LIVERPOOL JOHN MOORES UNIVERSITY

Industrial Robotics

Module Information

2022.01, Approved

Summary Information

Module Code	5501ICBTMT
Formal Module Title	Industrial Robotics
Owning School	Engineering
Career	Undergraduate
Credits	15
Academic level	FHEQ Level 5
Grading Schema	40

Teaching Responsibility

LJMU Schools involved in Delivery
LJMU Partner Taught

Partner Teaching Institution

Institution Name
International College of Business and Technology

Learning Methods

Learning Method Type	Hours
Lecture	45
Practical	9
Tutorial	15
Workshop	6

Module Offering(s)

Display Name	Location	Start Month	Duration Number Duration Unit

APR-PAR	PAR	April	12 Weeks
JAN-PAR	PAR	January	12 Weeks
SEP_NS-PAR	PAR	September (Non-standard start date)	12 Weeks

Aims and Outcomes

Aims	This unit will develop learners' understanding of robots and the skills needed to program them for a range of industrial applications.

After completing the module the student should be able to:

Learning Outcomes

Code	Number	Description
MLO1	1	Explain the fundamentals of Robotics.
MLO2	2	Demonstrate ability to programme a Robot.
MLO3	3	Design a robot cell and plan its implementation.
MLO4	4	Analyse the applications of Industrial Robots.

Module Content

Outline Syllabus	Manipulator elements: electrical and fluid drive systems such as harmonic, cycloidal, shaft, rod, screw, belt, chain; sensors such as absolute and incremental encoders, potentiometers, resolvers, tachometers; brakes; counterbalance devices Control elements: CPU; system and user memory; interface modules; power modules Intelligence: relating to proximity, range, position, force, temperature, sound and gas Sources of error or malfunction: environmental contamination such as smoke, arc-flash, dirt, fluids, heat; parallax; wear; data corruption; accessibility; sensitivity; accuracy; design Programming methods: task programming; manual data input; teach programming; explicit programming; goal-directed programming Facilities: conditional loops; datum shifts; location shifts; interrupts; peripheral communications; TCP offsets; canned cycles; macros Industrial tasks: such as welding; assembly; machining; gluing; surface coating; machine loading Setting up and executing the program: program/location input; start-up inter-locking; program testing; fine-tuning; automatic operation Design parameters: layout; cycle times; control; accessibility; error detection; component specification; protection of the robot and peripherals, future developments; hazard analysis such as human, robot design, robot operation, workplace layout, hardware failure, control system failure, control system malfunction, software failure, external equipment failure, external sensor failure; guarding; fencing; intrusion monitoring; safe system of work; restriction mechanisms Selection criteria: accuracy; repeatability; velocity; range; operation cycle time; load-carrying capacity; life expectancy; reliability; maintenance requirements; control and play-back; cost; memory; fitness for purpose; working envelope Design: station configuration; parts presentation; fixtures; parts recognition; sensors; cell services; safety interlocks; end effector design; flexibility Implementation factors: company familiarisation; planning; robot manufacturer back-up; economic analysis and ethical implications; installations scheduling; training
Module Overview	
Additional Information	

Assessments

Assignment Category	Assessment Name	Weight	Exam/Test Length (hours)	Module Learning Outcome Mapping

| Report | Coursework | 30 | 0 | MLO3 |
| Exam | Examination | 70 | 2 | MLO1, MLO2, MLO4 |

Module Contacts

Module Leader

Contact Name	Applies to all offerings	Offerings
Karl Jones	Yes	N/A

Partner Module Team

Contact Name	Applies to all offerings	Offerings