Government of Karnataka
Department of Technical Education
Board of Technical Examinations, Bengaluru

Course Title: Industrial Engineering and Management		Course Code:15MC53T
Mode (L:T:P) : 4:0:0	Credits:4	Core/ Elective: Core
Type of Course: Lectures & Student Activities		Total Contact Hours: 52
CIE= 25 Marks		SEE= 100 Marks

Prerequisites: Knowledge of Manufacturing technology,

Course Objectives: On successful completion of the course, the students will be able to know the basic management skills in optimum utilization of the resources with greater productivity, superior quality and sustainable development.

Course Outcome: At the end of the Course, the student should be able to

1. Explain the basic principles of production management.
2. Explain importance of managing the materials, inventory control and maintenance of the plant.
3. Summarize the need of Total Quality management and the usage of TQM tools in quality control.
4. Explain Modern Production Management techniques which plays major role in present industries.
5. Explain labour laws in maintaining harmonious relationship between employee and employers.
6. Explain the importance of Occupational Health, safety and Pollution control.

Course Outcome		CL	Linked PO	Teaching Hrs
CO1	Explain the basic principles of production management.	*U*	2	08
CO2	Explain the importance of managing the materials, inventory control and maintenance of the Plant	*U*	2	08
CO3	Summarize the need of Total Quality management and the usage of TQM tools in quality control	*U*	2	10
CO4	Explain Modern Production Management techniques which plays major role in present industries.	*U*	2	08
CO5	Explain labour laws in maintaining harmonious relationship between employee and employers	*U*	2,5	08
CO6	Explain the importance of Occupational health, safety and Pollution control.	*U*	2,5,6	10
Total Sessions				**52**

Legend: R; Remember, U: Understand A: Application

Mapping of Course Outcomes with Program Outcomes.

Course	Programme Outcomes									
	1	2	3	4	5	6	7	8	9	10
Industrial Engineering And Management	**0**	**03**	**0**	**0**	**01**	**01**	**0**	**0**	**0**	**0**

Course Content and Weightage For SEE

Unit No	Unit Name	CO	Hour	Marks allocated for different Cognitive level Questions			Marks Weightage (%)
				R	U	A	
1	Production Management	1	08	-	15	-	10.34
2	Material Management And Maintenance	2	08	-	15	-	10.34
3	Total Quality Management	3	10	-	45	-	31.0
4	Modern Production Management Techniques	4	08	-	15	-	10.34
5	Industrial Relation And Labour Laws	5	08	-	**15**	-	10.34
6	Occupational Health And Safety	6	10	-	40	-	27.58
Total			52	145 marks			100

Contents

Unit-I

Production Management

Management- Functions of Management, Henry-Fayol's principles of management, Functions of Manager,
Organization- types of organization
Production planning and Control (PPC) - Functions of PPC: planning, routing, scheduling, dispatching and Inspection ,
Productivity: factors to improve productivity
Project Management - Market survey, Project planning, Project capacity, selection of site for project, Aids of project management-CPM (Critical path Method)- PERT (Program evaluation and review Technique).
Cost analysis - Objectives of costing, Elements of costing, Material cost, Labor cost & Overheads,

8 Hours

Unit-II

Material Management And Maintenance

Material management- different methods of purchasing, Purchase procedure, Comparative statement, purchase order, Tender-Types of tender
Inventory and Inventory control - Definition, Functions of inventory control, Steps involved in inventory control, ABC Analysis, Advantages of Inventory Control,
Management Information System (MIS) - Objectives of MIS,
Material Requirement Planning (MRP)-concept, applications.
Enterprise resource planning (ERP) - concept, features and applications.
Plant maintenance -Types of maintenance, Preventive maintenance, Break down Maintenance, Advantages and disadvantages, Total Productive Maintenance, benefits of TPM, Tools of TPM, planned maintenance and predictive maintenance.

8 Hours

Unit-III

Total Quality Management

Quality Control - Factors affecting quality, Advantages of quality Control, Inspection, types of inspection,
Total Quality Management -Principles of Total Quality Management, PDSA cycles, PDCA cycles, Quality Circles,
Statistical Quality Control (SQC), - Acceptance sampling, Sampling inspection,
TQM Tools- Control Charts, Histograms, Pareto Charts, Cause and effect diagram
SIX SIGMA–Concepts, Benefits of Six Sigma,
Quality Certification Systems- ISO 9000 series, (ISO 9000, ISO 9001, ISO9002, ISO9003 & ISO 9004,) ISO9000 quality certification procedure, Benefits of ISO Certification
ISO-14000, Benefits of ISO-14000 Certification.

