

## Module Outline: Foundations of Computing Comp1421 2020-21

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2. Who are my teaching team?
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5. How does my module engage with the real-world environment?
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9. What is my responsibility in Comp1421
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11. What is my assessment / are my assessment(s)?
12. My Module Timetable

### 1. Things I need to know to achieve a successful module outcome:

SEMESTER 1		
	Date/time	Room
<b>Occurrence A</b>	<b>Face-to-face or Online workshops</b>	
	Thursday 09:15 – 10:30	CH1001
	Thursday 10:45 – 12:30	CH1001
	<b>Online Lecture</b>	
	Monday 14:15 – 15:15 (online support during this time)	Available at any time
<b>Occurrence B</b>	<b>Face-to-face or Online workshops</b>	
	Wednesday 13:15 – 14:30	CH1009
	Wednesday 16:45 – 18:00	CH1001
	<b>Online Lecture</b>	
	Monday 14:15 – 15:15 (online support during this time)	Available at any time

**SEMESTER 2**

SEMESTER 2		
	Date/time	Room
<b>Occurrence A</b>	<b>Face-to-face or Online workshops</b>	
	Thursday 09:15 – 10:30	CH1001
	Thursday 11:15 – 12:30	CH1001
	<b>Online Lecture</b>	
	Monday 14:15 – 15:15 (online support during this time)	Available at any time
	<b>Face-to-face or Online workshops</b>	
<b>Occurrence B</b>	Tuesday 16:15 – 17:30	CH1009
	Tuesday 17:45 – 19:00	CH1009
	<b>Online Lecture</b>	
	Monday 14:15 – 15:15 (online support during this time)	Available at any time
	<b>Face-to-face or Online workshops</b>	

<b>2. Who are my teaching team?</b>	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.
	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.

<b>3. What will I be able to do when I have attended and actively participated in this module?</b>	<p>Attendance is essential to your successful module outcome and your degree classification. Active participation in all sessions whether online or face-to-face will help you to:</p> <ol style="list-style-type: none"> <li>1. Apply algorithms to solve real-world computational problems</li> <li>2. Demonstrate understanding of data structures and their uses</li> <li>3. Design, build and test a computer-based solution</li> <li>4. Demonstrate knowledge of aspects of computer hardware</li> <li>5. Review contemporary issues within the discipline of Computing</li> <li>6. Communicate ideas and concepts in a clear and concise form</li> </ol>
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<p><b>4. How does my module fit into my course?</b></p>	<p>This module aims to provide the foundational skills and teach the necessary concepts that are required to engage and progress with solving real-world problems with computers. In other words, the material you will see on this module will prepare you for modules on your entire degree course. In particular, you will learn to question what a computer is (and does), the various types of computer from desktops to embedded microcontrollers. You will also learn how to think about programming a computer</p> <p>Each module and each level of your course progressively builds towards higher order skills and capabilities that you need to achieve the best results in your life. If you do not understand how this module fits into your overall course please discuss this with your module tutor/course leader.</p>
<p><b>5. How does my module engage with the real-world environment?</b></p>	<p>Since computing and computers are ubiquitous in the real world, the module team will draw on real-world examples in sessions.</p>
<p><b>6. How will my module help me enhance my academic skills and employment skills?</b></p>	<p>As businesses now frequently ask for details of your module attendance in your reference, we recommend that you attend all lectures and workshops whether they are online or face-to-face.</p> <p>By attending and participating in lectures and workshops you will get to work in groups, collaborate, share ideas, negotiate and influence others. These are all key employment skills that your future employers will expect from you.</p> <p>This module aims to develop a broad range of skills that are important to you, both in your studies and when you will be seeking employment, especially in Computing. While the following list is not exhaustive, it highlights the most important.</p> <ul style="list-style-type: none"> <li>• Numeracy and Data Analysis</li> <li>• Problem Solving</li> <li>• Planning an activity or project</li> <li>• Written and Oral Communication</li> <li>• Transferring an idea from one domain to another (coding).</li> </ul> <p>The UW <u>Careers &amp; Employability Service</u> is your online portal that contains tools to support students and graduates plan and manage their careers and develop employability skills. This includes 'myCareer', our new online platform for students to search for placements, internships and graduate roles, book onto careers fairs, workshops and events, access eGuidance, and complete the Worcester Award.</p> <p>Your WBS <u>Employability Enhancement Hub</u> is your online self-assessment portal that contains tools that allows you to map your employment skills and personal qualities against what employers want from graduates. By using it you will discover what you have learned from your academic study, work experience and extra-curricular activities and be shown how to demonstrate them in your CV.</p>

