



ENGINEERING METROLOGY

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PRE-REQUISITES : The student should have completed two semesters of UG Engineering or Science program

INTENDED AUDIENCE : Students of all Engineering and Science disciplines.

INDUSTRIES APPLICABLE TO : HAL, NAL, SAIL, ISRO

COURSE OUTLINE :

Engineering metrology is the use of measurement science in manufacturing. The study of metrology is highly valuable for the students and practitioners, specifically from mechanical and allied engineering stream. For a product to be successful, it needs to be manufactured according to metrological specifications, otherwise heavy costs are incurred to comply with the specifications in the later stage. Also, the role played by measurements in the day today life makes it essential to study metrology. This course is designed to impart the knowledge to develop measurement procedures, conduct metrological experiments, and obtain and interpret the results. A laboratory demonstration are also induced to enhance the learning process. The course would be useful in many areas in the traditional and modern high technology viz. manufacturing, industrial, scientific research, defense, and many others.

ABOUT INSTRUCTOR :

Prof. Janakarajan Ramkumar is Professor of Mechanical Engineering Department, and Design Program, at Indian Institute of Technology, Kanpur. He teaches manufacturing science, micro/nano technology, new product development. He has a bachelors in Production Engineering with his doctorate in Defect quantification in drilling of composites from IIT Madras, India with a best thesis award. Over the years his contribution in teaching and research is remarkable. He has worked for BOSCH group and improved the productivity of the company. His research and teaching focus is on nano technology and inclusive design. He has several international and national patents in his credit and has published more than 100 journal papers

Prof. Amandeep Singh Oberoi is a Faculty for online courses and shoulders the position of Senior Research Establishment Officer at the prestigious Indian Institute of Technology (IIT) Kanpur, India. Under the role, he is entrusted with the responsibility to manage Imagineering Laboratory, where the emphasis is principally given to providing novel product development and fostering services in defense, Agritech, and Medtech. Dr. Oberoi has accumulated an experience of over two decades: industrial and academic combined; his research interests include the things he values such as Sustainable Manufacturing Processes and Systems, along with areas such as Additive Manufacturing; Simulation of Manufacturing Systems; Product Design and Manufacturing. He has fetched grants and has holds projects from various national and international funding agencies such as DST, MoT, BIRAC, DRDO, SIDBI, CoL. His MOOCs courses in NPTEL and agMOOC are well-received, gaining favour with the audience and receiving positive feedback. Furthermore, he has visited countries like the USA, Canada, Australia, and Egypt to speak at various international symposiums organised by renowned bodies such as AARDO, CIRP, IEOM.

COURSE PLAN :

- Week 1 :** Introduction to Engineering Metrology
- Week 2 :** Introduction to Engineering Metrology
- Week 3 :** Statistics in Metrology
- Week 4 :** Linear Measurements
- Week 5 :** Angular and rotation measurements
- Week 6 :** Comparators
- Week 7 :** Optical measurements, and temperature measurements
- Week 8 :** Screw threads metrology, and gears metrology
- Week 9 :** Transducers
- Week 10:** Flow and Pressure measurements, and strain measurements
- Week 11:** Surface finish metrology, and mechatronics
- Week 12:** Nano-metrology, and Quality control