

## 17.2.0 INDUSTRIAL ORGANISATION AND MANAGEMENT

### 17.2.1 Introduction

This module unit is designed to equip the trainee with the knowledge skills and attitudes for organizational management for technical operators and subsequently managers of the industrial plant production and manufacturing services. The purpose of the module unit is to equip the trainee with skills of the human and material resources management to enhance productivity in the mechanical production and services industry.

Trainees undertaking this module will require knowledge of communication skills and Mathematics (statistics).

### 17.2.2 General Objectives

By the end of the module unit, the trainee should be able to:

- a) understand the theories of management
- b) apply management skills in his/her field
- c) manage the human resources appropriately to maximize production
- d) plan and control the production processes
- e) acquire the knowledge of procurement, storing and costing of a product
- f) demonstrate innovation in design and development of industrial production

### 17.2.3 Module Summary and Time Allocation Industrial Organization and Management

Code	Sub-Module Unit	Contents	Time Hrs
17.2.1	Management Theory	<ul style="list-style-type: none"><li>• Theories of management</li><li>• Modern influences on the work of pioneers of management</li><li>• Contributions of management theories in modern day organisation management</li></ul>	10
17.2.2	Organisation Structures	<ul style="list-style-type: none"><li>• Theories of organisation</li></ul>	8

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Code	Sub-Module Unit	Contents	Time Hrs
		<ul style="list-style-type: none"> <li>• Types of organisation structures and charts</li> <li>• Need for delegation in organisation</li> <li>• Problems associated with delegation</li> <li>• Authority and responsibility</li> <li>• Decision process in organisation</li> <li>• Concept of management by objectives (MBO)</li> </ul>	
17.2.3	Plant Maintenance	<ul style="list-style-type: none"> <li>• Functions of maintenance department</li> <li>• Types of maintenance</li> <li>• Factors affecting plant reliability</li> <li>• Procedure of setting up maintenance schedule / plan</li> <li>• Centralized and decentralized maintenance</li> </ul>	8
17.2.4	Material Procurement and Stores Control	<ul style="list-style-type: none"> <li>• Meaning of procurement</li> <li>• Methods of procurement</li> <li>• Role of Public Procurement and Disposal Act in an organisation</li> <li>• Stores procedure</li> <li>• Methods of stock control</li> <li>• Types of stores</li> <li>• Stores documents</li> <li>• Stock control levels</li> </ul>	8
17.2.5	Production Planning Control	<ul style="list-style-type: none"> <li>• Functions / objectives of production planning</li> <li>• Factors affecting</li> </ul>	8

Code	Sub-Module Unit	Contents	Time Hrs
		production <ul style="list-style-type: none"> <li>• Need for product design</li> <li>• Stages of product design and development</li> <li>• Objectives of production control</li> <li>• Activities of production control</li> </ul>	
17.2.6	Work Study	<ul style="list-style-type: none"> <li>• Objectives of work study</li> <li>• Limitations of work study</li> <li>• Phases of work study</li> <li>• Method study</li> <li>• Work measurement</li> <li>• Techniques of work measurement</li> <li>• Motion study</li> </ul>	6
17.2.7	Human Resource Management	<ul style="list-style-type: none"> <li>• Functions of human resource manager</li> <li>• Need for staff recruitment in organisation</li> <li>• Sources of staff recruitment</li> <li>• Process of staff recruitment</li> <li>• Objectives of staff training</li> <li>• Staff training methods</li> <li>• Staff appraisal</li> <li>• Methods of staff appraisal</li> </ul>	8
17.2.8	Economics	<ul style="list-style-type: none"> <li>• Economics and engineering</li> <li>• Factors of production</li> <li>• Scarce resources and decision making</li> <li>• Opportunity cost</li> </ul>	8

Code	Sub-Module Unit	Contents	Time Hrs
		<ul style="list-style-type: none"> <li>• Production possibility curve (frontier)</li> </ul>	
17.2.9	Office Administration	<ul style="list-style-type: none"> <li>• Functions of an office</li> <li>• Types of office layout</li> <li>• How an office can be organized</li> <li>• Types of filing</li> <li>• Methods of filing</li> <li>• Office equipment</li> </ul>	6
17.2.10	Estimating and Costing	<ul style="list-style-type: none"> <li>• Elements of cost</li> <li>• Cost structure</li> <li>• Unit cost</li> <li>• Marginal costing</li> </ul>	6
<b>Total</b>			<b>66</b>

