

Branch Name:	Mechanical Engineering
Program Code:	ET101
Course Name:	Production and Operation Management
Course Code:	2ET1010702T
Pre-requisite Course:	Operation Research

Course Objectives:

1. To provide knowledge on machines and related tools for manufacturing various components.
2. To understand the relationship between process and system in manufacturing domain.
3. To identify the techniques for the quality assurance of the products and the optimality of the process in terms of resources and time management.

Teaching and Examination Scheme:

Credit	Teaching Scheme Hours per week				Evaluation Scheme (Marks)								
					Theory (Marks)				Practical (Marks)				Total (Marks)
	L	T	P	Total	SEE		CCA		SEE		CCA		
					Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
4	3	1	-	4	24	60	16	40	-	-	-	-	100

Course Contents:

Sr. No	Topic	Total Hours	Weightage (%)
1	Introduction: Scope of production management. Production system and resources (machines, tooling, etc.); Types of production (batch, flow and unit), Roles of line supervisors and production managers.	04	10
2	Project Management: Project life cycle: concept phase (RFQ, Quotations, Proposals), Project initiations, DPR preparation (project value, business case development and feasibility study); Project planning (obtaining resources, acquiring financing and procuring required materials); Project team, producing quality outputs, handling risk, acceptance criteria; Project execution (allocation of resources, scheduling, building deliverables); Project Monitoring and control: Project networks, progress review (physical and financial), CPM and PERT, critical path, re-scheduling; Project closure: acceptance of project deliverable; Analytics: Performance, capability aggregation, cost benefit analysis, variability analysis, Output-outcome analysis, project documentation, best practices, and depository.	12	30
3	Production Planning and Control: Production planning, Process planning, Resource planning, demand-utility mapping (production capability index, forecasting models, aggregate production planning, materials requirement planning); Inventory Management: Economic order Quantity, discount models, stochastic inventory models, practical inventory control models, JIT; Supply chain and management.	08	20

4	Factory Management: Factory layout: line balancing, material flow and handling, Lean and green manufacturing, Human resource management, Training need analysis, Advantage and opportunities for Digitalization, Advanced factory systems: TQM; Important acts, regularities and safety norms, Reliability assessment of processes, Block chain, Energy management, Efficiency & throughput, Overall equipment effectiveness. Process capability, lean manufacturing.	08	20
5	Operation Management: Linear programming, objective function and constraints, graphical method, Simplex and duplex algorithms, transportation assignment; Simple queuing theory models; Traveling Salesman problem; Network models: shortest route, minimal spanning tree, maximum flow model.	08	20

Reference Books:

1. L.J. Krajewski and L.P Ritzmen, Operations Management: Strategy and Analysis, Pearson, 2010.
2. R.B. Chase, F.R. Jacobs and N.J. Aquilano, Operations Management for Competitive Advantage, Tata McGraw Hill, 2011.
3. W. J. Hopp and M. L. Spearman, Factory Physics: Foundations of Manufacturing Management, McGraw Hill International Edition, 2008.
4. Mahadevan. B., Operations Management: Theory and Practice, Pearson, 2015.
5. Taha H. A., Operations Research, 6th Edition, PHI India, 2003.
6. M.P. Poonia, Total Quality Management, Khanna Publishing House, 2022.

E-Resources:

1. https://onlinecourses.nptel.ac.in/noc20_mg06/preview

Course Learning Outcomes (CLO):

CLO	Description	Bloom's Taxonomy Level
CLO1	Explain the scope of production management and identify production systems, resources, and types of production.	2 Understanding
CLO2	Explain the project life cycle, including initiation, planning, execution, monitoring and control, and closure, with application of tools such as CPM, and PERT.	3 Applying
CLO3	Analyze project performance using financial, risk, and analytical techniques, and apply best practices for quality delivery, documentation, and acceptance of project outcomes.	4 Analyze
CLO4	Plan and control production by applying forecasting, resource and process planning, inventory management techniques, and supply chain principles to achieve efficient and cost-effective operations.	3 Applying
CLO5	Design and manage efficient factory systems by applying layout planning, lean and green manufacturing, quality and safety practices, digitalization, and performance evaluation tools such as process capability etc.	6 Creating
CLO6	Formulate and solve operations management problems using optimization techniques, queuing models, and network analysis methods for effective decision-making.	3 Applying 4 Analyze

Mapping of CLOs with POs & PSOs:

Course Learning Outcomes	Program Outcomes (POs)												Program Specific Outcomes(PSOs)	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CLO1	H	M	L										M	L
CLO2	M	H	M	M	L				M	L	M		H	M
CLO3	M	H	M	H	M				M	L	H		H	M
CLO4	M	H	H	M	M				M		H		H	H
CLO5	M	H	H	M	H		M		M		H	M	H	H
CLO6	M	H	H	H	M						M		H	H

H: High, M: Medium, L: Low