10 Hours

Unit-IV

Modern Production Management Techniques

Lean Manufacturing- Objectives, types of wastes, Steps for lean Production, Benefits
Just in Time-concepts and benefits,
KANBAN production- concepts and benefits,
Kaizen- concepts and benefits
SAP (Systems Applications and Products) - concepts and benefits
World class Manufacturing (WCM) - Basic concept-Principles of world class manufacturing
Concurrent Engineering-Elements of Concurrent Engineering

8 Hours

Unit-V

Industrial Relation And Labour Laws

Introduction to industrial relation -Objectives of industrial relation, International labour Organization (ILO), Objectives of ILO,
The Indian Factories Act-1948-Important definitions, Health provisions, Safety provisions, Welfare provisions, working hour's provisions.
The Payment of Wages Act 1936-Payment of wages, Deductions from salary, Imposition of Fine.

The Minimum Wages Act 1948- Objectives, Provisions.
The Apprentices Act 1961-Provisions under apprentice act
The Workmen's Compensation Act 1923- Important definitions, Provisions, Employers liability for compensation.
The Employees State Insurance Act 1948- Objectives, Benefits to employees
The Employees' Provident Funds & Miscellaneous Provisions Act 1952- Salient features of the Act.
The Payment of Gratuity Act 1972- Salient features of the act.

8 Hours

Unit-VI

Occupational Health and Safety

Introduction to Occupational Safety, National safety council of India, Indian standard on OH& S management system, occupational health & safety management system (OHSAS), OHSAS 18001, How to use OHSAS 18001.
Accident-causes for accident, Direct and indirect losses due to an accident, Steps to prevent accidents, Personal protective devices for Mechanical hazards, Role of safety officer in industry
Fire safety-Fire prevention and Protection, Sources of Fire, Principles of fire extinguishing, A, B, C-Types of fire extinguishers.
Electrical safety - Hazardous of Electricity, Safety precautions to prevent electrical shocks.
Industrial Pollution- Air pollution, Water pollution, Noise pollution, Soil pollution, Sources, Effects and Prevention of above pollutions, Industrial wastes and their control.

Environment - Climate change, Global warming, acid rain, Green house effect, ozone layer, depletion- Causes, effects and Preventive measures, National environmental Legislations

10 Hours

References

Sl.No.	Title of Books	Author	Publication
1.	Industrial Organization and Engineering Economics	T.R.Banga & S C Sharma	Khanna.Publishers
2.	Production and operation management-5th Edition	S N CHARY	Mc Graw Hill publication,
3.	Industrial management and organizational behavior	K.K.Ahuja	-
4.	Industrial management and engineering economics	O.P.khanna	Khannapublishers
5.	Industrial Engineering and Production management	M. MAHAJAN	Dhanpat rai and co.
6.	Production and operations management	-Dr .K.Aswathappa and Dr.Sreedhar Bhatt	Himalaya publishers
7.	Safety Management in Industry	Krishnan.N V	Jaico Publishing House, Bombay, 1997
8.	Total Quality Management	S Raja Ram, Shivashankar	-
9.	A hand book of Occupational Safety and Industrial Psychology	S.P.RANA, P.K.GOSWAMI, Dr.INDU RATHEE	S. CHAND Publication

e- References

1. https://www.youtube.com/watch?v=10S03_VkFmk
2. https://www.youtube.com/watch?v=yYIVumq6sVM
3. https://www.youtube.com/watch?v=XDrpfL1TkP0
4. https://www.youtube.com/watch?v=H58TPQNr2kM
5. https://www.youtube.com/watch?v=set2cb-TMA0
6. https://www.youtube.com/watch?v=uNNP60MEaYw
7. https://www.youtube.com/watch?v=mYq3tP7RArE
8. https://www.youtube.com/watch?v=CBFKBf1rOyo
9. https://www.youtube.com/watch?v=F7hk_sMings
10. https://www.youtube.com/watch?v=0Ld78M3hfjo&list=PLMiiHACprHh3AfvcbGoZSdFPLLciLcsCf
11. https://www.youtube.com/watch?v=DAQapF-F4Vw&list=PL678705AFF9E8064E

