Title:	Engineering Dynamics 2 APPROVED
Long Title:	Engineering Dynamics 2

Module Code:	MECH8031	**Duration:**	1 Semester

Credits:	5
NFQ Level:	Advanced
Field of Study:	Mechanical Engineering
Valid From:	Semester 1 - 2016/17 (September 2016)
Module Delivered in	2 programme(s)
Module Coordinator:	GER KELLY
Module Author:	Andrew Cashman
Module Description:	This module applies the fundamental principles of kinematics and kinetics of rigid bodies to real world engineering problems. This module may be delivered in a half semester time frame.

Learning Outcomes	
On successful completion of this module the learner will be able to:	
LO1	Simplify real world dynamics problems by applying an appropriate mathematical formulation, solve, interpret the results and communicate findings.
LO2	Analyse both linear and angular displacements, velocities and accelerations of rigid bodies by applying the principles of kinematics.
LO3	Apply appropriate methods such as Newton's second law, work and energy principles, and impulse and momentum methods to analyse the effect of forces on two dimensional motion of rigid bodies.
LO4	Undertake experimental analysis of various machine systems, writing clear and concise laboratory reports to communicate findings.

Pre-requisite learning

Module Recommendations
This is prior learning (or a practical skill) that is strongly recommended before enrolment in this module. You may enrol in this module if you have not acquired the recommended learning but you will have considerable difficulty in passing (i.e. achieving the learning outcomes of) the module. While the prior learning is expressed as named CIT module(s) it also allows for learning (in another module or modules) which is equivalent to the learning specified in the named module(s).

2176	MECH7013	Mechanics of Machines

Incompatible Modules
These are modules which have learning outcomes that are too similar to the learning outcomes of this module. You may not earn additional credit for the same learning and therefore you may not enrol in this module if you have successfully completed any modules in the incompatible list.

N/A

Co-requisite Modules

No Co-requisite modules listed

Requirements
This is prior learning (or a practical skill) that is mandatory before enrolment in this module is allowed. You may not enrol on this module if you have not acquired the learning specified in this section.

No requirements listed

Module Content & Assessment

Indicative Content
Plane Kinematics of Rigid Bodies Linear motion, rotation, absolute motion, relative motion, Coriolis acceleration
Plane Kinetics of Rigid Bodies Fixed-axis rotation, angular acceleration, work-energy relations, linear and angular momentum, interconnected rigid bodies
Vibration and Time Response Single degree of freedom free and forced vibration, damped vibrations, torsional vibrations, transverse vibrations, Dunkerley method, Rayleigh method, whirling of shafts
Laboratory Work Experimental analysis of kinetics systems, torsional and transverse vibrations

Assessment Breakdown	%
Course Work	100.00%

Course Work

Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Open-book Examination	Plane Kinematics of Rigid Bodies	1,2	40.0	Week 6
Practical/Skills Evaluation	Laboratory work	1,4	20.0	Every Week
Performance Evaluation	Plane Kinetics of Rigid Bodies	1,2,3	40.0	Week 12

No End of Module Formal Examination

Reassessment Requirement
Repeat examination *Reassessment of this module will consist of a repeat examination. It is possible that there will also be a requirement to be reassessed in a coursework element.*

The institute reserves the right to alter the nature and timings of assessment

Module Workload

Workload: Full Time				
Workload Type	*Workload Description*	*Hours*	*Frequency*	*Average Weekly Learner Workload*
Lecture	Formal lecture	3.0	Every Week	3.00
Lab	Experimental analysis	1.0	Every Week	1.00
Independent & Directed Learning (Non-contact)	Self-directed learning	3.0	Every Week	3.00
			Total Hours	7.00
			Total Weekly Learner Workload	7.00
			Total Weekly Contact Hours	4.00

Workload: Part Time				
Workload Type	*Workload Description*	*Hours*	*Frequency*	*Average Weekly Learner Workload*
Lecture	Formal lecture	3.0	Every Week	3.00
Lab	Experimental analysis	1.0	Every Week	1.00
Independent & Directed Learning (Non-contact)	Self-directed learning	3.0	Every Week	3.00
			Total Hours	7.00
			Total Weekly Learner Workload	7.00
			Total Weekly Contact Hours	4.00

Module Resources

Recommended Book Resources

- **J.L. Meriam, L.G. Kraige 2013, *Engineering Mechanics (Dynamics) SI Version*, 7 Ed., John Wiley and Sons Limited [ISBN: 978-1-118-08345-1]**

Supplementary Book Resources

- **Uicker, J. J. and Pennock, G. R. 2003, *Theory of Machines and Mechanisms*, 3 Ed., Oxford University Press New York [ISBN: 019515598X]**
- **Waldron, K. J. and Kinzel, G. L. 2003, *Kinematics, Dynamics and Design of Machinery*, 2 Ed., John Wiley and Sons Limited New York [ISBN: 0471244171]**

This module does not have any article/paper resources

Other Resources

- **Website: Khan Academy*Physics Tutorials***
  https://www.khanacademy.org/science/phys ics

Module Delivered in

Programme Code	Programme	Semester	Delivery
CR_EMECH_8	Bachelor of Engineering (Honours) in Mechanical Engineering	6	Mandatory
CR_EMESY_8	Certificate in Mechanical Engineering Systems	2	Elective