

## Subject Description Form

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| <b>Subject Code</b>                              | ME39002/IC348   |
| <b>Subject Title</b>                             | Appreciation of Manufacturing Processes   |
| <b>Credit Value</b>                              | 3 Training Credits  |
| <b>Level</b>                                     | 3   |
| <b>Pre-requisite</b>                             | ME29003/IC2105  |
| <b>Objectives</b>                                | <p>This subject aims at developing students' understanding on:</p> <ul style="list-style-type: none"><li>• the principles and operations of common manufacturing processes, and</li><li>• the properties and application of different materials.</li></ul>  |
| <b>Intended Learning Outcomes</b>                | <p>Upon completion of the subject, students will be able to:</p> <ol style="list-style-type: none"><li>a) demonstrate a holistic understanding on the working principle, capability and operation of common manufacturing processes.</li><li>b) justify appropriate manufacturing processes for specific product requirements.</li><li>c) select and use various common engineering materials for specific purpose. and</li><li>d) collaboratively complete an application oriented project through group work and discussions / and discuss current industrial practices and technologies.</li></ol>   |
| <b>Subject Synopsis/<br/>Indicative Syllabus</b> | <p><b>Outline Syllabus:</b></p> <ol style="list-style-type: none"><li>1) Properties and uses of common materials including ferrous metal, non-ferrous metals, and polymers.</li><li>2) Working principles and operation of metal removal processes including turning, milling, CNC machining, and electro-discharge machining.</li><li>3) Working principles and operation of common production processes including casting methods for metal parts, and plastic injection moulding.</li><li>4) Working principles and operation of arc welding and gas welding.</li><li>5) Working principles and operation of common sheet metal parts manufacturing processes including blanking, forming, and turret pressing.</li><li>6) Working principles, operation, and comparison of surface-finish processes including electro-plating, and aluminium anodising.</li></ol> |

