

SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY
SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

Course Title: INDUSTRIAL ORGANIZATION

Code No. : IND 100-3

Program: ELECTRICAL/ELECTRONIC/COMPUTER/MECHANICAL TECHNOLOGY

Semester: SIX

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Author: B. ADOLPH

New: Revision X

APPROVED:


Chairperson

Date

INDUSTRIAL ORGANIZATION

IND 100

Course Name

Course Number

PHILOSOPHY/GOALS:

1. To gain a reasonable level of proficiency in the use of such management tools as Critical Path and those included in productivity improvement.
2. To develop an appreciation and understanding of Management structures such as: Operations Analysis, R & D, Productivity Improvement, Quantity-Quality Control, Motivation, Labour Management Relations, Stress and Alienation Processes.
3. To develop a consciousness of the issues woven into today's social fabric.

METHOD OF ASSESSMENT (GRADING METHOD)

The first objective will be handled by in-class instruction and verified by test.

The second objective will be accomplished mainly by self-learning through assigned readings from the textbook and by ancilliary lecture material. Testing of this work will be by true/false tests conducted on Monday mornings at 10:00 a.m.

The topics and testing schedule are as follows:

1. History of Industry	Jan. 24
2. Management and Organizational Structure	31
3. Operations Analysis	Feb. 7
4. Finance and Budgeting	14
5. R & D	21
Winter Break - February 28 - March 4	
6. Production Planning	Mar. 7
7. Productivity Improvement	21
8. Quantity Control	28
9. Labour Management Relations	Apr. 4
10. Motivation	11

The third objective will be accomplished by class discussion of topics relevant to the issues of the day and related to the theme "The Work Ethic in the Shadow of the Chip". A paper on this topic is due at the end of March.

Each of the three sections is worth about 1/3 of the final mark.

An average on **all** tests and assignments of 55% constitutes a passing grade.

A	80	-	100%
B	69	-	79%
C	55	-	68%

SPECIFIC OBJECTIVES:

The objectives of IND 100, stated in general terms, are as follows

1. To gain a reasonable level of proficiency in the use of such management organizational techniques as Critical Path.
WORTH_____33%
2. To develop an appreciation and understanding of Management structures such as: Operations analysis, R & D Productivity Improvement, Quantity-Quality Control, Motivation, Labour Management Relations, and Stress and Alienation.
WORTH_____33%
3. To develop a questioning attitude and a position in the confusion that is being woven into the present day social fabric.
WORTH_____33%

PART I -- will be handled by lecture, and verification of skills gained will be by test.

PART II -- will be accomplished mainly by self-learning through readings of the text book, and by some lecture material. Testing will be True/False. Test day Monday 10 a.m.

PART III -- will be accomplished by class discussion of timely topics relevant to the issues of the day and will be related to the theme "The Work Ethic in the Shadow of the Chip", a paper of significant length is due at the end of March.

TOPICS - Reading List

1. American Industry	29 pages
2. Management and organizational Structure	24 pages
3. Operations Analysis	23 pages
5. Finance and Budgeting	28 pages
6. R & D	22 pages
8. Production Planning	20 pages
9. Productivity Improvement	19 pages
12. Quantity Control	30 pages
15. Labour Management relations	31 pages
17. Motivation	22 pages

itic Number	Periods	Topic Description	Reference
		<u>The Supervisors in Basket Management Game</u>	Handout
		<u>Background of Manufacturing Management</u> Prior to 1800 The Industrial Revolution Charles Babbage Frederick W. Taylor	
		<u>Organization & Planning for Manufacture</u> Organization in Manufacturing Organization principles	MOM 25-46
		<u>Forms of Ownership</u> Industrial Proprietorship General Partnership Limited Partnership Co-operative Corporation & Officers Stocks & Bonds	MOM 449-467
		<u>Plant Locations & Buildings</u> Plant location Location planning Location Factors & rating Buildings	MOM 47-68
		<u>Design of Manufacturing Processes</u> Functional Scope of Process Design Basic Factors Affecting Design Types of Manufacturing Relating Process Design to Types of Manufacturing Improvement of Product Design for Manufacturing Evaluation of Design	MOM 69-90
		<u>Industrial Equipment</u> Processing Equipment Mechanization & Automation Portable Tools Determination of Equipment Requirements	MOM 91-115
		<u>Methods Engineering</u> Areas of Application Origin Tools for Methods Analysis Work Simplification Value Analysis Social & Economic Effects of Method Study	MOM 117-135
		<u>Work Measurement</u> Origin of Work Measurement Uses of Work Measurement Data Work Measurement Equipment Stop Watch Studies Work Sampling MTM & Standard Data	MOM 136-155

