COURSE DETAILS
Course Code: F21AR
Full Course Title: Autonomous Systems Research
SCQF Level: 11
SCAF Credits: 30
Available as Elective: No

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

COURSE AIMS
The aims of this course are to properly prepare students for their PhD studies in Robotics and Autonomous Systems introducing them to the subject of autonomous systems, research methods and responsible research.

LEARNING OUTCOMES – SUBJECT MASTERY
Ability to write literature review, which critically evaluates research and current technical developments against a stated aim.
Ability to search for and critically evaluate the value of written and online material.

Ability to understand a topic in enough depth to create and deliver an effective masterclass.

A good understanding of ethics and responsible research methods.

LEARNING OUTCOMES – PERSONAL ABILITIES
Ability to work on research project critically analysing material, planning and managing time.

Ability to present work effectively to others, orally and written.

SYLLABUS
In this innovative module students will pick one of five interaction themes (listed below) and write an extended critical review of the state of the art in current research. This will be independent study by the student but also supported by making a guided choice of lecture attendance from relevant MSc courses at HWU and UoE as part of the Centre for Doctoral Training in Robotics and Autonomous Systems (CDT-RAS). Assessment will be based on this literature review report, as well as, a short pitch and the creation and delivery of a Master Class. Other topics covered in class include technical writing and responsible research methods.
Safe Interaction Themes

1. Physical Interactions: control, actuation, compliance, sensing, mapping, planning, embodiments, swarms;
2. People Interactions: human-robot interaction, affective robotics, smart spaces, human-robot teaming, collaborative decision-making, cobots, multimodal interfaces;
3. Self-Interactions: condition monitoring, prognosis, explainable AI, certification, verification, safety, security, multi-agent interactions;
4. Interaction Enablers: vision, embedded and parallel computing, novel and soft fabrication methods, optimisation, (transparent) machine learning, deep reinforcement learning and other AI techniques inc. natural language processing (NLP).