

Course Name: Industrial Engineering and Ergonomics

Course Outcomes (CO):

At the end of this course, the students will be able to:

1. Ability to understand the productivity and work study.
2. Ability to apply plant layouts and understanding the applications of material handling equipment.
3. Ability to understand managerial ergonomics.
4. Ability to apply the concept of inventory and supply chain management.
5. An understanding of job evaluation and merit rating.

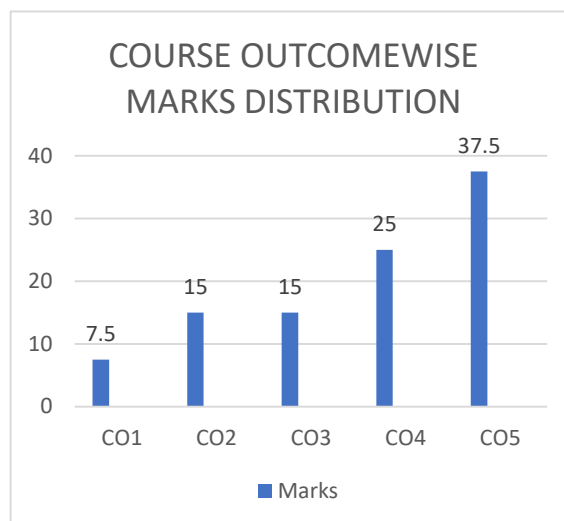
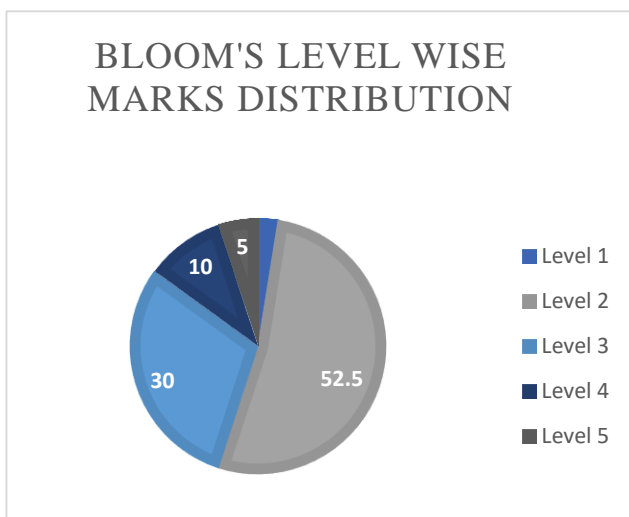
Model Question Paper
Total Duration (H:M): 3:00
Course: Industrial Engineering and Ergonomics
Maximum Marks :100

Note: (1) *Use of design data book is permitted*
(2) *For Unit- I, Unit II, Unit III, Unit-IV, Unit-V, Attempt all questions.*

Q. No	Questions	Marks	CO	BL
1a)	Discuss the objective of method study.	2.5	CO1	L2
1b)	Explain operation process chart.	2.5	CO2	L2
1c)	Write short note on SIMO chart, and chrono cycle graph.	2.5	CO2	L2
1d)	List the objectives of job evaluation and merit rating.	2.5	CO5	L1
2a)	What are the factors influencing productivity? Explain, how each factor will affect productivity?	5	CO2	L4
2b)	What are the various kinds of a Plant Layout. Enlist principle of good plant layout.	5	CO2	L3
3a)	Explain time study, rating, and standard rating.	5	CO1	L2

3b)	<p>The elements time (minutes) for 4 cycles of an operation using a stop watch are presented below.</p> <table border="1" data-bbox="289 264 1214 537"> <thead> <tr> <th>S. No</th> <th>1</th> <th>2</th> <th>3</th> <th>4</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>1.5</td> <td>1.5</td> <td>1.3</td> <td>1.4</td> </tr> <tr> <td>2</td> <td>2.6</td> <td>2.7</td> <td>2.4</td> <td>2.6</td> </tr> <tr> <td>3</td> <td>3.3</td> <td>3.2</td> <td>3.4</td> <td>3.6</td> </tr> <tr> <td>4</td> <td>1.2</td> <td>1.3</td> <td>1.1</td> <td>1.3</td> </tr> <tr> <td>5</td> <td>0.51</td> <td>1.0</td> <td>0.56</td> <td>0.48</td> </tr> </tbody> </table> <p>Calculate standard time for the operation if: (a) Element 2 and 3 are machine elements. (b) For other elements, operator is rated as 115 %.</p>	S. No	1	2	3	4	1	1.5	1.5	1.3	1.4	2	2.6	2.7	2.4	2.6	3	3.3	3.2	3.4	3.6	4	1.2	1.3	1.1	1.3	5	0.51	1.0	0.56	0.48	5	CO5	L4
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3c)	What is work sampling. Write down the procedure for conducting work sampling and designing the study.	5	CO5	L3																														
3d)	<p>The observed time and performance rating for the six elements are given in the table below, compute the standard time assuming rest and personal allowances as 20 % and contingency allowances as 4 % of basic time.</p> <table border="1" data-bbox="302 1010 1201 1329"> <thead> <tr> <th>Element</th> <th>Observed Time (minutes)</th> <th>Rating</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>0.30</td> <td>90</td> </tr> <tr> <td>2</td> <td>0.10</td> <td>95</td> </tr> <tr> <td>3</td> <td>0.60</td> <td>95</td> </tr> <tr> <td>4</td> <td>0.15</td> <td>90</td> </tr> <tr> <td>5</td> <td>1.5</td> <td>85</td> </tr> <tr> <td>6</td> <td>0.9</td> <td>90</td> </tr> </tbody> </table>	Element	Observed Time (minutes)	Rating	1	0.30	90	2	0.10	95	3	0.60	95	4	0.15	90	5	1.5	85	6	0.9	90	5	CO5	L5									
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4a)	Explain Taylor and Merrick incentives plans.	5	CO4	L2																														
4b)	Explain with suitable example Methods Time Measurement (MTM) technique.	10	CO5	L2																														
4c)	Explain Gantt incentives plans.	5	CO3	L2																														
5a)	Explain types and characteristics of man machine systems.	10	CO3	L2																														
5b)	List the common problems in the oil, gas, and chemicals industries when human factor engineering has not been considered in the design phase:	10	CO4	L3																														

6a)	Explain display and types of visual display.	10	CO5	L2
6b)	Explain anthropometry, forms of anthropometric assessment its characteristics and purpose.	10	CO4	L3



BL – Bloom’s Taxonomy Levels (1- Remembering, 2- Understanding, 3 – Applying, 4 – Analysing, 5 –Evaluating, 6 - Creating)

CO – Course Outcomes PO – Program Outcomes; PI Code – Performance Indicator Code