|  | 7) Application of dimensional and geometrical measuring tools.  |                      |               |  |         |                           |        |                           |                |   |   |                           |    |   |   |   |  |                     |    |  |  |  |   |                      |    |   |   |   |   |       |     |  |  |  |  |
|--|---|----------------------|---------------|--|---------|---------------------------|--------|---------------------------|----------------|---|---|---------------------------|----|---|---|---|--|---------------------|----|--|--|--|---|----------------------|----|---|---|---|---|-------|-----|--|--|--|--|
| <b>Learning Methodology</b>  | <p>Min-lectures aim at providing students an understanding of the principles and application of common manufacturing technologies, properties and selection of common engineering materials.</p> <p>Hands-on activities will be used for students to appreciate the working principles, capability and operation procedures of common manufacturing processes.</p> <p>Group product assembly will be used to enable students to apply acquired practical knowledge and skills to produce a functional product, and to facilitate students in performing group collaboration and problem solving skills learning.</p>  |                      |               |  |         |                           |        |                           |                |   |   |                           |    |   |   |   |  |                     |    |  |  |  |   |                      |    |   |   |   |   |       |     |  |  |  |  |
| <b>Assessment Methods in Alignment with Intended Learning Outcomes</b> | <table border="1"> <thead> <tr> <th rowspan="2">Assessment Methods</th> <th rowspan="2">Weighting (%)</th> <th colspan="4">Intended Learning Outcomes Assessed</th> </tr> <tr> <th>a</th> <th>b</th> <th>c</th> <th>d</th> </tr> </thead> <tbody> <tr> <td>1. Individual Assignments</td> <td>60</td> <td>✓</td> <td>✓</td> <td>✓</td> <td></td> </tr> <tr> <td>2. Product Assembly</td> <td>10</td> <td></td> <td></td> <td></td> <td>✓</td> </tr> <tr> <td>3. Individual Report</td> <td>30</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>Total</td> <td>100</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p>The Individual Assignments are aimed at assessing student's practical ability in using various processes to produce the components for the product.</p> <p>The Product Assembly is aimed at assessing student's group collaboration, organization, time management and problem solving capability.</p> <p>The individual Report is aimed at assessing student's appreciation, understanding, and application of all the processes involved in the product.</p> | Assessment Methods   | Weighting (%) | Intended Learning Outcomes Assessed                              |         |                           |        | a                         | b              | c | d | 1. Individual Assignments | 60 | ✓ | ✓ | ✓ |  | 2. Product Assembly | 10 |  |  |  | ✓ | 3. Individual Report | 30 | ✓ | ✓ | ✓ | ✓ | Total | 100 |  |  |  |  |
| Assessment Methods   | Weighting (%)   |                      |               | Intended Learning Outcomes Assessed                              |         |                           |        |                           |                |   |   |                           |    |   |   |   |  |                     |    |  |  |  |   |                      |    |   |   |   |   |       |     |  |  |  |  |
|  |   | a                    | b             | c  | d       |                           |        |                           |                |   |   |                           |    |   |   |   |  |                     |    |  |  |  |   |                      |    |   |   |   |   |       |     |  |  |  |  |
| 1. Individual Assignments  | 60  | ✓                    | ✓             | ✓  |         |                           |        |                           |                |   |   |                           |    |   |   |   |  |                     |    |  |  |  |   |                      |    |   |   |   |   |       |     |  |  |  |  |
| 2. Product Assembly  | 10  |                      |               |  | ✓       |                           |        |                           |                |   |   |                           |    |   |   |   |  |                     |    |  |  |  |   |                      |    |   |   |   |   |       |     |  |  |  |  |
| 3. Individual Report   | 30  | ✓                    | ✓             | ✓  | ✓       |                           |        |                           |                |   |   |                           |    |   |   |   |  |                     |    |  |  |  |   |                      |    |   |   |   |   |       |     |  |  |  |  |
| Total  | 100   |                      |               |  |         |                           |        |                           |                |   |   |                           |    |   |   |   |  |                     |    |  |  |  |   |                      |    |   |   |   |   |       |     |  |  |  |  |
| <b>Student Study Effort Required</b>                                   | <table border="1"> <thead> <tr> <th colspan="2"><b>Class Contact</b></th> </tr> </thead> <tbody> <tr> <td>Min-lecture /Hands-on Practice/ Product Assembly /Report Writing</td> <td>90 Hrs.</td> </tr> <tr> <td><b>Other Study Effort</b></td> <td>0 Hrs.</td> </tr> <tr> <td><b>Total Study Effort</b></td> <td><b>90 Hrs.</b></td> </tr> </tbody> </table>  | <b>Class Contact</b> |               | Min-lecture /Hands-on Practice/ Product Assembly /Report Writing | 90 Hrs. | <b>Other Study Effort</b> | 0 Hrs. | <b>Total Study Effort</b> | <b>90 Hrs.</b> |   |   |                           |    |   |   |   |  |                     |    |  |  |  |   |                      |    |   |   |   |   |       |     |  |  |  |  |
| <b>Class Contact</b>   |   |                      |               |  |         |                           |        |                           |                |   |   |                           |    |   |   |   |  |                     |    |  |  |  |   |                      |    |   |   |   |   |       |     |  |  |  |  |
| Min-lecture /Hands-on Practice/ Product Assembly /Report Writing       | 90 Hrs.   |                      |               |  |         |                           |        |                           |                |   |   |                           |    |   |   |   |  |                     |    |  |  |  |   |                      |    |   |   |   |   |       |     |  |  |  |  |
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| <b>Total Study Effort</b>  | <b>90 Hrs.</b>  |                      |               |  |         |                           |        |                           |                |   |   |                           |    |   |   |   |  |                     |    |  |  |  |   |                      |    |   |   |   |   |       |     |  |  |  |  |

**Reading List and References**

Reading Materials published by the Industrial Centre :

1. Marking Out, Measurement, Fitting & Assembly
2. Metal Cutting Processes 1-Turning
3. Metal Cutting Processes 2 - Milling
4. Computer Numerical Control (CNC)
5. Foundry Processing
6. Plastics Technology Practice
7. Sheet Metal Fabrication
8. Welding Practice
9. Photo-Chemical Machining (PCM)
10. Surface Finishing