Comp1421

Module Outline: Foundations of Computing Comp1421 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	Thursday Friday	09:15 – 10:45 10:45 – 12:15	CH1009
B	Thursday Friday	11:15 – 12:45 12:15 – 13:45	CH1009

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. CHLG2020 542024 c.price@worc.ac.uk	MA in Natural Sciences (Cambridge), PhD Electronic Engineering (University of Leuven – Belgium), Fellow of the Higher Education Academy, National Teaching Fellow. Over 70 research publications.
Module Tutor:	Dr. Pete Moody CH1005 542199 p.moody@worc.ac.uk	BSc Physics with Planetary and Space Physics (Aberystwyth). MSc Atmospheric Physics and Dynamics (Imperial College), PhD Atmospheric Physics (UMIST), PG Diploma in Computing for Commerce and Industry (Open University), Fellow of the Higher Education Academy.
Module Tutor:		Delete/add rows as required

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

The resource list for this module can be accessed via Blackboard.

W/C date		**Pre/post-class reading or activity**	**Topic of Activity**	**LOs**	**Sub Date**
13 Sept	Induction Week / Review Week				
20 Sept	1		Computing with the physical world: Arduino Blinky and Traffic Lights. **Module Introduction. Report 1 guidance.**	LO1	
27 Sept	2	Investigating WBEngine	WBEngine coding testbed. Sequential / Concurrent behaviour. The loop structure.	LO1	
4 Oct	3	Investigating Raptor	Flow diagrams using Raptor: Control Flow. Application to loops and arrays.	LO1	
11 Oct	4		More flow diagrams and code snippets. Further work with arrays.	LO1	
18 Oct	5	Reading code snippets	Reading code. Sort and search algorithms. Investigating time-behaviour of algorithms	LO1	
25 Oct	6	Finite State Machine notes	Algorithms for games. Algorithms for robots, e.g. Finite State Machines.	LO1	
1 Nov	Progress Week and Award Ceremonies				
8 Nov	7		Data flow and the concept of a 'stack'. **Formative feedback. Report 1 guidance.** **Mock Examination released.**	LO2	
15 Nov	8		The Nature of a Computer. Digital electronic logic gates and information representation.	LO2	
22 Nov	9		Solving logic problems using Logisim simulator. Sum of Products approach	LO2	
29 Nov	10		Simplification of solutions to logic problems using Boolean algebra.	LO2	Ass 1
6 Dec	11		Investigating geometry.	LO2	
13 Dec	12		Investigating maths functions. **Formative feedback. Exam guidance.** **Mid-module feedback collection.**	LO2	
20 Dec	**Christmas Break**				
27 Dec	**Christmas Break**				

3 Jan	**Revision week and Personal mid-year review**				
10 Jan	**Assessment Week**				Ass 2
17 Jan	13	Intro to differential drive robots; kinematics and motor drive	Robot Design-Build-Test. **Assignment 3 guidance (Part 1)**	LO3	
24 Jan	14	Intro to line-following and object detection	Robot Design-Build-Test	LO3	
31 Jan	15		Robot Design-Build-Test **Formative feedback. Assignment 3 guidance**	LO3	
7 Feb	16		Robot Design-Build-Test **Feedback on Report1 and Examination.**	LO3	
14 Feb	17		CPU Architecture. The 'fetch-execute cycle'. SAM simulator.	LO4	
21 Feb	18		CPU Architecture. The 'fetch-execute cycle'. SAM simulator. **Assignment 3 guidance (Part2)**	LO4	
28 Feb	Progression Week				
7 Mar	19		LANs **Assignment 4 guidance**	LO5/6	Ass 3.1
14 Mar	20		WANs	LO5/6	
21 Mar	21		Structure of Network Messages	LO5/6	
28 Mar	22		Network security	LO5/6	
4 Apr	23		Personal online security **Formative feedback. Assignment 4 guidance**	LO5/6	
11 Apr	Easter Break				
18 Apr	Easter Break				
25 Apr	24		Social (mis)uses of computer networks	LO5/6	
2 May					Ass 4 6th May

Bank Holiday Monday – 2 May 2022

Reassessment Week: w/c 4 July 2022

4. What are the main themes of my module?

1) Reading and writing *structured* code supported by flow diagrams

2) Concepts of control flow, data flow, program goal-hierarchy

3) Digital circuits including logic and Arduino artefacts, CPU structure and operation

4) Design-build-test process applied to construction and programming a differential-drive robots.

5) Networking concepts

5. How is my module taught?

Learning is centred on student-based activities which will be introduced and supported by tutor inputs. You will be encouraged to collaborate with your fellow students; in particular the role of talking to each other to help you learn will be promoted.

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	Develop and deploy algorithms to solve real-world computational problems
2	Demonstrate understanding of data and control structures and their uses
3	Design, build and test a computer-based solution
4	Explain aspects of computer hardware
5	Discuss contemporary issues within the discipline of Computing
6	Explain ideas and concepts in a clear and concise form

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

Reflective and resilient lifelong learning: Working both independently, and in class, collaborating with your fellow students will give you the opportunity to reflect on your progress. This, in turn, will help you understand and develop your own learning style; being aware of this will help you to develop during your entire degree course.

Problem solving: All sessions will include elements of problem solving. While you will mostly do this independently, it is important that you work with your fellow-students, especially through conversations where you share thinking, be considerate but critical of others' ideas, but come to an agreed solution. This is particularly important when you learn to code.

Teamwork and effective communication: During the robot design-build-test mini-project you will work in teams (teamwork is not assessed). You are encouraged to establish informal groups with one or more fellow students, so you learn the value of good communication, and practise developing these skills.

Digital citizenship: This comes for free with the course.

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

Since computing and computers are ubiquitous in the real world, the module team will draw on real-world examples in sessions.

8. What have previous students said about my module?

i) Crash course in so many computing topics – great!

ii) Building the robot and using the Arduino

iii) Building small programs from the ground up

In response to student wishes, we shall (i) give slightly more time to Arduino work (ii) more guidance coding the robot (iii) make the Exam more tolerable.

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

Occasionally, students will purchase an Arduino kit for home use. If you want to, I suggest you purchase the slightly more expensive kit based on the 'Mega2560'.

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.