<p><b>7. What do I need to know before I attend and participate in my lectures?</b></p>	<p>Learning and teaching is divided into three “Units”.</p> <p><b>Unit 1</b> will be delivered in the first semester. Here you will learn about ‘algorithms’ which means structured approaches to apply computers to solve real-world problems. You will also learn about the electronic basis of the digital computer, and Boolean logic and algebra. Finally, you will be introduced to techniques useful in Computer Graphics.</p> <p><b>Unit 2</b> will be delivered in the second semester. Here you will be introduced to aspects of computer hardware, using Arduino technology. You will then use this to design, build and test a two-wheeled robot. You will also be introduced to the processing architecture of a typical Central Processing Unit (CPU).</p> <p><b>Unit 3</b> will be delivered in the second semester It will cover Internet architecture, TCP/IP based software, and the world wide web before exploring software used to make the Architecture of the Internet secure. It will also look at users and management of users in organisations that engage with the Internet (nearly all of them nowadays!)</p> <p>You will also be required to engage in <b>preparation</b> for sessions and to complete <b>activities in your own time</b>. These are indicated in Section 12, below.</p> <p>Last year students enjoyed the “crash course” in a lot of computing topics, seeing how hardware and software work together, and designing and building a real-world robot. Students also enjoyed having more than one lecturer.</p>
<p><b>8. How can I help myself to achieve a successful outcome?</b></p>	<p>You need to do a lot of reading to obtain your degree. This means you must get used to conducting independent study and using the library resources such as journal articles, books, data bases, etc. to source credible information. These are available from the Library website: (<a href="https://library.worc.ac.uk">https://library.worc.ac.uk</a>).</p> <p>To ensure you can achieve a successful outcome of this module, you must prepare for each lecture through independent study. Your preparation for each lecture is shown in the Module Programme in this document; the sources identified for each week’s preparation are provided in the module’s Talis Aspire Resource List which is available via a link in your module’s Blackboard site or via: <a href="https://worc.rl.talis.com/index.html">https://worc.rl.talis.com/index.html</a>.</p> <p>To obtain your best module outcome you must attend and fully participate in all sessions. If you cannot attend any of your online or face-to-face sessions for any reason you must notify the module leader as soon as possible before the session. Continued non-attendance / disengagement may lead to you being removed from the course.</p> <p>If you need help with your academic skills such as academic writing, referencing, critical analysis, independent study, time management, etc. please contact Firstpoint in the Peirson Study and Guidance Centre on St John's Campus, call them on 01905 542551, or email <a href="mailto:firstpoint@worc.ac.uk">firstpoint@worc.ac.uk</a>. Further information is available on the Firstpoint website: <a href="https://www.worcester.ac.uk/life/help-and-support/services-for-students/firstpoint.aspx">https://www.worcester.ac.uk/life/help-and-support/services-for-students/firstpoint.aspx</a> and the Library website: <a href="https://library.worc.ac.uk">https://library.worc.ac.uk</a>.</p> <p><b>The Academic Liaison Librarian for the Business School</b> is available by email: <a href="mailto:askalibrarian@worc.ac.uk">askalibrarian@worc.ac.uk</a>.</p> <p><b>If there is anything which is unclear, or you do not understand, please ask a member of the module team.</b></p>