Student Activity

Activity No.	Description of the Student Activity
1	prepare Comparative statement, Placing the purchase order with necessary terms and conditions
2	Given the data, prepare the scheduling using Gantt chart.
3	Visit a nearby industry make a Power point presentation on Modern production management techniques in use.
4	Identify any one product ,being manufactured in local industry, Study the process they are following for manufacturing the product, submit hand written report
5	Visit a nearby industry, make a report on quality system is put in practice and quality tools they are using in work place
6	case study on plant maintenance of nearby industry, observe what type of maintenance they undertake in their industry.
7	Visit a nearby industry, make a report on safety measures and safety equipments using in work place

Note:

1. Group of max four students should do any one of the above activity or any other similar activity related to the course COs and get it approved from concerned Teacher and HOD.
2. No group should have activity repeated or similar
3. Teacher should ensure activities by different groups must cover all COs
4. Teacher should asses every student by using suitable **Rubrics** approved by HOD

Sample Rubrics

Dimension	Exemplary	Accomplished	Developing	Beginning	Roll No. of the Student				
	5/4	3	2	1	1	2	3	4	5
Organization	Information presented in logical, interesting sequence	Information in logical sequence	Difficult to follow presentation--student jumps around	Cannot understand presentation--no sequence of information	Ex: 2				
Subject Knowledge	Demonstrates full knowledge by answering all class questions with explanations and elaborations	At ease with expected answers to questions but does not elaborate	Uncomfortable with information and is able to answer only rudimentary questions	Does not have a grasp of the information. Cannot answer questions about subject	3				
Graphics	Explain and reinforce screen text and presentation	Relate to text and presentation	Occasionally uses graphics that rarely support text and presentation	Uses superfluous graphics or no graphics	4				
Oral Presentation	Maintains eye contact and pronounces all terms precisely. All audience members can hear	Maintains eye contact most of the time and pronounces most words correctly. Most audience members can hear presentation	Occasionally uses eye contact, mostly reading presentation, and incorrectly pronounces terms. Audience members have difficulty hearing	Reads with no eye contact and incorrectly pronounces terms. Speaks too quietly	5				
Total Score=2+3+4+5=14/4=3.5=4									

Institutional Activity

Activity No	Description of the Institutional Activity
1	Organize seminar, workshop, lecture from eminent persons in the following domain: a) Enterprise resource planning b) Six sigma c) Safety issues in industries b) Labour laws c) Safety importance and equipments e) Role of industries in preventing environment pollution f) World class manufacturing g) Lean manufacturing etc
2	Organize industrial visit
3	Motivate student to take case study on Environmental pollution to inculcate self and continuous learning

Course Assessment Pattern

Particulars			Max Marks	Evidence	Course outcomes
Direct Assessment	**CIE**	Three tests (Average of three tests)	20	Blue books	1,2,3,4,5,6
		Student Activity	05	Student Activity Sheets	1,2,3,4,5,6
	SEE	End of the course	100	Answer scripts at BTE	1,2,3,4,5,6
Indirect Assessment	**Student Feedback on course**	Middle of the course		Feedback forms	1, 2and3
		End of the course		Feedback forms	1,2,3, 4, 5and6

Note: I.A. test shall be conducted for 20 marks. Average marks of three tests shall be rounded off to the next higher digit.

Note to IA verifier*: *The following documents to be verified by CIE verifier at the end of semester

1. Blue books (20 marks)
2. Student suggested activities report for 5 marks and should be assessed on RUBRICS
3. Student feedback on course regarding Effectiveness of Delivery of instructions & Assessment Methods.

MODEL QUESTION PAPER (CIE)

Test/Date and Time	**Semester/year**	**Course/Course Code**	**Max Marks**
Ex: I test/6 th weak of sem 10-11 Am	Vth SEM	Industrial Management and Engineering	20
	Year: 2017-18	Course code: 15MC53T	
Name of Course coordinator :		Topic: Units:1,2	**CO: 1,2**

Note: Answer all questions

Question no	**Question**	**MARKS**	**CL**	**CO**	**PO**
1	Explain Henry-Fayol's principles of management. **OR** Explain with line diagram how Functional Organization will suit for Steel industry.	5	U	1	2
2	Explain production-planning and control and	5	U	1	2
3	Explain the concept and features of ERP **OR** Explain MRP	5	U	2	2
4	Explain the advantages and disadvantages of Preventive maintenance	5	U	2	2

