GUJARAT TECHNOLOGICAL UNIVERSITY

INDUSTRIAL ENGINEERING (15)
DESIGN OF FACILITIES LAYOUT
SUBJECT CODE: 2151506
B.E. 5th SEMESTER

Type of course: Core

Prerequisite: None

Rationale: To understand intricacies of selection of site for establishment of an industrial enterprise and organizational factors of planning for production flow systems, this subject offers conceptual frameworks and analytical techniques to understand activity relationships and comprehensive layout design.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
L	T	P	C	Theory Marks			Practical Marks			
				ESE (E)	PA (M)		ESE (V)		PA (I)	
					PA	ALA	ESE	OEP		
4	0	2	6	70	20	10	20	10	20	150

Content:

Sr. No.	Content	Total Hrs	% Weightage
1	Plant Location: Selection of site-factors to be considered- plant layout-process-group layout- layout planning- computerized planning techniques.	7	12%
2	Plant Layout: Objectives, Topologies, advantages & Disadvantages of each type. Plant Services- Capacity estimation, Plant Safety-Elements of Safety Engineering, Material Handling-Systems and equipment; Stores/Warehouses, Receiving/Dispatch, Production flow systems.	12	20%
3	Objectives in Location and Layout of Facilities: Planning for production flow systems activity relationship, Personnel and organization factors; Developing alternatives of layout for facilities for particular functions – Manufacturing, receiving and shipping, Storage and warehousing systems; Principles of factory layout; Quantitative and computer aided approaches to facilities layout. Environment aspects lighting, Ventilation, Dust control and Humidity. Plant services Steam, Compressed air.	15	25%
4	Interaction of layout and flow system: Design philosophies; Analysis of different types of assembly lines; Flexibility in assembly lines and flow lines; Automation and computer aids in warehousing operation.	10	15%
5	Location of multiple facilities: Expansion of facilities, Strategic considerations and current trends, Group Technology-Production Flow Analysis (PFA) Rank Order Clustering (ROC), Line Balancing etc.	10	14%
6	Equipments Replacement: Repair, Replacement based on technical and economic considerations, Use of DCF techniques.	10	14%

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
30	40	10	10	5	5

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's 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.

Reference Books:

1. Making Equipment – Replacement Decisions – Hackamack Lawrence; American Management Association, N.Y. (1996).
2. Location Analysis for Manufacturing – Karaska Gerald J. and D.F.Bramball; M.I.T.Press Cambridge Mass (1969).
3. Computerized Layout - An Integrated Approach to Special Planning and Communication – Jacobs F., Robert, John Bradford and Larr P. Ritzman; Industrial Engineering (July 1980).
4. Facilities Management – Towards best practices –Ed. Peter Barrett; Blackwell Science (1998).
5. Plant layout and Materials handling – Apple J.M.; Wiley
6. Facilities Layout and Location – Francis R.L. and White J.A.; Prentice Hall

Course Outcome:

After learning the course the students should be able to:

1. Able to understand various types of layout.
2. Able to understand plant location techniques
3. Able to understand site selection for any types of Industries.

List of Experiments:

1. Selection of territory (Case study).
2. Plant location analysis for different types of industries.
3. Types of layout and plant layout procedure.
4. Application of travel chart in plant lay out.
5. The study of work station lay out (case study).

Design based Problems (DP)/Open Ended Problem:

Design of plant layout of industries around the region.

Major Equipment:

None.

List of Open Source Software/learning website:

www. nptel.ac.in

ACTIVE LEARNING ASSIGNMENTS: Preparation of power-point slides, which include videos, animations, pictures, graphics for better understanding theory and practical work – The faculty will allocate chapters/ parts of chapters to groups of students so that the entire syllabus to be covered. The power-point slides should be put up on the web-site of the College/ Institute, along with the names of the students of the group, the name of the faculty, Department and College on the first slide. The best three works should submit to GTU.