Tooic Number	Periods	Topic Description	Refer
		<u>Materials Handling</u> Objectives of Material Handling Analysis of Material Handling Problems General Types of Materials Handling Equipment Selection Factors & Costs Relation of Materials Handling to Flow of Material Storage Packaging	MOM 156-179
10		<u>Plant Layout</u> Objectives Factors Affecting Plant Layout Process Layout Product Layout Plant Layout Techniques SSLP	MOM 180-200
11		<u>Manufacturing Control</u> Control Fundamentals Common Characteristics of Good Control Procedures Manufacturing Controls and People Basic Causes of Control Failure Control as a Tool of Management	MOM 203
12		<u>Production Planning & Control</u> Production Planning & Control Functions Factors Affecting Production Planning & Control Project Planning Methods (C.P.M.) Measuring Effectiveness	MOM 25 #
13		<u>Quality Control</u> Quality Standards Responsibility Inspection Statistical Quality Control Control Charts Reliability	MOM 277-30C
14		<u>Maintenance Engineering</u> Scope of Maintenance Economics of Maintenance Maintenance Procedures Types of Maintenance	
15		<u>Personnel Management</u> The Role of Unions Employment Training Health Safety Benefits Services	

Topic Number	Periods	Topic Description	Reference
16		<u>Labour Relations</u> Influence of Unions The Union Movement Independent Union Union Organization & Security Economic Weapons Labour Law Relations with Union	

INDUSTRIAL ORGANIZATION

IND 100-3

COURSE OBJECTIVES

TOPIC #1 The Supervisors In Basket

General Objective: This synthesized business situation serves only one purpose -- to familiarize the student with the functions that exist in any business. The game, as such, demands some subjective decision making -- subjective because the students will not have any true basis for the determination of the best solution. There are no specific objectives for this topic.

TOPIC #2

General Objective: The student will be able to trace the growth of Scientific Management from Babbage to Taylor, and in so doing will discover the great need for Organization.

Specific Objectives:

The student will be able to:

1. Explain to what extent Frederick Taylor can be considered the father of the Industrial Management Revolution in the United States.
2. Explain why the current age of automation will be considered the second industrial revolution.
3. Explain the difference between Babbage and Adam Smith in their approach to the division of labour.
4. Explain why the factory system didn't get started before the Industrial Revolution.
5. Compare the management principles of Henri Fayal with those of Frederick Taylor.
6. Compare and Contrast "interchangeable manufacture" with "duplicate manufacture".

TOPIC #3 Organization and Planning for Manufacturing

General Objectives: The student will demonstrate his understanding of the principles which apply to various forms of ownership, the role of the stock market, and the factors which determine type of organization.

Specific Objectives;

The student will be able to:

1. List the advantages and disadvantages of a sole proprietorship.
2. List the advantages and disadvantages of an equal partnership.
3. List the advantages and disadvantages of a corporation.
4. State the means and mechanisms by which a corporation raises capital.
5. State the role of the stock market in today's business world.
6. State the overall objective of manufacturing organization.
7. State the nine typical functions of a manufacturing organization.
8. Explain the "span of control".
9. List five ways in which management activities may be subdivided.
10. Explain the principle of responsibility and authority.
11. Determine and explain the strengths and weaknesses of the line type of organization and the functional type of organization.
12. Explain how the organization chart, the organizational manual, and standard practice manual are tools of co-ordination.

TOPIC #4 Plant Locations and Buildings

General Objectives: The student will demonstrate his understanding of the various factors which determine plant location, and building configuration and answer appropriate questions.

Specific Objectives:

The student will be able to:

1. Explain through an analysis of significant factors why Abitibi located in Sault Ste. Marie.
2. Explain why a candy company, presently located in New York City, plans to relocate to a small community of about 5,000 people, about 45 miles away.
3. Explain why a company prefers to use not more than 10 to 15 percent of the available labour supply in any of its many new branch plants.

4. Explain why there is a new trend which notes that many companies are locating in the country than in the cities.
5. Describe in your own words the typical factory building being constructed today and comment on how it might be built more cheaply.

TOPIC #5 Design of Manufacturing Processes

General Objective: The student shall demonstrate his understanding of the considerations involved in designing the correct manufacturing process by answering the following specific questions as outlined in the Specific Objectives.

Specific Objectives:

The student will be able to:

1. Outline the steps which are identified as functions of Process Design.
2. List the three basic factors that effect the design of a manufacturing process, and with brief notes, explain what he understands these to mean.
3. Using the lot size model $Q = \sqrt{\frac{2RS}{C}}$ determine Q , the economic lot size for an annual usage of 15000 parts at \$20.00 per set-up and a carrying cost of \$.12 per piece per year.
4. List the shortcomings of the model used in S.O.#4.
5. Explain why the cost of a part increases with its quality? Must this always be so?
6. List the procedure by which a part, designed by the product designer finally comes to function through the efforts of designer and process engineer.
7. Determine the information needed to make a decision as to whether or not a company, embarking on the manufacture of power lawn mowers, should be planned for continous or intermittent manufacture.
8. Explain the meaning and application of "balancing out the line".

TOPIC #6 Industrial Equipment

General Objective: The student will dexionstrats understanding of the considerations involving in selecting, purchasing or replacing manufacturing machines.

