Course Outline (Higher Education)

School: School of Engineering, Information Technology and Physical Sciences

Course Title: MECHANISM AND MACHINE THEORY

Course ID: ENGIN2303

Credit Points: 15.00

Prerequisite(s): (ENCOR1000 or ENCOR1021 or ENGIN1005)

Co-requisite(s): Nil

Exclusion(s): (ENMEC2111)

ASCED: 030701

Description of the Course :

Within mechanical and mechatronics engineering the motion and control of mechanisms is fundamental to designing machines that move. In this course students will be introduced to the basic concepts and mathematical models employed to simulate how machines and mechanisms respond to different stimuli. By the end of the course students will be skilled to undertake linkage design and analysis tasks both individually and in teams.

Grade Scheme: Graded (HD, D, C, etc.)

Work Experience:

No work experience: Student is not undertaking work experience in industry.

Placement Component: No

Supplementary Assessment: Yes

Where supplementary assessment is available a student must have failed overall in the course but gained a final mark of 45 per cent or above and submitted all major assessment tasks.

Program Level:

Level of course in Program	AQF Level of Program					
	5	6	7	8	9	10
Introductory						
Intermediate			✔			

Level of course in Program	AQF Level of Program					
	5	6	7	8	9	10
Advanced						

Learning Outcomes:

On successful completion of the course the students are expected to be able to:

Knowledge:

K1. Explain how linkages are designed and integrate them successfully into machine system assemblies.

K2. Describe dynamic models of mechanisms on the basis of the desired performance criteria.

K3. Describe how computers are employed for mechanism design and analysis.

Skills:

S1. Analyse and synthesise machine components and subassemblies, and integrate them successfully into machine system assemblies.

S2. Design and analyse typical machines and drives.

S3. Predict dynamic characteristics and operating conditions of machines and drives.

S4. Apply advanced computer aided engineering techniques to the design and analysis of machines and drives.

Application of knowledge and skills:

A1. Apply advanced computer aided engineering techniques to the design and analysis of machines and drives.

A2. Present findings in textual, graphical and mathematical formats.

Course Content:

Topics may include:

- Mobility and kinematics of linkages
- Computer-aided mechanism analysis
- Motion generation and control via cam-follower systems
- Power transmission and flywheel design
- Introduction to robotics: planar manipulators

Values:

V1. Recognise the diversity of factors influencing the design and purchasing of machines and drives for a range of industrial settings.

V2. Be committed to quality, ethical standards and occupational health and safety.

V3. Appreciate learning as a lifelong process.

Graduate Attributes

The Federation University FedUni graduate attributes (GA) are entrenched in the Higher Education Graduate Attributes Policy (LT1228). FedUni graduates develop these graduate attributes through their engagement in explicit learning and teaching and assessment tasks that are embedded in all FedUni programs. Graduate attribute attainment typically follows an incremental development process mapped through program progression. **One or more graduate attributes must be evident in the specified learning outcomes and assessment for each FedUni course, and all attributes must be directly assessed in each program**

Graduate attribute and descriptor		**Development and acquisition of GAs in the course**			
		Learning Outcomes (KSA)	**Code** A. Direct B. Indirect N/A Not addressed	**Assessment task (AT#)**	**Code** A. Certain B. Likely C. Possible N/A Not likely
GA 1 Thinkers	Our graduates are curious, reflective and critical. Able to analyse the world in a way that generates valued insights, they are change makers seeking and creating new solutions.	K2, S1-S4	A	AT1, AT2	A
GA 2 Innovators	Our graduates have ideas and are able to realise their dreams. They think and act creatively to achieve and inspire positive change.	Not applicable	Not applicable	Not applicable	Not applicable
GA 3 Citizens	Our graduates engage in socially and culturally appropriate ways to advance individual, community and global well-being. They are socially and environmentally aware, acting ethically, equitably and compassionately.	Not applicable	Not applicable	Not applicable	Not applicable
GA 4 Communicators	Our graduates create, exchange, impart and convey information, ideas, and concepts effectively. They are respectful, inclusive and empathetic towards their audience, and express thoughts, feelings and information in ways that help others to understand.	K1-K3, S2, A1-A2	A	AT1-AT3	A
GA 5 Leaders	Our graduates display and promote positive behaviours, and aspire to make a difference. They act with integrity, are receptive to alternatives and foster sustainable and resilient practices.	S1, S3	A	AT1-AT3	B

Learning Task and Assessment:

Learning Outcomes Assessed	Learning Tasks	Assessment Type	Weighting
K1, K3, S1, S3, S4, S5, A1, A2	A detailed design of a machine or mechanism will be undertaken either individually or in a group.	Project report	20 - 30%
K2, K3, S2	Within the course a range of tutorial problems will be submitted for assessment.	Report containing solutions to specified problems	20 - 40%
S1, S2, K1, K2	Assessment of all or part of the course by examination.	Test	40 - 60%

Adopted Reference Style:

Other (Refer to the library website for more information: IEEE)