Elective Course 1: Manufacturing Resource Planning and Control

Course Type:	PS: Program Specialisation	Course Credits:	2
Course Code:	O3SE509	Course Duration:	30 Hours

Course Objective:

- To familiarize students with core concepts, techniques, and systems in manufacturing resource planning.
- To equip students with practical skills in material requirements planning (MRP), scheduling, and inventory control.
- To develop analytical capabilities for evaluating production capacity, demand forecasting, and resource utilization.
- To enable students to apply lean manufacturing principles and quality control methodologies.
- To foster understanding of contemporary trends and technological advancements in manufacturing planning.

Pre-requisites: Operation Management

Course Outcomes:

- CO1: Choose appropriate Production planning to achieve business plan
- CO2: Compare manufacturing resources available and select right ones to optimize cost
- CO3: Identify ways to manage demand and capacity planning
- CO4: Analyse best practices followed for Material Requirement Planning
- CO5: Create a plan to address contemporary organizational issues based on the frameworks and theories covered.
- CO6: Create manufacturing resource plan based on understanding of concept

Unit / Module	Content	CO Mapping	Hours Assigned
1	Overview of operations planning and control, challenges in securing a competitive edge, understanding Enterprise Resource Planning and	CO1, CO2	3

	its linkage with functional units, Customized Software, data integration; integrating MPC with ERP; performance metrics to evaluate effectiveness		
2	Demand management and the MPC environment (MTS, ATO, MTO); communicating with other modules like Sales & Operations Planning, Master Production Scheduling; information use in demand management; CRM; balancing supply and demand; Collaborative Planning, Forecasting and Replenishment (CPFR); 9-step CPFR process model	CO2, CO3, CO6	3
3	Sales and Operations Planning: S&OP fundamentals, planning and management; payoffs; S&OP process, displays, basic trade-offs, economic evaluation of alternate plans; new management obligations, functional roles, integrating strategic planning, controlling the Operations Plan; Lawn King Inc case	CO2, CO3, CO6	3
4	Master Production Scheduling; MPS activity, statement of future output, business environment for MPS, other linkages; MPS techniques – time-phased, rolling through time, Order Planning and ATP; planning in an ATO environment; 2-level MPS; MPS stability-freezing and time-fencing; managing MPS	CO2, CO3, CO6	3
5	Material Requirements Planning; MRP in MPC; record processing – basic MRP record, linking records; technical issues-processing frequency, bucketless systems, lot sizing, pegging, FPOs, service parts, planning horizon; Scheduled Receipts vs Planned Order Releases; using the MRP system; system dynamics	CO2, CO3, CO6	3

6	Capacity Planning and Management; role in MPC systems, hierarchy of decisions, links to other MPC modules; capacity planning and control techniques – CPOF, Capacity Bills, Resource Profiles, Capacity Requirements Planning (CRP); finite capacity scheduling, using APS systems; management and capacity planning utilization. Managing bottleneck capacity, choosing measure of capacity, choice of technique, using the capacity plan	CO3, CO4, CO5, CO6	3
7	Production Activity Control; framework, MPC system linkages, linkages between MRP and PAC, JIT effect on PAC; Production Activity Control techniques, concepts, lead-time management, Gantt Charts, Priority Sequencing Rules, Theory of Constraints (TOC), Vendor Scheduling and follow-up, influence of internet	CO3, CO4, CO5	3
8	Advanced Scheduling and Just-in-Time; basic scheduling research, 1-machine, 2-machine, dispatching and sequencing rules; advanced procedures-due date setting, dynamic due dates, Labour-limited systems group scheduling and transfer batches: major elements of JIT its impact on MPC and applications, hidden factory; levelling production, pull system introduction, product and process design	CO3, CO4, CO5	3
9	Distribution Requirements Planning; DRP in the Supply Chain, MPC system linkages, marketplace, demand management, MPS; DRP techniques – basic DRP record, TPOP, linking multiple warehouse records, managing day-to-day variations from plan, safety stock; management issues – data integrity, organizational support,	CO3, CO4, CO5, CO6	3

	problem-solving		
10	Management of Supply Chain Logistics; framework for supply chain logistics, breadth of supply chain logistics, total cost concept; design, operation and control decisions; supply chain logistical elements – transportation, warehouses, inventory; warehouse replenishment systems; warehouse location analysis; vehicle scheduling analysis; customer service measurement MTS, MTO	CO3, CO4, CO5, CO6	3

Textbooks:

1. Manufacturing Planning and Control for Supply Chain Management, 6e; F Robert Jabobs, William Berry, D Clay Whybark, Thomas Vollmann; Mc Graw Hill

Reference Books:

1. Designing and Managing the Supply Chain – Concepts, Strategies and Case Studies, 4e; David Simchi-Levi, Philip Kaminski, Edith Simchi-Levi, Ravi Shankar; Mc Graw Hill