<b>9. What is my responsibility in Comp1421</b>	<p>It has been proven that your lecture attendance is strongly linked to your module success. As we want you to do well, we recommend you attend all of your online or face-to-face lectures and workshops, undertake all of your lecture preparation, participate with in-class activities and ask for help if you need it.</p> <p>If you cannot attend for any reason you must notify the module leader as soon as possible before the session. If the module leader knows you are unable to attend, they will be able to help you catch back what you have missed. Your non-attendance / disengagement in the lectures may lead to you being removed from the module.</p> <p><b>If there is anything which is unclear, or you do not understand, please ask a member of the module team.</b></p>
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<b>10. How do I get help if I have a disability or a particular learning need?</b>	<p>The University of Worcester is committed to ensuring diversity and equality within our learning, teaching and assessment practice. If you have a registered disability or particular learning need and you wish this to be taken into account, please speak to your Personal Academic Tutor or let the module leader know. You will find additional useful information on the Disability and Dyslexia webpages at <a href="https://www2.worc.ac.uk/disabilityanddyslexia/">https://www2.worc.ac.uk/disabilityanddyslexia/</a></p>
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<b>11. What is my assessment / are my assessment(s)?</b>	<p>There are 4 items of assessment distributed over both semesters. These are detailed in the tables below</p>
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<b>Assignment 001</b>	Report with annotated code
<b>Word Limit or equivalent (e.g. time)</b>	1500 words
<b>Weighting</b>	25%
<b>Learning Outcomes Assessed</b>	ILO1: Apply algorithms to solve real-world computational problems
<b>Submission date</b>	Friday 4 <sup>th</sup> December 2020
<b>Feedback date</b>	All assignment feedback will be issued on the 20 <sup>th</sup> working day following the submission deadline. Feedback will be released on: Friday 8 <sup>th</sup> January 2021
<b>Module Leader</b>	Colin Price
<b>Verified by</b>	Chris Bowers

<b>Assignment 002</b>	Examination
<b>Word Limit or equivalent (e.g. time)</b>	1 hour
<b>Weighting</b>	25%
<b>Learning Outcomes Assessed</b>	ILO2 Demonstrate understanding of data structures and their uses
<b>Submission date</b>	Exam Week (w/c 11 <sup>th</sup> January 2021)
<b>Feedback date</b>	All assignment feedback will be issued on the 20 <sup>th</sup> working day following the submission deadline. Feedback will be released on: Friday 11 <sup>th</sup> February 2021

<b>Module Leader</b>	Colin Price
<b>Verified by</b>	Chris Bowers

<b>Assignment 003</b>	Report and Individual Presentation
<b>Word Limit or equivalent (e.g. time)</b>	1000 words and 10 minutes
<b>Weighting</b>	30%
<b>Learning Outcomes Assessed</b>	ILO3 Design, build and test a computer-based solution ILO4 Demonstrate knowledge of aspects of computer hardware
<b>Submission date</b>	Thursday 11 <sup>th</sup> March 2021
<b>Feedback date</b>	All assignment feedback will be issued on the 20 <sup>th</sup> working day following the submission deadline. Feedback will be released on: Friday 23 <sup>rd</sup> April 2021
<b>Module Leader</b>	Colin Price
<b>Verified by</b>	Chris Bowers

<b>Assignment 004</b>	Paper with References
<b>Word Limit or equivalent (e.g. time)</b>	1000 words
<b>Weighting</b>	20%
<b>Learning Outcomes Assessed</b>	ILO5 Review contemporary issues within the discipline of Computing ILO6 Communicate ideas and concepts in a clear and concise form
<b>Submission date</b>	Thursday 6 <sup>th</sup> May 2021
<b>Feedback date</b>	All assignment feedback will be issued on the 20 <sup>th</sup> working day following the submission deadline. Feedback will be released on: Feedback release date Friday 4 <sup>th</sup> June 2021.
<b>Module Leader</b>	Colin Price
<b>Verified by</b>	Chris Bowers

