

THE OPEN UNIVERSITY OF TANZANIA

FACULTY OF BUSINESS MANAGEMENT

OPM 351: PRODUCTION SYSTEM DESIGN AND ANALYSIS

COURSE OUTLINE

OPM 351: PRODUCTION SYSTEMS AND DESIGN

1.0 Introduction:

Companies carry out manufacturing planning and control activities in several different areas in different degree of detail. The need of different firms calls for different activities, as well. In this course you will learn an overview for viewing these different aspects of Manufacturing Production Systems and designs.

Repetitive manufacturing are found in many plants that assemble similar products (e.g. automobile, watches, computers and televisions). For such products, components-part management is necessary, but every thing is coordinated with the flow or assembly rate for the end items.

Business Analysis is about identifying and understanding business requirements so that information systems will meet business needs. Many IT development projects fail to deliver because not enough effort is spent on analyzing and prioritizing business requirements.

This course introduces students to the skills and knowledge needed to analyze and design systems. The central theme is that system development should be business driven rather than led by technology. It encompasses the view that information systems include business processes as well as information technology.

The course covers essential approaches to requirements elicitation, business analysis and financial justification – all within a project framework. It is practical and interactive delivered using a mixture of lectures in the reference books and case study.

Students will learn how to elicit and document user requirements, construct high level business models, produce more detailed business models and use these models within a variety of development lifecycles of the production systems.

1.1 COURSE OBJECTIVE

- Understand what a production system is.
- Identify relevant techniques used in business analysis and where they are best used in the system development life cycle.
- Understand the importance of strategic analysis and its associated techniques.
- Be able to carry out a preliminary investigation including a feasibility study.
- Elicit business requirements using traditional fact-finding methods and techniques such as prototyping and Use Cases.

- Model as-is and to-be business processes at various levels from context diagrams down to the documentation of elementary processes.
- Understand how business analysis leads into system design.
- Carry out a basic cost-benefit analysis using financial techniques and tools.
- Understand the fundamentals of effective communication.

2.0 LECTURE ONE. PRODUCTION REQUIREMENT ANALYSIS.

2.1: Overview

Requirement for analysis and specification writing are sciences practiced by many, mastered by surprisingly few. And yet, the payoff from achieving excellence in these areas is large. The two aspects, Requirements Analysis and Specification Writing, are treated as separate but related topics, each in a course of one year.

Requirements Analysis course addresses the techniques used to capture validate and gain a complete understanding of requirements communicated at all stages of the system life cycle. Specification course addresses in detail the conversion of individual requirements into effective requirements specifications. The course focuses on the structure and language of requirements specification.

2.2 Objective of the Lecture

After completing this lecture, students will be able to:

- Understand what production system is.
- Explain Production planning.
- Relate manufacturing from Production
- System analysis and modeling.
- Understand how business analysis leads into system design.
- Carry out a basic cost-benefit analysis using financial techniques and tools.

2.3 Sub Topics:

- Define a system in relation to production.
- Define the term production
- Production planning management
- Manufacturing and production
- System analysis
- Define what a design is.
- What is cost-benefit?
- Tools and techniques in system design

3.0 LECTURE TWO: PRODUCTION ACTIVITY SYSTEM LIFE CYCLE

3.1 Overview

Production activity control also concerns, when necessary detail schedule and control of individuals' jobs at work centers on the shop-floor and it concerns vendor scheduling for the purpose of maintaining life cycle of the production. An effective production activity control system can ensure meeting the company's customer service goals.

3.2 Objective of the Lecture

After completing this lecture students will be able to:

- Understand the framework of production.
- Understand how material planning and control relate to other aspects of production.
- Understand the product activity control techniques.
- Show example of production activity.
- Design a data base for production activity control.

3.3 Sub Topics:

- Define and use framework of production.
- Explain Just In Time production concept.
- Explain the basic concepts and models used in shop-floor scheduling and control.
- Design PAC systems and implementation in different companies.
- Explain the data elements necessary for PAC system.

4.0 LECTURE THREE: PRODUCTION PLANNING AND SYSTEM DESIGN.

4.1. Overview

The managerial objective is to develop an integrated game plan whose manufacturing portion is the production plan. The production plan therefore, links strategic goals to production and is coordinated with sales objectives, resources availability and financial budgets. If production plan isn't integrated, production managers cannot be held responsible for meeting the plan, and informal approaches will develop overcome inconsistencies.

4.2 Objective of the Lecture

After completion of this lecture students will be able to:

- Schedule production planning.
- Understand the production process.
- Understand the management obligations in production firms.
- Operating production planning systems.

4.3 Sub Topics

- Strategic management and the relationship with production planning.
- Fundamental activities in production planning and techniques.
- Production planning process and forecasting.
- Key responsibilities for effective production systems.
- Start of art in system planning for production.

5.0 LECTURE FOUR: DEMAND MANAGEMENT.

5.1. Overview.

Demand management calls for all potential market be linked to manufacturing capacity and coordination. This is an activity of manager's day to day interaction between customers and the company. A well developed demand management module within manufacturing planning and control system brings significant benefit.

Proper planning of all external and internal generated demands means the capacity can be better planned and coordinated. Timely and honestly order of customers promises are possible only when one has demand schedule in place, and physical distribution can be improved significantly. The lecture will show how to achieve this.

