

Management of Innovation in Engineering

Course Outline

Part I – Innovation in Context

Module 1 – Orientation, instructor background, syllabus overview, & assignments

- Overview of the entire course
- Grading structure (Critical Reviews, Book Review, Discussions, Projects)
- Web site layout and operation
- Project team formation and operation – Review past projects
- Critical Thinking and Performance Rubric
- Course Value in Career Planning – Levels of Management Thinking

Module 2 – Dimensions of Innovation

- Global market trends
- Sources of Innovation (internal and external)
- Types of innovation – product, process, organizational, and business model
- Innovation environments – manufacturing, service, public sector
- Degrees of Innovation Disruptive, Radical, incremental

Module 3 – Diffusion of Innovation

- Introduction to Social Evolution and Innovation
- Introduction to the History of Engineering and societal impact
- Diffusion of Innovation theory

Part 2 – Developing an Innovative Enterprise

Module 4: - Designing and developing an Innovative Lean Enterprise through Business Transformation

- What is transformational change?
- What is an Innovative Enterprise?
- How do we design and develop it?
 - Directional planning and future state visioning
 - Business process Analysis
 - Business process design and infrastructure alignment

Module 5: - Organizational Approach to Cultural Transformation

- Building an innovative culture
- Motivating teams and individuals
- Recognizing and overcoming systemic barriers
- Understanding organizational politics
- Fostering organizational learning
- Roles and responsibilities in a transformation project

Part 3 – Building the Lean Innovation Management Process

Module 6 – Enterprise Integration and Process Management

- Enterprise wide process modeling and the supply chain
- New product development in various environments – the use of the stage gate method
- Systems engineering approach applied to enterprise process integration
- Process and workflow analysis
- Design and Systems thinking

Module 7 – Integrating Process, Project, Programme Management &

- Roles and responsibilities in a process driven enterprise
- Programme and Project Management in a Process Driven Enterprise
- Concurrent engineering and collaborative product development concepts
- Effective Integrated Project team (IPT's)

Module 8 – Lean Product Development and Knowledge Management

- Deliverables Architecture and Knowledge Management
- Rules and Set based Product Development
- Programme structuring and planning
- Risk management
- Project initiation and execution
- Engineering change and programmed reviews

Module 9 – Deploying and embedding the innovation process

- Management of Change
- Organizing for deployment
- Overcoming resistance to change
- Role of an external management consultant as facilitator, coach and change agent

Part 4 - Sustaining the Innovative Lean Enterprise

Module 10 – Continuous Analyses of the “As Is” / “To Be” Business Process

- Researching customer needs
- Selecting and Prioritizing Issues
- Defining / designing Processes – Value Stream Mapping
- Establishing standards and performance measures
- Setting objectives for improvement

Module 11 – Continuous Improvement through Structured Problem Solving

- Problem Identification
- Root Cause analysis
- Data gathering and root cause analysis
- Problem Solving Tools and Techniques
- Formulating and selecting alternative solutions
- Documentation and implementation

Module 12 – Maintaining an Innovative Culture - Also Final Draft Report Team Presentations

- Learning Organization
- The Organization as a Living System
- Mechanics of effective teams
- Effective meetings
- Facilitator's role
- Integrated thinking
- Finding a higher purpose