

GUJARAT TECHNOLOGICAL UNIVERSITY, AHMEDABAD, GUJARAT

COURSE CURRICULUM

**COURSE TITLE: OPERATIONS MANAGEMENT AND INFORMATION SYSTEMS
(COURSE CODE: 3351907)**

Diploma Programme in which this course is offered	Semester in which offered
Mechanical Engineering	5 th Semester

1. RATIONALE

On one hand, the revolution of information technology has forced mechanical operations based. industries to integrate this technology in their day to day operations and on another hand, optimum utilisation of resources with quality objectives has become base for survival. This course will develop in the students the abilities to search for better solutions for any operating problems/situations by logical thinking and to develop analytical skill by learning important operation management techniques. The routine work and routine systems are being handled by the people at the operating level in industries with integration of computers and operations management philosophy. The stress is given on operations management, cost effectiveness and quality aspects with computer based information systems, which are required in day-to-day operations in industries for smooth and efficient operations. Proper and rapid flow of information improves the decision making process and the industrial relations as a consequence

2. LIST OF COMPETENCY

The course content should be taught and implemented with the aim to develop different types of skills so that students are able: to acquire following competencies

- **Plan, use, and control resources optimally and economically.**
- **Interpret and operate simple information systems in a given situation.**

3. COURSE OUTCOMES.

The theory should be taught and practical should be carried out in such a manner that students are able to acquire different learning outcomes in cognitive, psychomotor and affective domain to demonstrate following course outcomes.

- i. Perform various tasks like market survey, demand forecasting, shop floor and plant supervision, etc.
- ii. Utilize resources optimally and efficiently.
- iii. Implement and monitor data base management systems for mechanical based industries.

4. TEACHING AND EXAMINATION SCHEME.

Teaching Scheme (In Hours)			Total Credits (L+T+P)	Examination Scheme				Total Marks
				Theory Marks		Practical Marks		
L	T	P	C	ESE	PA	ESE	PA	
3	0	2	5	70	30	20	30	150

Legends: L-Lecture; T – Tutorial/Teacher Guided Theory Practice; P -Practical; C – Credit, ESE -End Semester Examination; PA - Progressive Assessment.

5. COURSE DETAILS

Unit	Major Learning Outcomes (in cognitive domain)	Topics and Sub-topics
Unit – I. Introduction.	1a. Describe operations management and information system in mechanical based industries. 1b. Explain Optimization: concept need and scope. 1c. List types of production, their merits and demerits. 1d. List types of operations layouts: - types, features, applications. 1e. Explain concept and importance of information systems. 1f. List types of resources (7M).	1.1 Operations management: concept, meaning, definition, scope and functions. 1.2 Optimization: concept, meaning, definition, need and scope. 1.3 Types of production, their merits and demerits. 1.4 Types of operations layouts: - types, features, applications. 1.5 Types of resources (7M). 1.6 Data-meaning and types. 1.7 Information-meaning and types. 1.8 Information system: need, concept, definition, features, objectives and examples. 1.9 Need to integrate information systems and optimum utilization of 7M resources.
Unit – II Marketing.	2a. Calculate future demand of the product. 2b. Survey market for given product. 2c. Show the attitude to work as service engineer. 2d. Explain Concept, need and maintenance of customers' data by using Customer Relationship Management	2.1 Demand forecasting- Definition, importance, types for new products and established products, and their features and applications. 2.2 Time series analysis: features, types (This includes simple average, simple moving average and weighted moving average) and examples. 2.3 Market survey-importance and methods. 2.4 Marketing channels-types and applications. 2.5 Service after sales-importance, need of technical know-how, ways and methods, attitude attributes as service engineer, examples of better sales and service set up. 2.6 Concept, need and maintenance of customers' data by using Customer

Unit	Major Learning Outcomes (in cognitive domain)	Topics and Sub-topics
	(CRM) method / technique.	Relationship Management (CRM) method / technique.
Unit – III Supervision with cost & quality control	3a. Develop the concept to optimize utilization of 7M resources at shop floor/plant level. 3b. Define quality and various quality fads. 3c. Familiarize with TQC, TQM, ISO 9000 and other quality systems in current use. 3d. Construct simple house of matrix using QFD. 3e. Explain pareto analysis. 3f. Establish relationship between cost and quality. 3g. Establish relationship between rejection, cost and quality.	3.1 Importance of productivity, quality and cost saving during shop floor and plant supervision. 3.2 Qualities of good supervision at shop floor and plant level to optimise 7M resources utilisation. 3.3 Quality- Evolution of various quality definitions. 3.4 Definitions of quality policy, quality systems, quality management, quality control, (QC) quality circle, quality assurance (QA), and SQC. 3.5 Quality circle-concept, methodology and benefits with example. 3.6 Philosophical concept, meaning, importance with respect to employee leadership, customer satisfaction, quality, and Total Quality Management (TQM). 3.7 Introduction to quality system standards (ISO9000, BS 14000 and current with its area of application). 3.8 Quality Function Deployment (QFD)- concept, method to construct house of quality, examples. 3.9 Correlation between rejection, rework, cost and quality. 3.10 Pareto analysis-concept and examples.
Unit – IV Data base management system.	4a. Develop familiarity with objectives and need of data base management systems and software available in the market. 4b. Prepare RDBMS using database management system software.	4.1 Data management-concept, need, basic terminology used. 4.2 Data base: definition, meaning, importance, approach and architecture. 4.3 Objectives of database organizations. 4.4 Data models: meaning, relationship and association, drawing schema, bubble chart & tree structure for suitable mechanical engineering application. 4.5 Data Base Management System (DBMS) - definition, scope, importance, awareness about current software packages & their features , 4.6 Relational Data Base Management System

