COURSE DETAILS

Course Code: B59RM
Full Course Title: Robotic Mechanical Systems 1
SCQF Level: 9
SCAF Credits: 15
Available as Elective: Yes

DELIVERY LEVEL

Undergraduate: Yes  Postgraduate Taught: Yes  Postgraduate Research: No

COURSE AIMS

This module aims to
• introduce computer integrated manufacturing and develop methods related to computer numerical control (CNC)
• provide fundamental knowledge and skills in robot kinematics and the essential training in robotic mechanical system design with the focus on the simulation of kinematic motion.

LEARNING OUTCOMES – SUBJECT MASTERY

On completion of this module, students will be able to:
• understand the integration of computer-based technologies within the ‘Engineering a Product’ cycle and the importance of data dependency and systems integration.
• understand the importance of the integration of the design and associated manufacturing processes.
• acquire specific knowledge related to computer numerical control (CNC).
• describe the motion characteristics for a given architecture of robots.
• select 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.

LEARNING OUTCOMES – PERSONAL ABILITIES

On completion of this module, students will be able to:
• give effective presentations on the mechanical design of a robot or other mechanical systems involving motion.
• further develop technical writing skills through writing presentation.
• develop the ability to criticise and evaluate design information.

SYLLABUS

• Computer integrated manufacturing (CIM)
• Shop floor layout
• CNC manufacturing
• Classification of industrial robots
B59RM Robotic Mechanical Systems 1

- 3D modelling of robots
- Direct kinematics
- Inverse kinematics
- Workspace analysis
- Motion simulation of robots
- Repeatability and accuracy
- Robot calibration

COURSE RELATIONSHIPS
N/A

LOCATION AND ASSESSMENT METHODS

<table>
<thead>
<tr>
<th>Edi</th>
<th>SBC</th>
<th>Ork</th>
<th>Dub</th>
<th>Malay</th>
<th>IDL</th>
<th>COLL</th>
<th>ALP</th>
<th>OTH</th>
<th>Method</th>
<th>Weight</th>
<th>Exam Mins</th>
<th>Type</th>
<th>Diet</th>
<th>Synoptic Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>OTH</td>
<td>Examination</td>
<td>50</td>
<td>120</td>
<td>Assessment</td>
<td>Semester 2</td>
<td></td>
</tr>
<tr>
<td>Y</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>OTH</td>
<td>Coursework</td>
<td>50</td>
<td></td>
<td>Assessment</td>
<td>Semester 2</td>
<td></td>
</tr>
<tr>
<td>Y</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>OTH</td>
<td>Examination</td>
<td>100</td>
<td>120</td>
<td>Reassessment</td>
<td>Semester 3</td>
<td></td>
</tr>
</tbody>
</table>