F20RO Intelligent Robotics

COURSE DETAILS
Course Code: F20RO
Full Course Title: Intelligent Robotics
SCQF Level: 10
SCAF Credits: 15
Available as Elective: No

DELIVERY LEVEL
Undergraduate: Yes  Postgraduate Taught: No  Postgraduate Research: No
Additional Information:

COURSE AIMS
To introduce students to concepts and techniques used in robotics and applications ranging from industrial automation to robotic companions.
To understand the basic concepts used in evolutionary, swarm and other bio-inspired robotics.
To understand the basic concepts used in developmental robotics and human-robot interaction.
To gain exposure to the main issues involved in building intelligent robot controllers.

LEARNING OUTCOMES – SUBJECT MASTERY
- To appreciate the basic concepts of automation and intelligent robotics.
- To develop detailed understanding of the geometries of industrial manipulators.
- To develop detailed understanding of the architectures of autonomous guided vehicles (AGVs).
- To develop detailed understanding of interfacing & control issues of manipulator arms and AGVs.
- To explore the applications and implications of automation and human-robot interaction.
- To appreciate the different forms and uses of various sensor technologies, including multi-modal sensing.
- To develop detailed understanding of the architecture of behaviour-based robotics (BBR), evolutionary robotics and swarm robotics.
- To explore the collaboration and ethical issues of human-robot interaction.
- To make informed judgements about appropriate methodologies for developing and evaluating robotics applications.

LEARNING OUTCOMES – PERSONAL ABILITIES
- To critically analyse various paradigms and architectures.
- To appreciate the real-world constraints imposed on technical skills.
- To offer professional insights into the financial imperatives which apply to the introduction of new technology.
- To offer ethical insights into the introduction of new robotics technology.

SYLLABUS
Fundamentals of Manipulators - Geometry, kinematics, control and programming.
Basics of Mobile Robots - Mapping, path planning and navigation.
Behaviour Based Robotics - Evolutionary, swarm and other bio-inspired robotics.
### COURSE RELATIONSHIPS

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Level</th>
<th>Title</th>
<th>School</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>F29AI</td>
<td>9</td>
<td>Artificial Intelligence and Intelligent Agents</td>
<td>School of Math and Comp Sci.</td>
<td>Pre-Requisite</td>
</tr>
</tbody>
</table>

### 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></td>
<td>Examination</td>
<td>60</td>
<td>120</td>
<td>Assessment</td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>Y</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Coursework</td>
<td>40</td>
<td></td>
<td>Assessment</td>
<td></td>
<td>Semester 2</td>
</tr>
</tbody>
</table>