

| Course Type | Course Code | Name of the Course    | L | T | P | Credit |
|-------------|-------------|-----------------------|---|---|---|--------|
| DE          | OMED606     | Engineering Metrology | 3 | 0 | 0 | 3      |

| Prerequisites                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Bachelor/Master/PhD students having background in Mechanical Engineering/Production Engineering/Manufacturing Technology                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Course Objectives                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <p>At the end of the course, the students will be able to:</p> <ol style="list-style-type: none"> <li>1. Understand Engineering metrology in manufacturing.</li> <li>2. Understand the value of metrology for the students and practitioners.</li> <li>3. Understand importance of metrological specifications.</li> <li>4. Understand how to develop measurement procedures, conduct metrological experiments, and obtain and interpret the results.</li> <li>5. Understand the traditional and modern high technology viz. manufacturing, industrial, scientific research, defense, and many others.</li> </ol> |
| Learning Outcome                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <p>On successful completion of this course students will be able to</p> <ol style="list-style-type: none"> <li>1. Understand concept of engineering metrology.</li> <li>2. Understand the concept of linear and angular measurements.</li> <li>3. Understand the working of different types of measuring instruments.</li> <li>4. Understand the concept of surface finish, strain, and nano metrology.</li> <li>5. Understand the concept of quality control.</li> </ol>                                                                                                                                         |

| Unit No. | Topics to be covered                               | No. of lecture videos | Video time (Minutes) | Learning Outcomes                                                                                                           |
|----------|----------------------------------------------------|-----------------------|----------------------|-----------------------------------------------------------------------------------------------------------------------------|
| 1        | Introduction to Engineering Metrology              | 4                     | 206                  | On successful completion of this unit students will be able to understand the concept of engineering metrology.             |
| 2        | Introduction to Engineering Metrology              | 4                     | 168                  | On successful completion of this unit students will be able to understand the concept of engineering metrology.             |
| 3        | Statistics in Metrology                            | 4                     | 163                  | On successful completion of this unit students will be able to understand statistics required in metrology.                 |
| 4        | Linear Measurements                                | 5                     | 146                  | On successful completion of this unit students will be able to understand the concept of linear measurements                |
| 5        | Angular and rotation measurements                  | 4                     | 146                  | On successful completion of this unit students will be able to understand the concept of angular and rotation measurements. |
| 6        | Comparators                                        | 4                     | 157                  | On successful completion of this unit students will be able to understand the working of comparators.                       |
| 7        | Optical measurements, and temperature measurements | 4                     | 139                  | On successful completion of this unit students will be able to understand optical and temperature measurements.             |

|              |                                                         |           |             |                                                                                                                              |
|--------------|---------------------------------------------------------|-----------|-------------|------------------------------------------------------------------------------------------------------------------------------|
| 8            | Screw threads metrology, and gears metrology            | 5         | 160         | On successful completion of this unit students will be able to understand the metrology of screw threads and gears           |
| 9            | Transducers                                             | 4         | 132         | On successful completion of this unit students will be able to understand transducers.                                       |
| 10           | Flow and Pressure measurements, and strain measurements | 3         | 103         | On successful completion of this unit students will be able to understand measurement of flow and strain.                    |
| 11           | Surface finish metrology, and mechatronics              | 4         | 139         | On successful completion of this unit students will be able to understand the concept of surface finish and mechatronics.    |
| 12           | Nano-metrology, and Quality control                     | 6         | 180         | On successful completion of this unit students will be able to understand the concept of nano-metrology and quality control. |
| <b>Total</b> |                                                         | <b>51</b> | <b>1839</b> |                                                                                                                              |

**Textbooks:**

1. Bewoor, A.K. and Kulkarni, V.A., 2009. Metrology and measurement. McGraw-Hill Education.
2. Venkateshan, S.P., 2015. Mechanical measurements. John Wiley & Sons.

**Reference Book:**

1. Fridman, A.E., 2011. The quality of measurements: a metrological reference. Springer Science & Business Media.