5.2 Objective of the Lecture

After completion of this lecture students will be able to:

- Prepare demand management plan.
- Understand the demand techniques.
- Manage demand for a system.
- Managing effective demand practice.

5.3 Sub Topics:

- Demand and its importance to production.
- Role of demand in production system.
- Techniques used in demand management.
- Demand management for day to day basis.
- Effective demand management.

6.0 LECTURE FIVE: PRODUCTION DESIGN AND CONTROL

6.1. Overview.

Manufacturing planning and control issues are integrated with system design. The first linking the design of a firm's system with its corporate strategy for competing in the market place. As the investment in Manufacturing Planning and

Control is large and remains fixed in considerable time, getting it correct is critical to short and long run prosperity. Many companies make costly mistakes when their MPC systems don't support their basic mission in the market place.

6.2. Lecture objective.

After completing this lecture students will be able to:

- Explain MPC design options.
- Choose MPC design options.
- Understanding choices in practice for MPC.
- Integrating MPC and JIT systems.
- Explain in detail the material planning options

6.3 Sub Topics:

- Critical alternatives in designing systems to meet firm goals.
- Selecting the best alternative MPC design to support corporate strategy.
- Manufacturing firms with competitive environment mission and designing MPC system.
- MPC and Just In Time Inventory management and other options.

7.0 LECTURE SIX: IMPLEMENTATION OF MPC SYSTEMS.

7.1. Overview

Implementation of an effective manufacturing planning and control system focus almost exclusively managerial, since that's where the ultimate responsibility lies. This lecture focuses on fundamental issues involving preparing the organization, forming an implementation team, managing the project, and assessing the results.

Addressing these issues is critical to implementing a truly effective MPC system on a timely basis with realized results at each step in the process.

7.2 OBJECTIVE OF THE LECTURE

After completing the lecture students will be able to:

- Initiate a project
- Understand the prerequisite for project implementation
- Understand the role of organization in MPC
- Understand team implementation strategies
- Understand periodic auditing of MPC.

7.3 SUB TOPICS

- Manufacturing Planning and Control vision and design effort required.
- Successful implementation of MPC
- Player's roles and situations.
- Forming project teams for implementation.

- Users' education for MPC.
- Planning, Management and successful implementation.
- Periodic audits and stages.
- Economic order quantities.

8.0 LECTURE SEVEN: INVENTORY MANAGEMENT

8.1. Overview

For production systems, inventory management is important to make sure that production don't stop and frustrate timely delivery of orders. Inventory will include management of raw materials, finished goods, and spare-parts. This lecture will examine in detail the techniques used to determine appropriate order quantities and timing of individual items in a system. If the functions of inventory management efficiently carried, customers will be fully satisfied and the company goal achieved.

8.2 OBJECTIVE OF THE LECTURE

After completing this lecture, students will be able to:

- Understand the basic concepts in Inventory.
- Understand the techniques for inventory management.
- Understand the costs related to inventory
- Examine Economic order quantity in relation to other methods.
- Examine Quantity discount model.
- Understand the concept of Multi-item management.

8.3 Su Topics

- Independent demand inventory.
- Routine inventory management.
- Techniques for evaluating inventory management.
- Losses in relation to large inventory handling.
- Focusing on management attention on important issues of inventory.
- Sources of supply and demand uncertainty.

9.0 LECTURE EIGHT: DISTRIBUTION REQUIREMENT PLANNING.

9.1. Overview

Distribution Requirement Planning (DRP) provides the basis for trying the physical distribution system to the manufacturing planning and control systems. The set of Distribution Requirement Planning techniques can help firms that maintain distribution inventories improve their ability to link marketplace requirement with manufacturing activities.

A well-developed DRP system helps management anticipate future requirement in the field, closely match material supply to demand, effectively deploy inventory to meet customer service requirement, and rapidly adjust to the

vagaries of the marketplace. The system encourages significant logistics savings through better planning of aggregate transportation capacity needs and dispatching of shipments.

This lecture focuses on the techniques work, how they tie into the MPC system, and how they can be used to realize the potential savings.

9.2 LECTURE OBJECTIVE.

After completing this lecture students will be able to:

- Understand Distribution Requirement Plan in Manufacturing.
- Understand the DRP techniques.
- Evaluate the management issues in DRP

9.3 Sub Topics:

- Relation between Distribution Requirement Planning and MPC.
- DRP and how to manage the demand and supply.
- DRP and organization to realize the system success.
- Channels of Distribution in real firms.

10.0 EVALUATION

This course is evaluated in the normal system of the University.

• Two assignment @7.5%	=	15%
• Two Timed Tests @ 12.5	=	25%
• Final Examination	=	<u>60%</u>
Total		100%

11.0 REFERENCES

- 1.1 In this course one can use any relevant text, journal of production, internet and other materials.
- 1.2 Thomas E.V, William L.B, and Clay D.W (1997) *Manufacturing Planning and Control Systems*. MacGraw Hill: Irwin
- 1.3 Johnson R, Chambers S, Harland C, Harrison A, and Slack N (2003) 3rd Edition; *Cases in Operation Management*, Prentice Hall *Financial times*. Pearson Education.