1. Course Code | F21RO  
2. Course Title | Intelligent Robotics  
3. SCQF Level | 11  
4. Credits | 15  

5. School | Mathematical and Computer Sciences  

6. Course Co-ordinator | N Taylor, P Vargas, K Lohan  
7. Delivery: Location & Semester |  
   - Edin: Sem…2  
   - SBC: Sem……  
   - Orkney: Sem………  
   - Dubai: Sem……  
   - IDL: Sem….  
   - Collaborative Partner: Name………………………..Sem……..  
   - Approved Learning Partner: Name …………………………………Sem………..  

8. Pre-requisites | F29AI Artificial Intelligence or equivalent  

9. Linked Courses (specify if synoptic) | None  

10. Excluded Courses | None  

11. Replacement Courses | Code:  
   Date Of Replacement:  

12. Degrees for which this is a core course | MSc Artificial Intelligence, MSc Robotics, Autonomous and Interactive Systems, MRes Robotics and Autonomous Systems. Option on MSc Advanced Internet Applications, MSc AI with Speech and Multimodal Interaction, MSc IT (Software Systems), MSc Software Engineering  

13. The course may be delivered to: |  
   - UG only  
   - PG only ☒  
   - UG & PG ☐  

14. Available as an Elective? | Yes ☒ No ☐  

15. 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.  

16. Syllabus  
Fundamentals of Manipulators - Geometry, kinematics, control and programming.  
Basics of Mobile Robots - Mapping, path planning and navigation.  
Sensing Technologies - Tactile, visual, auditory and multi-modal sensing.  
Behaviour Based Robotics, Evolutionary, swarm and other bio-inspired robotics.  
17. Learning Outcomes (HWU Core Skills: Employability and Professional Career Readiness)

**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.

**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.

18. Assessment Methods

<table>
<thead>
<tr>
<th>Method</th>
<th>Duration of Exam (if applicable)</th>
<th>Weighting (%)</th>
<th>Synoptic courses?</th>
<th>Method</th>
<th>Duration of Exam (if applicable)</th>
<th>Diet(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exam</td>
<td>2 hours</td>
<td>60%</td>
<td></td>
<td>Exam</td>
<td>2 hours</td>
<td>3</td>
</tr>
<tr>
<td>Coursework</td>
<td></td>
<td>40%</td>
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</tbody>
</table>

19. Re-assessment Methods

- Exam
  - 2 hours
  - 60%

20. Date and Version

- Date of Proposal: February 2014
- Date of Approval by School Committee: March 2014
- Date of Implementation: January 2015
- Version Number: 3