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17.2.1T1	<p><i>Content</i></p> <p>Theories of management</p> <ul style="list-style-type: none"> <li>i) Classical theory</li> <li>ii) Scientific theory</li> <li>iii) Bureaucratic theory</li> <li>iv) Administrative theory</li> <li>v) Human relations theory</li> <li>vi) Behavioural theory</li> </ul> <p>operational research</p>	<p>associated with delegation</p> <ul style="list-style-type: none"> <li>e) describe the decision making process</li> <li>f) explain the concepts of management by objectives (MBO)</li> </ul>
17.2.1T2	Pioneers of management	<p><b>17.2.2C Competence</b></p> <p>The trainee should have the ability to draw organisation structure and apply correct decisions making Process in managing an organisation</p>
17.2.1T3	Contribution of management theories in modern day management	
<b>17.2.2</b>	<b>ORGANIZATION STRUCTURES</b>	
	<b>Theory</b>	<i>Content</i>
17.2.2T0	<i>Specific</i>	17.2.2T1 Theories of organisation
Objectives	<p>By the end of the sub-module unit, the trainee should be able to:</p> <ul style="list-style-type: none"> <li>a) explain various theories of organisation</li> <li>b) identify various types of organisation structures</li> <li>c) differentiate between authority and responsibility</li> <li>d) explain the problems</li> </ul>	<ul style="list-style-type: none"> <li>i) Cybernetics</li> <li>ii) Formal</li> <li>iii) Informal</li> </ul>
		17.2.2T2 Types o organisation structures
		<ul style="list-style-type: none"> <li>i) Vertical</li> <li>ii) Horizontal</li> <li>iii) Circular</li> <li>iv) Functional</li> <li>v) Matrix</li> </ul>
		17.2.2T3 Authority and responsibility
		<ul style="list-style-type: none"> <li>i) Accountability</li> <li>ii) Span of control</li> <li>iii) Responsibility</li> </ul>
		17.2.2T4 Delegation problems
		<ul style="list-style-type: none"> <li>i) Accountability</li> <li>ii) Span of control</li> <li>iii) Staff</li> </ul>
		17.2.2T5 Decision making (factors)
		<ul style="list-style-type: none"> <li>i) Environment</li> </ul>

	<ul style="list-style-type: none"> <li>ii) Government regulations</li> <li>iii) Society</li> <li>iv) Internal environment</li> <li>v) Company policies</li> </ul>	<p>have the ability to prepare maintenance schedule for the plant</p>
17.2.2T6	<p>Management by objectives</p> <ul style="list-style-type: none"> <li>i) Organizational tasks</li> <li>ii) Group objectives</li> <li>iii) Evaluation</li> <li>iv) modification</li> </ul>	<p>17.2.3T1</p> <p><i>Content</i></p> <p>Functions of plant maintenance department</p> <ul style="list-style-type: none"> <li>i) Installation</li> <li>ii) Modification</li> <li>iii) Efficient management</li> <li>iv) Equipment appraisal</li> </ul>
<b>17.2.3</b>	<b>PLANT MAINTENANCE</b>	17.2.3T2
	<b>Theory</b>	Types of plant maintenance
17.2.3T0	<p><i>Specific Objectives</i></p> <p>By the end of the sub-module unit, the trainee should be able to:</p> <ul style="list-style-type: none"> <li>a) describe the functions of plant maintenance</li> <li>b) describe the types of plant maintenance</li> <li>c) describe the procedures of setting up maintenance plan</li> <li>d) explain the factors affecting the reliability of the plant</li> <li>e) describe centralized and decentralized maintenance</li> </ul>	<ul style="list-style-type: none"> <li>i) Planned maintenance</li> <li>ii) Preventive</li> <li>iii) Corrective</li> <li>iv) Running</li> <li>v) Shut down</li> <li>vi) Unplanned</li> <li>vii) Emergency breakdown</li> <li>viii) Centralized maintenance</li> <li>ix) Decentralized maintenance</li> <li>x) Advantages and limitations of centralized and decentralized maintenance</li> <li>xi) Condition based</li> <li>xii) Predictive maintenance</li> </ul>
17.2.3C	<b>Competence</b>	17.2.3T3
	The trainee should	<p>Procedures of setting up maintenance plan</p> <ul style="list-style-type: none"> <li>i) Inventory</li> <li>ii) Maintenance</li> <li>iii) Programme</li> <li>iv) Production schedules</li> <li>v) Material</li> </ul>

- resources
- vi) Job cards
- vii) Work order
- viii) Work request
- ix) Work study
- x) Planning charts
- xi) Safety
- 17.2.3T4 Factors affecting plant reliability
  - i) Plant design
  - ii) Maintenance
  - iii) Optimum use of resources
- 17.2.3T5 Centralized and decentralized maintenance

## 17.2.4 MATERIALS PROCUREMENT AND STORES CONTROL

### Theory

- 17.2.4T0 *Specific Objectives*  
By the end of the sub-module unit, the trainee should be able to:
- a) explain term procurement
  - b) explain procurement procedure
  - c) describe the stores procedure
  - d) describe documents used in store keeping
  - e) determine the stock levels
  - f) describe various types of stores