Unit	Major Learning Outcomes (in cognitive domain)	Topics and Sub-topics
		(RDBMS) - concept, definition, features and applications. 4.7 Preparation steps/ procedure for creating, storing, editing & retrieval of database on latest available database management software package. (MS Access or other in current use).
Unit – V Information systems.	5a. Develop simple data base information system for given input. 5b. Demonstrate suitable communication media for implementation of data base management systems.	5.1 Role of computers in information systems. 5.2 Management Information System (MIS) ; concept, definition, need & applications. 5.3 Computer aided information systems :(such as inventory records, operation schedule, consumables issues, tools issues, inspection and quality control reports, failure frequencies with reasons, efficiency and utility reports, maintenance records, produced power units per day, temperature at certain interval, etc..) : need, importance, design considerations, software selection criteria, examples. 5.4 Information communication: - Communication process; computer networks and its types, structures, need and applications, protocols - types, features, applications. 5.5 Communication media – types, features, benefits for industrial environment, working (this includes Internet and Intranet, E-mail, etc.). 5.6 Basics of Enterprise Resource Planning (ERP)

6.SUGGESTED SPECIFICATION TABLE WITH HOURS AND MARKS (THEORY)

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
I	Introduction.	6	4	6	0	10
II	Marketing.	8	6	4	4	14
III	Supervision with cost & quality control.	10	7	4	5	16
IV	Data base management systems.	10	7	4	5	16
V	Information systems.	8	0	4	10	14
	Total	42	24	22	24	70

Legends: R = Remember U= Understand; A= Apply and above levels (Bloom's revised taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

General Notes:

- If midsem test is part of continuous evaluation, unit numbers I, II and III (Up to 3.7 only) are to be considered.
- Ask the questions from each topic as per marks weightage. Numerical questions are to be asked only if it is specified. Optional questions must be asked from the same topic.

7. SUGGESTED LIST OF EXERCISES/PRACTICALS.

The practical/exercises should be properly designed and implemented with an attempt to develop different types of skills (**outcomes in psychomotor and affective domain**) so that students are able to acquire the competencies/programme outcomes. Following is the list of practical exercises for guidance.

*Note: Here only outcomes in psychomotor domain are listed as practical/exercises. However, if these practical/exercises are completed appropriately, they would also lead to development of certain outcomes in affective domain which would in turn lead to development of **Course Outcomes** related to affective domain. Thus over all development of **Programme Outcomes** (as given in a common list at the beginning of curriculum document for this programme) would be assured.*

Faculty should refer to that common list and should ensure that students also acquire outcomes in affective domain which are required for overall achievement of Programme Outcomes/Course Outcomes.

Sr. No.	Unit No.	Practical Exercises (outcomes in Psychomotor Domain)	Approx Hours required
1	I	Preparatory activities: Student will practice and prepare the report on following. <ol style="list-style-type: none"> Importance of attitude and information systems in day to day operations of shop floor/plant. Objectives of learning this subject. Definitions and illustrations of system, data and information. Attitude dos and don'ts as supervisor on shop floor/plant. 	2
2	II	Forecasting: Teacher will assign the data. Student will practice and prepare the report on solution steps of three forecasting problems, one each from simple average, simple moving average and weighted moving average.	2
3	II	Market survey, sales and service: Student will practice and will prepare report on following. <ol style="list-style-type: none"> Teacher will assign any one mechanical engineering product in the group of 3 to 4 students and will develop market survey form/steps. Student will carry out market survey and will conclude the results of market survey. Students will also present the conclusion. Teacher will assign any one mechanical engineering 	6

