

# **Inclusive Curriculum for Mechanical and Electronic System Design**

University

Dr Roya Haratian, Dr Mehran Koohgilani Design and Engineering Department, Science and Technology Faculty

Introduction Highly technical final year UG 40-credit unit for Design Engineering Course as merger of two former 20-credit units: Advance Mechanics and Electronics

# Framework





# Methodology

### Structures and Processes

- Blended Learning: Pre-uploaded weekly slides, recorded lectures and demos on the VLE
- 12X2 Lectures (Mechanics & Electronics): Core knowledge transfer
- 6X2 Design Clinique: Groupwork monitor, feedback & feedforward
- 6X2 Workshop/Lab Sessions: Practical experience
- Use of Advanced Simulation Tools: Solidworks, MATLAB, Proteus

#### Curriculum

- Problem/Project based pedagogy (Institute of Mechanical Engineering (IMechE)'s national design challenge) Group based learning /Social constructivism pedagogy •
- Assessment and Feedback
  - Group Mechatronics Project (40%): Prototype Competition, Poster, Presentation for the IMechE Design Challenge
  - Individual Mechatronics e-Portfolio (60%): Mathematical System Modelling, Critical Thinking, Analysis and Interpretation of results
  - Peer review (Self, group members and other groups assessment ) Regular bespoke formative and summative feedback and Rubric

# **Community and Belonging**

- Mixed groups of students (gender, ethnicity, neurodiversity and etc)
- Collaborative Environment (group sessions and virtual platforms)
- e-Platform to facilitate effective communication between groupmates
- Monitored supervision journal/forums to address questions

#### Pathway to Success

- Weekly announcements on VLE reminding each week plan
- e-Portfolio individual assignment submission: potential to be as evidence of expertise in support of their CV
- Research informed education practice

Soft skills training (Critical Thinking, Group work, e-Portfolio & etc)

# Outcome

100% pass rate with mean mark of 62 out of 100; High student engagement. **Future Plan** 

Next year Robotics will be added to the curriculum

# References

Hull University, 2021, Inclusive Curriculum Framework Lev Vygotsky, 1931, Adolescent Pedagogy development of thinking in adolescence



IECHANICA



HOMEPAGE - IMechE Pipe Climb

e Components of the Design	Navigation
statistical a monitory call associes of the machatronic system involves.	HOMEPHOE - Medit Pipe Climoer
e methanical aspect of the mechanism system menes signing with the combination of the physics and mathematical relates to allow the system to complete its tasks despite the	ELECTRONICS
point feations that the system is being subject to, such as the certification by and pipe frictions. These functions will affect the	Design Electronics
a field fractional subcase at low the white dustates	Simulation - Electronics
	Implementation - Electronics
	MECHANICS
	Design - Mechanica
	Simulation - Nechanics
	Inglementation - Hechanics
	Past-Script - Acknowledgements and Defendating