MECH 7007 MECHANICAL SYSTEM DESIGN

Credit Points 10

Legacy Code 301018

Coordinator Richard Yang (https://directory.westernsydney.edu.au/search/name/Richard Yang/)

Description This subject advances students understanding on product design and development of machine components and assemblies using systems engineering approaches. The subject covers a review on the design of main components of machinery to ensure their functionality, strength and durability, which includes drive components - gears, shafts, belt drives, and bearings, and structural components - welds and treaded fasteners. The machine assembly design is delivered based on systems engineering. Academic skills on research and communication are ensured to be achieved through conducting systems engineering approached-based mechanical system design projects.

School Eng, Design & Built Env

Discipline Mechanical Engineering

Student Contribution Band HECS Band 2 10cp

Level Postgraduate Coursework Level 7 subject

Restrictions

Students must be enrolled in the Master of Engineering, Graduate Certificate in Engineering or Bachelor of Research Studies / Master of Research.

Assumed Knowledge

The students are assumed to have a good understanding on basics of mechanical design, fundamentals and advanced topics in mechanics of materials, fundamentals on fluid mechanics and heat transfer and thermal dynamics.

Learning Outcomes

On successful completion of this subject, students should be able to:

1. Apply the concepts of machine design in devising machine components design
2. Recognise standard engineering formats of representing machine parts
3. Apply governing standards guiding mechanical design to interpret and evaluate mechanical component and system design
4. Apply the design process towards an applied end
5. Examine the typical design process using basics of main machine components and bearing design and their selection
6. Apply principles of stress analysis for sizing of machine components and systems engineering approaches to perform a mechanical system design overall
7. Practise design alternatives to enhance CAD skills using commercial software
8. Conduct mechanical design in a team working environment

Subject Content

1. Nature of Mechanical System Design and Systems Engineering
2. Machine Component Design I - Chain Drives, Belt Drives, and Gears
3. Machine Component Design II - Shaft, Keys, Couplings and Seals
4. Machine Component Design III - Machine Frames, Bolted Connection and Welded Joints
5. Systems Engineering Design I - Systems Engineering Landscape and Structure of Complex Systems
6. Systems Engineering Design II - The System Development Process and Systems Engineering Management
7. Systems Engineering Design III - Systems Engineering Management
8. Systems Engineering Design IV - Concept Development
9. Systems Engineering Design V - Engineering Development
10. Systems Engineering Design VI - Post Development

Assessment

The following table summarises the standard assessment tasks for this subject. Please note this is a guide only. Assessment tasks are regularly updated, where there is a difference your Learning Guide takes precedence.

Type	Length	Percent	Threshold	Individual/ Group Task
Short Answer	3 x approx. 6 pages each	30	N	Individual
Log/ Workbook	4 x approx. 5 pages each	20	N	Individual
Report	15-min oral presentation conducted in class and marked individually (10%) and design project report marked as group work (30%)	40	Y	Group
Quiz	1 hour each including ten minutes reading time	10	N	Individual

Prescribed Texts

- Mott, RL 2013, Machine elements in mechanical design, 5th edn, Pearson, Boston.
- Kossiakoff, Alexander; Sweet, William N.; Seymour, Sam; Biemer, Steven M., 2011, Systems Engineering : Principles and Practice, 2nd edn., Wiley (ebook, online available)

Teaching Periods

Autumn (2022)

Parramatta City - Macquarie St

Day

Subject Contact Richard Yang (https://directory.westernsydney.edu.au/search/name/Richard Yang/)

View timetable (https://classregistration.westernsydney.edu.au/even/timetable/?subject_code=MECH7007_22-AUT_PC_D#subjects)

Autumn (2023)

Parramatta City - Macquarie St

On-site

Subject Contact Richard Yang (https://directory.westernsydney.edu.au/search/name/Richard Yang/)

View timetable (https://classregistration.westernsydney.edu.au/odd/timetable/?subject_code=MECH7007_23-AUT_PC_1#subjects)