Model Question Paper(SEE)

V Semester Diploma Examination

Industrial Management and Engineering

Time: **3 Hours**] [Max Marks**: 100**

Part A

Note: Answer any SIX from Part A **6x5=30 marks**

1. Explain the functions of organization
2. Explain preventive maintenance
3. Summarize the duties of purchasing officer
4. Explain the objectives of quality control
5. Explain different types of control charts
6. Explain Lean manufacturing
7. Explain the objectives of Industrial relation?
8. Explain Health provisions Under Indian factory act-1948
9. Explain global warming effects and control measures

Part B

Answer any SEVEN from Part B **7x10=70 marks**

1. Explain Administration, Management and Organization
2. Explain the benefits and tools of TPM
3. Outline the applications of Material Requirement Planning (MRP)
4. Explain $\bar{X}$ and $\bar{R}$ Charts with graphical representation
5. Explain the application of sampling inspection in industries
6. Explain 7 forms of wastes
7. Explain steps involved in KANBAN
8. Explain Workmen's Compensation Act
9. Explain acid rain with effects and control measures
10. Explain soil pollution , its effects and control measures to prevent the same

Model Question Bank

V- Semester Diploma Examination

Industrial Management and Engineering

Note: *The paper setter is of liberty to set the questions on his/her desecration based on cognitive levels notified for that unit. They have to follow only blue print of SEE question paper format. The model question bank is only for reference to students/course coordinator to initiate the process of teaching-learning only.*

Unit-I

Production Management

Cognitive level –Understanding

1. Explain Henry Fayol's principles of management
2. Explain the types of Business Organization
3. Explain 1) Administration 2)Management c) Organisation
4. Explain the functions of Manager?
5. Explain organization and list the types of organization.
6. Explain production and explain the needs for production
7. Explain productivity
8. Explain the factors to improve productivity
9. Explain production-planning and control and mention its needs
10. Explain planning and mention the functions of planning
11. Explain scheduling and explain master schedule
12. Explain scheduling and explain manufacturing schedule
13. Explain despatching and mention its types
14. Explain the functions of despatching
15. Explain inspection and mention the objects of inspection
16. Explain the inspection standards
17. Explain the functions of inspection department
18. Explain the types of Inspection
19. Explain management
20. Explain administration
21. Explain Organization
22. Explain Administration, Management and Organization
23. Explain with line diagram how Line staff & Functional Organization will suit for Steel industry
24. Explain line organization and mention its advantages and limitations.
25. Explain functional organization and mention its advantages and limitations.
26. Explain Line & staff organization and mention its advantages and limitations.

27. Explain PPC
28. Explain the procedure for routing
29. Explain the functions of despatching
30. Explain centralised inspection and mention its advantages and disadvantages
31. Explain Floor Inspection and mention its advantages and disadvantages
32. Explain Patrolling Inspection and mention its advantages and disadvantages
33. Explain the duties and responsibility of chief inspector.

Unit- II
Material Management and Maintenance

Cognitive level –Understanding

1. Explain material management and mention its functions
2. Explain purchase and mention the objects of purchasing department
3. Explain the duties of purchasing officer
4. Explain the terms and forms used in purchase department
5. Explain tender
6. Explain the advantages and disadvantages of inventory control
7. Explain plant maintenance and explain its needs
1. Explain the Explain the different methods of purchasing
2. Explain the functions of purchasing department
3. Explain the Performa of purchase order
4. Explain the procedure for purchasing the materials
5. Explain the specimen copy for preparation of comparative statement
6. Explain different types of tender
7. Explain stock or inventory control and mention the functions of inventory control
8. Explain the steps in inventory control
9. Explain Management Information System
10. Explain the concept and features of Enterprise resource planning (ERP)
11. Explain the concept of Material Requirement Planning (MRP)
12. Explain TPM and tools of TPM
13. Explain the objectives of plant maintenance
14. Explain preventive maintenance
15. Explain Breakdown maintenance
16. Explain preventive maintenance and Breakdown maintenance
17. Explain planned maintenance and predictive maintenance
18. Explain plant maintenance schedule
19. Explain break down maintenance and mention its advantages and disadvantages
20. Explain with a block diagram ABC classification of materials