- 17.2.4C **Competence**  
The trainee should

have the ability to maintain optimum stock levels for production process

### Content

- 17.2.4T1 Meaning of procurement
- 17.2.4T2 Procurement procedure
  - i) Quotation
  - ii) Tendering
  - iii) Spot purchase
  - iv) Contract
  - v) Role of Public Procurement and Disposal Act in an organisation
- 17.2.4T3 Store procedure
  - i) Receiving
  - ii) Storing
  - iii) Requisition
  - iv) Issuing
  - v) LIFO
  - vi) FIFO
  - vii) FILO
- 17.2.4T4 Documents used in store keeping
  - i) Stock record card
  - ii) Bin cards
  - iii) Stores ledger
  - iv) Computer based systems
- 17.2.4T5 Calculate stock levels
  - i) Maximum stock level
  - ii) Minimum stock level
  - iii) Re-order level
  - iv) Economic order quantity (EOQ)
- 17.2.4T6 Types of stores
  - i) Centralized store

- ii) Decentralized stores

production control

*Suggested Learning Resources*

- i) Store documents
- ii) Bin cards
- iii) Stores ledger
- iv) stock card
- v) Public Procurement and Disposal Act documents

**17.2.5 PRODUCTION PLANNING CONTROL**

**Theory**

*17.2.5T0 Specific Objectives*

By the end of the sub-module unit, the trainee should be able to:

- a) explain the function of production planning
- b) explain factors affecting production planning
- 3) describe methods of production
- d) describe the need for product design
- e) describe stages of product design and development
- f) explain the objectives of production control
- g) describe the activities of

**17.2.5C Competence**

The trainee should have the ability to plan a properly coordinated production process

*Content*

**17.2.5T1 Functions of production planning**

- i) Selection of process
- ii) A breakdown of parts
- iii) Decision to produce or purchase
- iv) Planning the machines, equipment and tools
- v) Development of machine operations
- vi) Development of time standard
- vii) Routing
- viii) Making production schedules

**17.2.5T2 Factors affecting planning**

- i) Environmental
- ii) Political
- iii) Legal
- iv) Socio-economic
- v) Technological

**17.2.5T3 Methods of production**

- i) Jobbing
- ii) Batch
- iii) Flow



- iv) Mass
  - v) Process
- 17.2.5T4 Need for product design
- i) Optimization of material resources
  - ii) Optimization of manufacturing process
  - iii) Reduction of cost
  - iv) Standardization
  - v) Specialization
  - vi) Simplification
  - vii) Marketing requirements

- 17.2.5T5 Stages of product design and development
- i) Idea generation
  - ii) Preliminary design and sketches
  - iii) Analysis of design
  - iv) Evaluation
  - v) Functional design
  - vi) Final design
  - vii) Prototyping
  - viii) Production design

- 17.2.5T6 Objectives of production control
- i) Prime purpose
  - ii) Minimizing idleness of machines and man
  - iii) Meeting promises to

- customer
- iv) Inventory turnover
- v) Quality of the product

- 17.2.5T7 Activities of production control
- i) Routing
  - ii) Scheduling
  - iii) Follow-up
  - iv) Processing
  - v) Dispatching
  - vi) Programming

*Suggested Learning Resources*

- i) Charts
- ii) Model
- iii) Prototypes

**17.2.6 WORK STUDY**

**Theory**

*17.2.6T0 Specific Objectives*

By the end of the sub-module unit trainees should be able to:

- a) explain the basic concept of work study
- b) describe the conditions limiting the utilization of work study
- c) explain the phases of work-study
- d) explain the objectives of method study

- e) describe the techniques used in work measurements

- ii) activity
- iii) sampling
- iv) synthesis
- v) analytical estimating
- vi) PMTS (predetermined motion time systems)

**17.2.6C Competence**

The trainee should have the ability to calculate standard times and determine the duration of a given task at minimum cost

*Suggested Learning Resources*

- i) Flow chart diagrams
- ii) Reference work/text books

*Content*

17.2.6T1 Objectives of work study

- i) Productivity
- ii) Cost reduction
- iii) Methods of production
- iv) Time

17.2.6T2 Limitations of work study

- i) Physical facilities
- ii) Workers resistance/resentment

17.2.6T3 Phases of work study

- i) Method study
- ii) works measurement

17.2.6T4 Objectives of method study

- i) efficiency
- ii) optimum utilization of resources
- iii) personnel and equipment
- iv) cost effectiveness

17.2.6T5 Techniques of work measurement

- i) time

**17.2.7 HUMAN RESOURCE MANAGEMENT**

**Theory**

17.2.7T0 *Specific Objectives*

By the end of the sub-module unit trainee should be able to:

