Course descriptor B51RO

Course code	**B51RO**
Course title	Robotic Mechanical Systems
Credits	15
School	Engineering and Physical Sciences
SCQF Level	11
Semester	2
Aims	This course aims to: • Provide advanced knowledge and skills in robot kinematics with the focus on the simulation of kinematic motion • Provide advanced knowledge and skills for robot analysis and design with a focus on static analysis, dynamics and design • Introduce fundamental mechatronic design
Syllabus	Classification of robots • 3D modelling and motion simulation of robots • Direct kinematics • Inverse kinematics • Workspace analysis • Instantaneous kinematics • Singularity • Static analysis • Dynamics • Control • Trajectory generation • Simulation • Robot design • Repeatability and accuracy • Recent advances in a current robotic topic

Learning Outcomes	
Subject Mastery	On completion of this course, students will be able to: • select and design appropriate architecture(s) of robots to satisfy the motion requirement for a number of applications. • perform the motion analysis of robots. • simulate the motion of robots using CAD software. • formulate the instantaneous kinematic equations for a variety of robots • identify singular configurations of robots

	• formulate the static and dynamic equations for a variety of robots • simulate the motion of robots as a whole using software • design a robot, with a focus on the mechanical design, for specified applications from the mechatronic perspective • apply recent advances in one of current robotic topics to analysis and design
Personal Abilities	On completion of this course, learners will be able to: • Design creatively the mechanical system of a robot or other mechatronic systems involving motion • Work effectively in a group • Be aware of the importance of new technology, people and culture on overall business performance and their impact on upstream engineering process such as design

Assessment method	50% written examination, 50% coursework