

Module Outline: Nature of Computing Comp 3402 2023-24 Sem1&2

1. Who will be teaching me on my module?

Name	Email address	Room	Staff Profile
Module Leader: Dr. Colin Price	c.price@worc.ac.uk	CH2011	https://www.worcester.ac.uk/about/profiles/dr-colin-b-price https://colin-price.wbs.uni.worc.ac.uk/index.htm
Module Tutor Dr. Andrew Tomlinson	a.tomlinson@worc.ac.uk		https://www.worcester.ac.uk/about/profiles/andrew-tomlinson

To obtain help with your learning within this module please contact your Tutor or Module Leader by email, c.price@worc.ac.uk

2. What are the main themes of my module?

In addition to coherent technical and pedagogical themes running throughout the sessions, there are five more general themes:

1) Sustainable Development Goals (UNESCO SDGs) in particular the study of vibration energy harvesting. These should help you become more aware of some technical and theoretical aspects of green energy.



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'.

3) Choice. This has been built into most assignments to allow you to select the best approach for you as an individual, to aid your individual learning, and develop your individual skills.

4) Research. Many of the topics covered on this module are aligned with the Module Leader's active research. These include vibration energy harvesting, neural circuits, logic in language, systolic arrays.

5) Generative AI. There will be opportunities to investigate 'AI' such as ChatGPT.

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

This module will be run from the module leader's website, <https://colin-price.wbs.uni.worc.ac.uk/index.htm>. A link will be placed in Blackboard. All assignments will be submitted via Blackboard.

W/C	Preparation	Learning Activities	LOs
18-Sep	Induction Week		
25-Sep	1 PP1.1 Brief	POSITION PAPER 1 (Part 1)	
02-Oct	2		
09-Oct	3 Read Chapter 1	Image Processing: Enhancement and Segmentation.	1
16-Oct	4		
23-Oct	5 PP1.2 Brief PP1.1 Early-Bird	POSITION PAPER 1 (Part 2)	
30-Oct	Progression Week		
06-Nov	6		
13-Nov	7 Read Chapter 19	Vibration Energy Harvesting.	2
20-Nov	8		
27-Nov	9 PP2.1 Brief PP1 Official Hand-in	POSITION PAPER 2 (Part 1)	
04-Dec	10 Read Chapter 11		
11-Dec	11	Logic in Language and Digital Logic.	3
18-Dec	12 Agree Choice of Topics for PP3.1	Algorithmic Beauty of Plants	
25-Dec	Christmas Break:		
01-Jan	Christmas Break:		
22-Jan	13 PP2.2 Brief PP2.1 Early-Bird	POSITION PAPER 2 (Part 2)	
29-Jan	14		
05-Feb	15 Read Chapter 12	Design and Synthesis of Digital Computers	5
12-Feb	16		
19-Feb	17 PP3.1 Brief PP2 Official Hand-in	POSITION PAPER 3 (Part 1)	
28-Feb	18		
04-Mar	Progression Week:		
		Mini-Project from choices agreed 18 th December 2023	4
11-Mar	19		
18-Mar	20		
25-Mar	Easter Break:		
01-Apr	Easter Break:		
08-Apr	21 PP3.2 Brief PP3.1 Early-Bird	POSITION PAPER 3 (Part 2)	
15-Apr	22	Modern Operating Systems:	
22-Apr	23	1) Arduino Free-RTOS	7
29-Apr	24 PP3 Official Hand-in	2) OpenMP parallel programming in Visual Studio	

Bank Holiday Monday – 6th May and 27th May 2024 Reassessment Week: w/c 8 July 2024

4. How is this module taught?

There are six units of instruction, each spread over 4 weeks. Each unit has an associated position paper.

There will be occasions where you are able to choose between activities, according to your interest, and one group of 4 sessions will be dedicated to a 'mini-project' where you will work in small groups to solve a problem of your choice. Possible choices will be discussed w/c 18th December 2023 and a selection agreed.

Teaching will consist of short tutor inputs. All sessions will be hands-on and will be organised through worksheets. You will be encouraged to have conversations with your fellow students both in class and outside sessions. All units of instruction will be supported by the module leader's book chapters, draft chapters will be provided free of charge.

5. 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) Reflect, critically on alternative and emerging computing technologies.

(2) Critically analyse important contemporary applications of computers.

(3) Critically assess how an understanding of the natural world helps us create digital worlds through programming.

(4) Critically evaluate the structure and function of autonomous intelligent systems.

(5) Critically reflect on the design of digital or analogue computers.

(6) Critically appraise the principles of a modern operating system.

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

Reflective and resilient lifelong learning: You will be encouraged to talk and listen and to value the place of conversation in learning. This is a good preparation for employment.

Problem solving: Some activities are creative, others allow you to investigate, but most will have an element of problem-solving (understood in its broadest sense) where you will have opportunity to develop your thinking skills.

Teamwork and effective communication: You will experience teamwork in the 'Design Build Test' mini-project (this will not be assessed) and you should take this as an opportunity to develop your communication skills; listening to others and reflecting on their point of view and so perhaps changing yours, becoming confident of your point of view and getting this across to others.

Digital citizenship: This should happen automatically because of the nature of the Course.

6. How does my module engage with the real-world environment?

Results of scientific research of broad interest will be noted weekly when appropriate. More extensive discussions will take place when this research is relevant to the study unit.

7. What have previous students said about my module?

Here are some themes which have emerged from previous years:

- 1) Guided worksheets and book chapters made learning new topics enjoyable and manageable.
- 2) Clear structure of what is required in the reports with substantial guidance and support.
- 3) Series of smaller topics were fun to explore, not too maths or coding heavy, it allowed us to investigate more.
- 4) Diversity of module, it enabled to quickly learn different aspects of computing.

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

Please make sure you have access to the following software on your own computer if you wish.

- 1) Octave.
- 2) Unreal – 4.47.2 engine.
- 3) The latest Arduino IDE.
- 4) Visual Studio.

9. 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.