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 • Robotics applications

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 • Analyse the motion 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
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	60% written examination, 40% continuous assessment