- a) describe the functions of a HR manager
- b) describe the need for staff recruitment
- c) identify sources of labour in staff recruitment
- d) describe staff recruitment process
- e) describe the objectives of staff training
- f) describe the methods of staff training
- g) describe the objectives of staff

- h) describe the methods of staff appraisal
- 17.2.7C Competence**  
The trainee should have the ability to supervise work and assign appropriate tasks to the personnel
- Content*
- 17.2.7T1 Functions of HR manager Training Recruitment
- Wages
  - Salary
  - Welfare
  - Health
  - Safety
  - Industrial dispute
  - Public relations
  - Industrial relations and conflict resolution
- 17.2.7T2 Need for staff recruitment
- Labour turn-over
  - New technology
  - Expansion
  - Production
  - Demand
  - Retirement
  - Replacement
- 17.2.7T3 Sources of labour
- Internal
  - External
- 17.2.7T4 Staff recruitment process
- Personnel specification
  - Job specification
  - Advertising
  - Short listing
- v) Interviewing
- vi) Engagement
- 17.2.7T5 Objectives of training staff
- New technology
  - Retention
  - Personnel development
  - Organizational development
  - Motivation
- 17.2.7T6 Training methods
- Vestibule
  - Induction
  - Seminars
  - External courses
  - Internal courses
  - On-the-job training
  - Apprenticeship
  - Workshops
  - Group training
  - Role playing
- 17.2.7T7 Objectives of staff appraisal
- Promotion
  - Training
  - Change of staff
- 17.2.7T8 Methods of staff appraisal
- Grading
  - Personnel specification
  - Job specification
- Suggested Learning Resources*
- Reference books
  - Charts
  - Employment Act document
- 17.2.8 ECONOMICS**
- Theory**

**17.2.8T0 Specific Objectives**

By the end of the sub-module the trainee should be able to:

- a) describe the concept of economics
- b) describe the factors of production
- c) describe the relationship between scarce resources and decision making

scarce resources and decision making

- i) Gross national product
- ii) Gross domestic product
- iii) National income
- iv) Market economy
- v) Demand curves
- vi) Supply curves
- vii) Opportunity cost

**17.2.8C Competence**

The trainee should have the ability to utilize factors of production to realize profitability.

**Suggested Learning Resources**

- i) Reference books
- ii) Charts
- iii) Statistics on national income from Government Agency

*Content*

**17.2.8T1** Importance of economics in engineering

- i) Wealth creation
- ii) Engineers are involvement in reduction of human effort

**17.2.8T2** Factors of production

- i) Labour
- ii) Land
- iii) Capital
- iv) Entrepreneurship
- v) Market research
- vi) Geographical location
- vii) Politics
- viii) Statutory requirements

**17.2.8T3** Relationship between

**17.2.9 OFFICE ADMINISTRATION**

**Theory**

**17.2.9T0 Specific Objectives**

By the end of the sub-module the trainee should be able to:

- a) outline functions of office
- b) describe types of

- c) office layout
- d) describe types of filing
- e) explain how an office can be organized
- f) explain methods of filing
- g) identify and use office equipment

### 17.2.9C Competence

The trainee should have the ability to manage an office and resources effectively

#### *Content*

- 17.2.9T1 Functions of office
  - i) Coordination
  - ii) Assignment of responsibilities
  - iii) Conflict resolution
  - iv) Quality control
  - v) Keeping organization records
- 17.2.9T2 Office layout
  - i) Open office
  - ii) Close office
- 17.2.9T3 Types of filing
  - iii) Vertical filing
  - iv) Horizontal filing
- 17.2.9T4 How an office can be organized
  - i) Routine tasks
  - ii) Non-routine
  - iii) Work schedule
  - iv) Organization structure
- 17.2.9T5 Methods of filing
  - i) Alphabetical
  - ii) Geographical
  - iii) Numerical

- iv) Chronological
- 17.2.9T6 Identification and use of office equipment

#### *Suggested Learning Resources*

- i) Model office
- ii) Office equipment
- iii) telephone
- iv) fax
- v) computers
- vi) filing cabinets
- vii) typewriters /teleprinter
- viii) furniture

### 17.2.10 ESTIMATING AND COSTING

#### *17.2.10T0 Specific Objectives*

By the end of the sub-module the trainee should be able to:

- a) describe elements of cost
- b) determine the cost of a process or product
- c) calculate break-even point from the given data

#### 17.2.10C Competence

The trainee should have the ability to determine break-even point and the cost of producing a given component

#### *Content*

- 17.2.10T1 Elements of cost

- i) Material cost
- ii) Labour cost
- iii) Expenses (direct and indirect)

17.2.10T2 Cost

17.2.10T3 Break-even point

- Plot

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