

ENGR 4039 DESIGN FOR ADVANCED MANUFACTURING

Credit Points 10

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

Description This subject develops specific knowledge and skills in Design for Advanced Manufacturing technologies in the context of Industry 4.0 and Advanced Manufacturing. Advanced manufacturing represents state-of-the-art and cutting-edge manufacturing technologies and processes for high-quality and high precision production of materials and products. Throughout this subject, students will learn advanced manufacturing technologies and processes that lead to the transformation of materials and products into intelligent, sustainable, eco-friendly, and environmentally-conscious practices. Moreover, students will develop the ability to discern suitable practices, materials, and manufacturing processes, as well as analyse the outcomes of Advanced Manufacturing, with a focus on sustainability, efficiency, safety, and ethical considerations, all in the context of their application to the WSU Formula SAE Car Project. Upon successful completion of this subject, students can explore a range of career avenues, including roles such as Manufacturing Engineer, Product Designer, CAD/CAM Engineer, Materials Engineer, and related opportunities.

School Eng, Design & Built Env

Discipline Other Engineering And Related Technologies

Student Contribution Band HECS Band 2 10cp

Check your fees via the Fees (https://www.westernsydney.edu.au/currentstudents/current_students/fees/) page.

Level Undergraduate Level 4 subject

Co-requisite(s) ENGR 3033

Learning Outcomes

1. Develop specific knowledge and skills in Design for Advanced Manufacturing and Industry 4.0 technologies.
2. Analyse traditional and modern manufacturing technologies and processes and their roles in Product Development and Design through comparative analysis.
3. Develop an integrated and innovative Product Development and Design process including design, modelling, simulation, prototype, and manufacturing.
4. Evaluate advanced manufacturing processes and technologies through the analysis of relevant case studies.
5. Work collaboratively in designing for advanced manufacturing and fabrication project involving the WSU Formula SAE Race Car.

Subject Content

- Principles of Design for Advanced Manufacturing
- Digital Twins and Digitalisation of Advanced Manufacturing Process
- Virtual Reality (VR) and Augmented Reality (AR)
- Design for Additive Manufacturing
- Implementation of Advanced Sensor Technology in AM
- Implementation of Artificial Intelligence (AI) and Advanced Robotics in AM

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	Mandatory
Quiz	30 minutes (per Quiz)	20	N	Individual	N
Short Answer	2 hours (per tutorial)	20	N	Individual	N
Practical	2 hours (per lab)	20	N	Individual	N
Applied Project	2000 words (approx. with inclusion of visuals) Plus 10 minutes presentation	40	N		Y

Prescribed Texts

Gillespie, LK 2017, *Design for advanced manufacturing: technologies and processes*, McGraw-Hill Education, New York.