		product in group of 3 to 4 students. Students will visit related shops/traders/industry and will get information on sales schemes and the service steps being executed.	
4	III	<p>Quality circle: Teacher will assign the case to be solved in quality circle in the group of 3-4 students. Group will practice and prepare the report on following.</p> <ol style="list-style-type: none"> Reproduce the case. List the objectives to be solved. Viewpoints of each member. Group discussion on view points of each member listing the merits and demerits of each. Suggestive outcome/s of the quality circle group. Benefits sought if suggestive outcome/s of group is /are implemented. 	2
5	V	<p>Management information system: Student will practice and will prepare report on following.</p> <ol style="list-style-type: none"> Select and name data base management system software. List and explain features of selected data base management software. Explain how data entry, editing, sorting and retrieval are performed in selected data base management system software. Teacher will assign the input data. Based on this, prepare appropriate data model and develop the information system using selected data base management system software. Also sort, edit and retrieve the data as asked by teacher. Teacher will also assign the data for this. Also attach the print of data base and outcome of sorting/retrieval. 	8
6	ALL	<p>Mini project and presentation:</p> <ol style="list-style-type: none"> A group of 5-6 students will visit one industry/organization (small scale/medium scale/shop based) and will study the system of handling the unit. Students will record following. <ol style="list-style-type: none"> How output planning is done? How materials purchase quantities are decided? What is the system of inventory control? Whether computers are used in any way or not. If used, for what purpose, these are used. How they are optimizing utilization of resources? How is the quality control system? How rework and rejection records are kept? What they do to reduce rejection and rework? Do they keep record keeping systems for utilization of resources?(Human-man power, machines, equipment, devices, plants, etc.). If yes, how they 	8

		<p>are maintaining? If no, suggest any computer based system with details.</p> <p>x. How supervisors are performing? Take interviews of supervisors and ask them important aspects to be followed for developing good qualities to become successful supervisors.</p> <p>xi. Any other point/s suggested by teacher.</p> <p>b. Prepare power point presentation and present the work including photographs and movies of actual project work.</p> <p>(This may be flexi –time based work. It may not be necessary to exactly follow the time table slots.)</p>	
Total Hours			28

Notes:

- a. It is compulsory to prepare log book of exercises. It is also required to get each exercise recorded in logbook, checked and duly dated signed by teacher. PA component of practical marks is dependent on continuous and timely evaluation and submission of exercises.
- b. Term work report must not include any photocopy / ies, printed manual/pages, litho, etc. It must be hand written / hand drawn by student only.
- c. Mini project and presentation topic/area has to be assigned to the students in the beginning of the term by batch teacher.
- d. For practical ESE part, students are to be assessed for competencies achieved. They should be given experience/part of experience to perform.

8. SUGGESTED LIST OF STUDENT ACTIVITIES

The student activities are same as given in list of practical/exercises. Teacher may give more such activities to interested/bright students.

9. SPECIAL INSTRUCTIONAL STRATEGIES (IF Any)

During practical exercises teacher should not prescribe solutions to students and should motivate them to come out with different alternatives (even if they may not be feasible) and should allow them to try and learn on their own from their mistakes. Teacher should help students only when they are completely stuck.

10. SUGGESTED LEARNING RESOURCES**A) List of Books**

S. No.	Title of Book	Author	Publication
1.	Computer database organization.	Jame's Martin	PHI publication
2.	Production and operations management.	N.G.Nair	TMGH publication
3.	Production and operations management.	Chase/Aquiline, Irwinpublication	PHI publication

4.	Management information system.	S.Sadagopan	PHI publication
5.	Production and operations management.	S.N.Charry	TMGH publication
6.	Modern production & operations management.	Elwood S. Buffa and RakeshK. Sarin.	John willy & sons publication
7.	Introduction to Database Management	Madhulika Jain, Jain & Shashi Singh	BPB publication
8.	Quality planning and analysis.	J.M.Juran, Frank M.Gryna	TMGHpublication

B) List of Software/Learning Websites.

- i. <http://www.ftpress.com/articles/article.aspx?p=2167438&seqNum=2> (OM)
- ii. <http://en.wikipedia.org/wiki/Quality>
- iii. <http://www.businessdictionary.com/definition/quality.html>
- iv. <https://www.youtube.com/watch?v=ypZiSguq4jM>
- v. <https://www.youtube.com/watch?v=LdhC4ziAhgY>
- vi. https://www.youtube.com/watch?v=jd8B0QK9_5g
- vii. <https://www.youtube.com/watch?v=tjQFtSmVppY> (market survey)
- viii. <http://www.wikihow.com/Make-a-Market-Survey>
- ix. <https://www.youtube.com/watch?v=IO4zrY2tdCY> (information system)
- x. <https://www.youtube.com/watch?v=LiQMHqi3csI>(information system)
- xi. <https://www.youtube.com/watch?v=DTWnQDAhp9k> (methods of production)
- xii. http://crl.du.ac.in/ical09/papers/index_files/ical-111_76_183_2_RV.pdf (quality circle)
- xiii. <http://www.slideshare.net/monikatoshika/quality-circle-7881239>(quality circle)

11. COURSE CURRICULUM DEVELOPMENT COMMITTEE

Faculty Members from Polytechnics.

- Shri K.H.Patel, Head of Mechanical Engineering Department, Dr. S.S. & S. Gandhi College of Engineering and Technology, Surat.
- Shri A.M Talsaniya, Lecturer in Mechanical Engineering, Sir B.P.I., Bhavnagar.
-

Coordinator and Faculty Members from NITTTR Bhopal.

- **Prof. S.K.Pradhan**, Associate Professor, Mechanical Engg. NITTTR, Bhopal
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