Module Outline: Robotics Comp2403 **2021-22**

This Module Outline provides details of your module and your learning objectives that you need to know to achieve a successful module outcome.

1. When do I have to attend my module sessions?

Occurrence	Day	Time	Room/Online
A	Tuesday	16:45-19:45	CH1007

*Room information***:** *Students are advised to check room details on the Live Timetable System link on the UW website Student portal. Should on occasion class cancellations be necessary, notifications will be made in accordance with the Class Cancellation Policy, which can be found here.*

2. Who will be teaching me on my module?

Name	Email address, Room number	Qualifications and experience:
Module Leader:	Dr. Colin Price, c.price@worc.ac.uk, Room CHLG020, Phone 542024	MA in Natural Sciences majoring in Experimental Physics (Cambridge), PhD Electronic Engineering (University of Leuven – Belgium), Fellow of the Higher Education Academy, National Teaching Fellow. Over 70 research publications in areas of Theoretical Physics, Literacy, Computer Science and Computer Science Education.

To obtain help with your learning within this module please contact your Tutor or Module Leader by email.

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3. What is my module week-by-week contents and what do I have to prepare for each session?

Module materials for your preparation and to enable you to participate in class are available in MyDay, which can be accessed at MyDay or the module's Blackboard site. This module will run primarily from the Module Leader's staff website here (a link will be supplied on blackboard).

The resource list for this module can be accessed via Blackbeard. **Note the following list is *indicative*.** The actual schedule is published on my staff webpages and may change as we work together as a class.

W/C		Preparation	Learning Activities
13 Sept	Induction Week / Review Week		
20 Sept	1	Breakfast chap.1	*Object avoidance with Parallax Bot. Finite state machine architecture*
27 Sept	2	Breakfast chap.2	*Line following with Parallax Bot. Intro to PID Control*
4 Oct	3	Breakfast chap.3 Wahde chap.6	*Robot Kinematics – Wheel encoders*
11 Oct	4	Breakfast chap.4 S&N chap.3 Wadhe chap.2	*Object detection*
18 Oct	5	Breakfast chap.5	*Navigation – detecting objects and navigating between them*
25 Oct	6	Breakfast chap.6 S&N chapt.4	*Stepper-motor Bot. Vision-1. Object or line detection*
1 Nov	Progress Week and Award Ceremonies		
8 Nov	7	Breakfast chap.7 S&N chapt.4	*Stepper-motor Bot. Vision-2. Intersection detection. Bar code direction*
15 Nov	8	Breakfast chap.8	*Sherlock, the bi-ped robot. Central Pattern Generators*
22 Nov	9		
29 Nov	10		*Design-Build-Test Project*
6 Dec	11		
13 Dec	12		
20 Dec	**Christmas Break**		
27 Dec	**Christmas Break**		
3 Jan	**Revision week and Personal mid-year review**		
10 Jan	**Assessment Week**		

4. What are the main themes of my module?

The themes are all connected to Robotics. Main themes are (i) sensing (especially vision), (ii) locomotion, (iii) navigation. There are 4 sessions dedicated to a design-build-test project.

In addition to these subject-specific themes there are two more general ones:

1) Sustainable Development Goals (UNESCO SDGs) where we shall take some time-out to see how robotics can help us with these.

2) Learning by talking and listening. You will be actively encouraged to talk with your classmates and with your tutor to discuss ideas, solve problems, debug code, and plan your assignments. The theory behind

how conversations help you learn has been developed by the Faculty of Education at Cambridge University. We are fortunate to be collaborating with these folk, to better understand their theory, it's called 'Dialogic Learning'.

5. How is my module taught?

This module is 100% hands-on with short tutor presentations. You will learn by experimenting and investigating with Arduino-based technologies.

6. What will I be able to do when I have attended and actively participated in all sessions of my module?

Attendance is essential to your successful module outcome, your degree classification and the development of your employment skills. Active participation in all sessions, whether online or face-to-face, will help you to develop your Graduate Attributes and achieve the module's learning outcomes:

a) Learning Outcomes of this module are:

1. Implement and evaluate robot control architectures
2. Apply the theory of robot kinematics.
3. Evaluate a range of sensor and motor-drive systems.
4. Design, build and test a robot application to solve a given problem.

b) Your contribution to your Graduate Attributes (which contribute to your employment skills) is:

Reflective and resilient lifelong learning: You will be encouraged to learn by having conversations with your fellow students. This will help develop the following attributes:

Problem solving: Real robots will present you with real problems to solve.

Teamwork and effective communication: Learning conversations will be encouraged at all times through informal collaborations. The design-build-test activity will develop teamwork skills (this is not assessed)

Digital citizenship: It's the nature of the course.

7. How does my module engage with the real-word environment?

Where possible, we shall promote contact with local micro-controller experts, such as Hitex and Phaedrus Systems.

8. What have previous students said about my module?

This is the first time this module has run with real robots. Due to restrictions, last year's students used a robot simulator. Here's some comments Students like

1) Standard of teaching and clear worksheets.

2) Ability to ask new questions and to try new things.

3) Being free to be creative.

9. Are there any special instructions for this module I need to be aware of?

If you decide to purchase an Arduino kit, make sure you have one based on the Mega2560. This is slightly more expensive than the Uno kits, but uses the same Arduino we shall be using in class, and has significant grunt.

10. What are my assignments for this module?

Detailed information on the assignments for this module and instructions on how to complete them are provided in your Assignment Briefs which are available on your module's Blackboard site.