Indian Institute of Technology, Bombay
Department of Mechanical Engineering
ME 103 – Department Introductory Course 1
Academic year: 2025–2026, Semester: Fall (1)

Instructors:
Neeraj Kumbhakarna (IC Engines and Combustion Lab)
Intercom: 7397
Email: neeraj_k@iitb.ac.in
Office: IC Engines and Combustion Lab, N4 Bay

Class time and venue:
Time: Slot 4 (Monday 1135-1230, Tuesday 0830-0925, Thursday 0930-1025)
Venue: LA 201

Office hours:
Please email and decide time of meeting

Teaching assistants:

Nenavath Manipal Naik	24m1648@iitb.ac.in
Sateesh Kumar Boda	24m1649@iitb.ac.in
Priyanshu Pradip Khobragade	24m1651@iitb.ac.in
Md. Imroz Bakht	24d0907@iitb.ac.in
Deepak Chudasama	24d0904@iitb.ac.in
Reetu Raj	20003791@iitb.ac.in

Course Contents
This course aims at introducing newly inducted aspiring mechanical engineers to the various aspects of mechanical engineering. The major sub-areas and basic concepts contained in them will be discussed under the following topics:

- The mechanical engineering profession: Definition of engineering in the modern sense, who are mechanical engineers? Technical problem-solving approach, general good practices to be followed, communication skills in engineering.
- Overview of thermal engineering:

  The thermal and fluids engineering stream deals with processes that deal with transfer of energy and motion of fluids, in both coupled and uncoupled manner. Since a significant section of mechanical engineering deals with generation of power, and almost the entirety of this power is generated by means of techniques that deal with transferring energy from some form to another form, thermal and fluids engineering plays a significant role. Besides the generation of power, most systems from mechanical engineering have to deal with either absorption or dissipation of heat, and with some or other form of fluids. Hence, the principles learnt in this stream are useful throughout the entire domain of mechanical engineering.
- Overview of design engineering:

  The design stream deals with the conceptualization of the machine that needs to be produced. The process begins with a thorough assessment of the need of such a machine. Once the necessities are clearly ascertained, the design process in initiated involving various methodologies of analysis, such as stress analysis, thermal analysis, analysis of the kinematics and dynamics of the machine including the transfer of motion and power, an analysis of manufacturability, etc. The analysis is conducted on both the machine as a composite unit as well as its components. Finally, the drawings of the manufacturable design are created and passed on to the engineers specializing in the manufacturing stream.

- Overview of manufacturing engineering:

  The manufacturing stream is involved with the manufacturing of components for the machines that were designed by the engineers specializing in the design stream. The process begins with identification of the proper raw materials, moves on to the choice of the machines that would be utilized for machining the components, and finally the machining process itself with its associated controls over dimensions and tolerances. Engineers in this stream are constantly attempting to innovate methodologies that allow production of the machines and their components with the best of quality, but with also with least amounts of debris and the least possible cost.

Classification is given for the purpose of understanding but actual sequence of the topics covered in the course may not be as given here

References and Texts

1. An Introduction to Mechanical Engineering by Jonathan Wickert (Cengage Learning India Private Limited)
2. The Ascent of Science, by Brian L. Silver, Oxford University Press
3. The Ascent of Man, by Jacob Bronowski, BBC Books (BBC videos - 13 episdoes - are available at: https://www.amazon.com/Ascent-Man-Complete-BBC-Region/dp/B000772842)
4. This is Biology, by Ernst Mayr, Harvard University Press
5. Mechanical Engineer`s Handbook by Dan B. Marghitu (Elsevier Science)
6. Mechanical Engineer`s Reference Book by Edward H. Smith (Elsevier Science & Technology)
7. Elements of Mechanical Engineering, K R Gopala Krishna, Subhash Publications, 2008

Attendance and in-class participation quizzes on Moodle:
Moodle will be used for this course to share course material and to send out announcements. Particularly, attendance and in-class activity participation will be tracked. Quizzes will be conducted in every class using Moodle. Instructions on how to answer the quizzes will be given during the class time.
Please note that attendance and in-class participation will be taken into account while deciding the final grade for this course.

Grading/Assessment policy

Written quizzes (during class time)	30%
In-class quizzes (Moodle)	10%
Mid-sem exam	20%
End-sem exam (comprehensive)	40%

All quizzes and exams will be closed book/notes. Students are expected to maintain integrity. Any breach of code will result in penalty as per the institute rules.
No make-up exams or quizzes will be allowed except as required by the Institute policy. Please see the course instructor prior to any anticipated absence. In case the absence is due to medical reasons or unavoidable emergencies, a appropriate documentary proof should be submitted as per institute rules within one week from the date of absence. A make-up exam or compensation in some way will be given in such cases. The formats of the original and the make-up exams may be different. For an anticipated final exam absence, please follow the prescribed institute procedure.

If a student feels that an exam or quiz was graded unfairly, or if there is an error in the grading, it should be brought to the attention of the instructor within two days after the graded material is handed back. Scores will not be reconsidered otherwise.

Academic integrity:
The work in all quizzes and exams is to be yours alone. Any incident of dishonesty, such as, copying or cheating, will be dealt with as per institute policies and may even result in failure in the course.

1. Quizzes and exams may contain materials that is not covered in the textbook, but discussed in the lectures. So, while in class please pay attention and proactively ask questions to the teacher to get things clarified in case of doubts.
2. In this course, in each class you will learn something conceptually new. Many a times, you will find these new concepts to be quite abstract. You have to prepare yourself to assimilate these concepts. The best way to do this is to spend some time in reviewing class notes and the textbook.
3. In case you find it difficult to follow anything during the course, please contact the teacher personally elaborating your difficulties so the teacher can help you.

Wishing you all the best!