Module Code	MEU33B05
Module Name	Mechanics of Machines
ECTS Weighting	5 ECTS
Semester taught	Semester 2
Module Coordinator/s	Professor Ciaran Simms
Module Learning Outcomes with reference to the Graduate Attributes and how they are developed in discipline	On successful completion of this module, students should be able to: LO1. Apply the principles of mechanics and vector analysis to real machine configurations and human body motion. LO2. Analyse common elements in machine design and human motion. LO3. Apply and develop computer programmes to study kinematics and dynamics of machines. LO4. Understand how to account for the effects of friction and balancing requirements in common machine components. **Graduate Attributes: levels of attainment** To act responsibly - Enhanced To think independently - Enhanced To develop continuously - Enhanced To communicate effectively - Enhanced
Module Content	This module addresses the theory and application of fundamental mechanics to machine configurations. This includes engines, whole body human and vehicle motion, linkages and friction devices. Together with the accompanying Mechanics of Solids module, the analysis provides the link between component motion and the resulting internal stresses due to inertia and contact forces. Modelling skills are developed together with the use of vector and matrix algebra in the synthesis of solutions to rigid body problems. The subject also introduces computing as a tool for the solution machine/linkage problems. This module completes the essential requirements of an Engineer in the machine dynamics area and prepares students for project work focused on machine design and human movement. This subject also provides a good basis for study in multibody dynamics and robotics and biomechanics. It builds on earlier introductory modules in mechanics, mathematics and programming.

Teaching and Learning Methods

This module uses Blackboard, podium lectures, self-directed assignments, a laboratory and tutorials to help students achieve the required learning outcomes.

In the current Covid-19 situation, the following changes to the normal teaching methods apply, and the same will apply in case of a new possible lockdown scenario during teaching term:

- All lectures and tutorials will be delivered online using Blackboard Collaborate Ultra. These sessions will be recorded and available for viewing via Blackboard at a later time.
- The end of semester exam modalities will probably be online/remote, although this is subject to change and will follow College guidelines.

Assessment Details
Please include the following:

- **Assessment Component**
- **Assessment description**
- **Learning Outcome(s) addressed**
- **% of total**
- **Assessment due date**

Assessment Component	Assessment Description	LO Addressed	% of total	Week due (provisional)
Written examination	End of semester examination	1-4	80	Exam period
Assignments	Software based assignments	1-3	20	Staggered in Weeks 3-8

Reassessment Requirements

Written Examination

Contact Hours and Indicative Student Workload Error! Bookmark not defined.

Contact hours: 46 (33 Lectures, 11 tutorials, 2 Lab)
Independent Study (preparation for course and review of materials): 30
Independent Study (preparation for assessment, incl. completion of assessment): 44

Recommended Reading List

- Kinematics and Dynamics of Machines, CE Wilson and J.P. Sadler (Pearson Prentice Hall)
- Dynamics , JL Meriam (Wiley)

Module Pre-requisite

MEU11E07 Mechanics

Module Co-requisite	NA
Module Website	https://www.tcd.ie/Engineering/undergraduate/baiyear3/modules/3B5.pdf
Are other Schools/Departments involved in the delivery of this module? If yes, please provide details.	No
Module Approval Date	
Approved by	
Academic Start Year	
Academic Year of Date	