**12. My Module Timetable**

W/C date	Teaching week number	Pre/post-class reading or activity	Topic	How does this link to my Assessment?
14 Sept	Induction Week / Review Week <i>Computing PAT meetings level 4, 5 &amp; 6 (Groups)</i>			
21 Sept	1		Computing with the physical world: Arduino Blinky and Traffic Lights.	ILO1
28 Sept	2		WBEEngine coding testbed. Sequential / Concurrent behaviour. The loop structure.	ILO1
5 Oct	3	Raptor Homework	Flow diagrams using Raptor: Control Flow. Application to loops and arrays.	ILO1
12 Oct	4		More flow diagrams and code snippets. Further work with arrays.	ILO1
19 Oct	5	Reading Code Snippets	Reading code. Sort and search algorithms. Investigating time-behaviour of algorithms	ILO1
26 Oct	6	Finite State Machines	Algorithms for games. Algorithms for robots, e.g. Finite State Machines.	ILO1
2 Nov	Progress Week and Award Ceremonies			
9 Nov	7	<i>Computing PAT meetings level 4, 5 &amp; 6 (Individual)</i>	Data flow and the concept of a 'stack'. <b>Formative feedback. Report 1 guidance. Mock Examination released.</b>	ILO2
16 Nov	8	<i>Computing PAT meetings level 4, 5 &amp; 6 (Individual)</i>	The Nature of a Computer. Digital electronic logic gates and information representation.	ILO2
23 Nov	9		Solving logic problems using Logisim simulator. Sum of Products approach	ILO2
30 Nov	10		Simplification of solutions to logic problems using Boolean algebra.	ILO2
7 Dec	11		Computer graphics techniques (vectors and matrices)	ILO2
14 Dec	12		Computer graphics techniques (vectors and matrices) <b>Formative feedback. Exam guidance. Mid-module feedback collection.</b>	ILO2
21 Dec	<b>Christmas Break</b>			
28 Dec	<b>Christmas Break</b>			
4 Jan	<b>Revision week and Personal mid-year review</b>			
11 Jan	<b>Assessment Week</b>			
18 Jan	13	Teaching Commences Semester 02  Module Selection	Robot Design-Build-Test. <b>Assignment 3 guidance</b>	ILO3
25 Jan	14	<i>Computing PAT</i>	Robot Design-Build-Test	ILO3

## Module Code

Jan		<i>meetings level 4, 5 &amp; 6 (Groups)</i>		
1 Feb	15		Robot Design-Build-Test <b>Formative feedback. Assignment 3 guidance</b>	ILO3
8 Feb	16		Robot Design-Build-Test <b>Feedback on Report1 and Examination.</b>	ILO3
15 Feb	17		CPU Architecture. The 'fetch-execute cycle'. SAM simulator.	ILO4
22 Feb	18		CPU Architecture. The 'fetch-execute cycle'. SAM simulator.	ILO4
1 Mar	Progression Week			
8 Mar	19		LANs	
15 Mar	20	<i>Computing PAT meetings level 4, 5 &amp; 6 (Individual)</i>	WANs	
22 Mar	21	<i>Computing PAT meetings level 4, 5 &amp; 6 (Individual)</i>	Structure of Network Messages	
29 Mar	<b>Easter Break</b>			
5 Apr	<b>Easter Break</b>			
12 Apr	22		Network security	
19 Apr	23		Personal online security	
26 Apr	24		Social (mis)uses of computer networks	
	* <b>Assessment Week 3 May - 14 May</b>			
	* <b>Bank Holiday Monday 3 May</b>			
	<b>Assessment Week</b>			

**Reassessment Week: 5 July 2021 – 16 July 2021**