	Value Engineering Defining value engineering, cost-reduction versus value engineering, reasons for poor value, Value engineering methodology/ job plan phases-information, function, creativity, evaluation, development and implementation phase, Function analysis system technique (FAST), Case study

4	Material Selection Importance of material selection, Factors affecting the material selection process, Material selection procedures, design recommendations, materials recommended-ferrous/non ferrous, copper/brass, engineering materials etc		
5	Manufacturing Process & Manufacturing Design Selection of manufacturing processes, primary manufacturing processes, secondary manufacturing processes, tertiary manufacturing processes, and design for manufacturing. Design review, DFM & DFA principle, manufacturing guidelines, Computer aided design, Design for Assembly		
6	Product Costing Cost and Price Structure, Information resources, Estimating direct and indirect costs, Design and manufacturing costs, ways to model manufacturing cost process flow model, parametric cost model		
7	Design for Maintenance Importance, Factors affecting ease of maintenance, elements and concepts of maintenance, corrective and preventive maintenance, Maintenance of a degrading system		
	Textbook 1. Eppinger, S. and Ulrich, K., 2015. Product design and development. McGraw-Hill Higher Education 2. Magrab, E.B., Gupta, S.K., McCluskey, F.P. and Sandborn, P., 2009. Integrated product and process design and development: the product realization process. CRC Press. 3. Boothroyd, G., 1994. Product design for manufacture and assembly. Computer-Aided Design, 26(7), pp505-520. 4. Pahl, G., Beitz, W., Feldhusen, J., & Grote, K.H. – <i>Engineering Design: A Systematic Approach</i> (Springer)		
Programme Name		Bachelor of Technology in Civil Engineering	Semester – VI

Semester - VI		Multidisciplinary Minor	Innovation and Entrepreneurship					
SN	Course Code	Course Title	L-T-P (Hours/Week)	Credit	TA	MST	ESE	ESE hours
4	R5CE3204T	Six Sigma	3-0-0=3	3	20	30	50	3
Course Outcome: After completion of course students will be able to 1. Understand the Fundamentals of Six Sigma and Quality Management 2. Apply DMAIC Methodology for Process Improvement 3. Apply Statistical Tools for Data-Driven Decision Making 4. Explore Effective Process Control and Quality Assurance 5. Analyse Challenges in Six Sigma Implementation								

Module	Course Contents
1	Introduction to Six Sigma Quality concepts and definition, History of continuous improvement, Six sigma principles, Historical context and evolution, Key concepts: DMAIC (Define, Measure, Analyze, Improve, Control, Focus area, Six sigma applications
2	Quality Management Principles Fundamentals of Total Quality Management (TQM), TQM vs Six Sigma, Cost of quality, Quality function deployment, Management and planning tools
3	Define and Measure Six Sigma Project Identification, Selection and Definition, Project Charter and Monitoring, Process characteristics and analysis, Process Mapping: SIPOC, Data Collection and Summarization, Measurement systems, Fundamentals of statistics, Process capability analysis
4	Analyze and Improve

	Hypothesis testing, Correlation and Regression Analysis, One-Way ANOVA, Two -Way ANOVA, Multivariate analysis, Failure mode effect analysis (FEMA), Fractional factorial design, Taguchi method
5	Control Seven QC tools, statistical process control, Operating characteristics curve for variable controls and attribute control, Design of acceptance sampling for attributes, Design of acceptance sampling for variables
6	Six Sigma Implementation Challenges Design for Six Sigma (DFSS)-DMADV, DMADOV, DFX, Team management, Case studies
	Text and References 1. Roderick A. Munro and Govindarajan Ramu and Daniel J. Zrymiak. The certified six sigma Green Belt Handbook, 2015 (2nd edition), ASQ Quality Press and Infotech Standards India Pvt. Ltd. 2. T. M. Kubiak and Donald W. Benbow. The Certified Six Sigma Black Belt Handbook, 2009 (2nd edition), Pearson Publication 3. Forrest W. Breyfogle III. <i>Implementing Six Sigma: Smarter Solutions Using Statistical Methods</i> , 2003 (2 nd edition), Wiley publications. 4. Evans, J R and W M Lindsay. An Introduction to Six Sigma and Process Improvement, 2014, CENGAGE Learning. 5. Howard S. Gitlow and David M. Levine, Six Sigma for Green Belts and Champions, 2004, Pearson Education, Inc. 6. Mitra, Amitava. Fundamentals of Quality Control and Improvement, 2013 (3 rd edition), Wiley India Pvt Ltd.

Programme Name	Bachelor of Technology in Civil Engineering	Semester – VII
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Semester - VII		Multi Disciplinary Minor	Innovation and Entrepreneurship					
SN	Course Code	Course Title	L-T-P (Hours/Week)	Credit	TA	MST	ESE	ESE hours
5	R5CE4201T	Management Information System	3-1-0	4	20	30	50	3
Course Outcome: After completion of course students will be able to 1. Analyze the fundamentals of MIS and identify key components 2. Explore data management systems and concepts in knowledge management systems 3. Examine the role and functionalities of enterprise systems in business operations 4. Analyse IT strategies and E-commerce applications in business operations 5. Develop knowledge of emerging technologies and ethical issues								

Module	Course Contents
1	Introduction to Management Information Systems Introduction to Management Information systems :Types of MIS, Capabilities, Complements, CCR Framework; Role of manager with respect to IT in an organization
2	Data and Knowledge Mangement Database management systems, Data Warehousing, Big Data, Foundations of business intelligence, BI for data analysis and presentation, Decision Support Systems, Learning Management Systems, Executive Information Systems
3	Strategic Enterprise Systems - ERP, SCM, CRM, SRM. Strategic Enterprise Systems - Enterprise Resource Planning (ERP) systems, Supply Chain Management (SCM) systems, Customer Relationship Management (CRM) systems
4	E-commerce and IT Strategy Mobile and E-commerce – B2C, B2B and e-procurement, C2C and mobile commerce, Web 2.0 and 3.0, IT Strategy and Balanced Scorecard
5	Operational Support Systems Operational Support Systems - Manufacturing Systems, Sales and Marketing Systems, HRIS, Finance and Accounting Systems
6	Emerging Technologies

	Emerging Technologies – Cloud computing, Big Data Technologies, Internet of Things, Bring Your Own Device (BYoD,) Virtual Reality, Augmented Reality, Blockchain, Artificial Intelligence
7	Ethical and Social Issues in MIS Information Security, Threat to IS , Security Controls, Social , Ethical MIS
	Recommended Reading 1. Kenneth C. Laudon & Jane P. Laudon. “Management Information Systems”. Pearson Publishing. 2. Abraham Silberschatz, Henry F. Korth, & S. Sudarshan. “Database System Concepts”. 7th edition McGraw Hill 3. Robson. W. Robson. Strategic Management and Information Systems: An Integrated Approach (2nd Edition), Financial Times, 1997. 4. <u>Prasad L.M., Prasad Usha.</u> (2023)“ Management Information Systems” Sultan Chand & Sons Publishing 5. Kelly Rainer, Brad Prince, Management Information Systems, Wiley