Specific Objectives:

The student shall be able to:

1. Define briefly and explain their differences
 - a) processes
 - b) operations
 - c) work units

2. Explain how the "human factor" enters into equipment selection.
3. Explain how the "hardening operation" which is a bottleneck operation could be stretched if necessary, if the cost of additional equipment is prohibitive.
4. Explain under what circumstances it would be advantageous for a company to use the declining balance method of depreciation instead of the straight line method.
5. Given two quotations on a new lathe:
 - Company X quotes \$4500 purchase price
 \$1000 operating cost per year
 Lifetime 10 years
 Salvage Value \$750
 - Company Y quotes \$5000 purchase price
 \$750 operating cost per year
 \$750 Salvage Value
 Lifetime 10 years

Determine the best investment if the minimum attractive return is 6% and the purchasing company uses the ANNUAL COST METHOD of Equipment evaluation.

TOPIC #7 Methods Engineering

General Objective: The student will be able to demonstrate his knowledge of the role of methods engineering by answering the questions posed in the following S.O.'s and by performing a methods study of a minor operation.

Specific Objectives:

1. State one example in which methods design has been used in the kitchen of your home.
2. After studying the manner in which coffee is dispensed in the Student Coffee Shop, suggest, using some tool of methods study, how the operation could be improved.
3. Explain what type of chart you might use to analyse the steps required in lubricating an automobile, and why.
4. Explain the reason that so few companies use suggestion plans.
5. Using Therbligs, describe the operation of removing your pen from your pocket and writing your name on a sheet of paper. What are some of the questions you might ask in seeking an improvement.
6. State why workers resist change. How can this resistance be reduced.

TOPIC #8 Work Measurement

General Objective: The student shall display sufficient skills as determined by the following S.O.'s to provide evidence that he understands the importance and significance of work measurement, as well as the inherent weaknesses.

Specific Objectives:

The student will be able to:

1. List and explain the functions in industry to which work measurement can make a contribution.
2. Explain why the stop watch has been the most commonly used timing device.
3. State and explain your position as to the suitability of work sampling to set standards on maintenance operations.
4. Explain why it is desirable to break a time study of a job down into a series of elements rather than unit jobs. ;
5. State why it is necessary to rate or level a time study. |
6. State why time and work measurement may be eliminated in the factory of the future.

TOPIC #9 Material Handling

General Objective: The student will display knowledge of the importance of proper material handling equipment and demonstrate his understanding by application of the general principles to answering of the questions listed in the S.O.'s and by discussion of case problems.

Specific Objectives:

The student will be able to:

1. State the seven objectives of the technician in his approach to materials handling problems.
2. List the three principles involved in material handling and provide an explanation of each.
3. List the factors involved in the Selection of Materials Handling Equipment.
4. List the tangible and intangible savings that serve as goals to the materials handling technologist.
5. Compared to small corner grocery stores. List the improvements made by modern supermarkets in materials handling.

6. Explain why, in terms of cost factors, that a large manufacturer of bulbs for flashlights, now ships bulbs loose in cartons of 1000, and 500. Could these factors also be applied to the manufacture of home lighting bulbs.

TOPIC #10 Plant Layout

General Objective: The student will demonstrate his understanding of the principles of effective arrangement of physical facilities and manpower by answering the S.O.'s below and by doing a simple layout to be assigned.

Specific Objectives:

The student will be able to:

1. Recall the primary goal of business by making reference to the factors of production.
2. List the objectives that govern the planning of a finished layout.
3. List the factors affecting, plant layout.
4. Differentiate between the meanings of Process Layout and Product Layout.
5. State the reasons that Algoma's machine shop has been set up on the basis of process layout.
6. Using the techniques of S.S.L.P. develop a layout for a single product machine shop under the factors as supplied.

TOPIC #11 Fundamentals of Control

General Objective: The student will demonstrate his knowledge of the Fundamentals of Control by answering the questions of the following S.O.'s and by writing his analysis of Case Problem "Meldrum Manufacturing Co.".

Specific Objectives:

1. Determine the control units of measure which could be used for:
 - a) Baking of bread in a bakery
 - b) A community fund drive
 - c) An insurance company
2. List and describe four basic control phases.
3. Define the term "objective" and state the importance of objectives in control situations.
4. Describe "degree of control" and give one example.

5. List five important features of good control systems that should be used as "benchmarks" in analysis.
6. State two basic causes of control failure and explain ways in which these: may be avoided.

TOPIC #12 Production Planning and Control

General Objective: The student will be aware of all of the elements inherent in a good Planning and Control System for production, will be able to design a critical path project consisting of 10 activities with interactions, and will answer questions and problems as assigned.

Specific Objectives:

The student will be able to:

1. Define and give examples of:

a) Routing	\
b) Loading	
c) Scheduling	i
d) Dispatching	j
e) Corrective Action	

as they applied to the Production Planning function.
2. List the two factors and explain how they affect the Production Planning; function.
3. List and define the eleven records or forms which must normally be consulted in order to develop a plan, and briefly describe each Critical Path.
4. As applies to the Critical Path method of developing a Plan, define::

a) Early Start Time	e) Critical Path Time
b) Late Start Time	f) Total Float
c) Early Finish Time	g) Free Float
d) Late Finish Time	h) Bar Chart
5. Design an arrow diagram for an assigned project of 10 activities, completing the project with a bar chart.
6. Answer correctly, questions 1 to 10, page 274.
7. Do cases 1, 2, page 275.