Unit -III
Total Quality Management

Cognitive level –Understanding

1. Explain quality and list the factors affecting quality
2. Explain quality control and mention the objectives of quality control
3. Explain the advantages of quality control
4. Explain inspection
5. Explain Total quality management
6. Explain the Obstacles associated with TQM Implementation
7. Explain SQC
8. Explain acceptance sampling
9. Explain the advantages of acceptance sampling
10. Explain different types of control charts
11. Explain flow charts
12. Explain quality circle and mention its functions
13. Explain the benefits of ISO 14000
14. Explain advantages of Quality control
15. Explain different types of inspection
16. Explain continues process improvement in TQM
17. Explain basic concepts of TQM
18. Explain the benefits of TQM
19. Explain the principles of Total quality management
20. Explain about PDCA cycles
21. Explain about PDSA cycles
22. Explain the benefits of Quality circle
23. Explain about control charts
24. Explain $\bar{X}$ and $\bar{R}$ Charts with graphical representation
25. Explain different types of control charts
26. Explain sampling inspection
27. Explain the application of sampling inspection in industries
28. Explain about Six Sigma concepts
29. Explain about Six Sigma benefits
30. Explain Histogram with graphical representation
31. Explain Pareto charts with graphical representation
32. Explain with graphical representation the Cause-and-Effect Diagram
33. Explain the Need for ISO 9000- ISO 9000-2000 Quality System
34. Explain about ISO 9000 Family

35. Explain the benefits of ISO Certification
36. Explain ISO9000 quality certification procedure.
37. Explain the Benefits of ISO-14000 Certification.

Unit – IV
Modern Production Management Techniques

Cognitive level –Understanding

1. Explain Lean manufacturing
2. Mention the objectives of lean manufacturing
3. Mention the benefits of lean manufacturing
4. Explain 7 forms of wastes
5. Explain steps involved in lean production
6. Explain concepts and benefits of JIT
7. Explain concept of KANBAN
8. Explain steps involved in KANBAN
9. Explain the concept of 5S
10. Explain steps involved in 5S
11. Mention the benefits in implementing 5S
12. Explain events involved in Kaizen
13. Explain concept of SAP ERP
14. Explain the basic concept of WCM
15. Explain the Principles of WCM
16. Explain the elements of Concurrent engineering
17. Write a short note on application of SAP ERP in industries
18. Write a short note on application of Kaizen in industries

Unit – V
Industrial Relation and Labour Laws

Cognitive level –Understanding

1. Explain the objectives of Industrial relations
2. Explain the objectives of ILO
3. Explain **Health provisions** Under Indian factory act-1948
4. Explain **Safety provisions** Under Indian factory act-1948
5. Explain **Welfare provisions** Under Indian factory act-1948
6. Explain **working hours provisions** Under Indian factory act-1948

7. Explain the provisions under Workmen's Compensation Act 1923
8. Explain employers liability for compensation under Workmen's Compensation Act 1923
9. Explain the Salient features of Employees PF Act-1952
10. Explain the Salient features of Payment of Gratuity Act 1972

Unit - VI

Occupational health and safety

Cognitive level –Understanding

1. Explain the purpose of national safety council of India (NSCI)
2. Explain the Indian standard on OH&S management system
3. Explain OHSAS-18001(Occupational Health and Safety management system)
4. Explain industrial safety and mention the needs and importance of safety
5. Explain industrial accidents
6. Write the Direct and indirect losses due to an accident
7. Describe the role of safety officer , safety supervisor and safety committee
8. Explain various personal protective devices as a safety measures against accidents
9. Explain Fire prevention and Protection
10. Explain main sources fire
11. Explain detection and prevention of fire, fire alarms and fire extinguishers
12. Explain various classification of fire
13. Explain the principle of fire Extinguishing
14. Explain the types of fire Extinguishers
15. Explain the hazardous of electricity
16. Explain safety measures to prevent electrical shocks
17. Explain industrial pollution
18. Explain the types of air pollutants
19. Explain air pollution , its effects and control measures to prevent the same
20. Explain with a sketch Cyclone separator
21. Explain with a sketch electrostatic precipitator
22. Explain water pollution , its effects and control measures to prevent the same
23. Explain soil pollution , its effects and control measures to prevent the same
24. Explain noise pollution , its effects and control measures to prevent the same
25. Explain the factors affecting for climate change
26. Explain global warming with effects and control measures
27. Explain acid rain with effects and control measures
28. Explain ozone layer depletion.