Module Descriptor

Title	Systems Programming Concepts		
Session	2025/26	**Status**	Published
Code	COMP09111	**SCQF Level**	9
Credit Points	20	**ECTS (European Credit Transfer Scheme)**	10
School	**Computing, Engineering and Physical Sciences**		
Module Co-ordinator	Stephen Devine		

Summary of Module

The aim of the module is to provide students with an understanding of the main concepts associated with device control and data acquisition together with the chance to develop further programming skills.

Students will be introduced to practical issues associated with hardware and operating systems. This will include topics such as advanced data structures, command line programming, inter process communications and other techniques required to manage and control current networked hosts and devices.

Students studying this module will have the opportunity to discover both physical computing and programming concepts, and will include the use of Micro controllers, and several types of sensors, such as light, temperature, humidity and sound.

This module will work to develop a number of the key 'I am UWS' Graduate Attributes to make those who complete this module:

Universal

Critical Thinker

Ethically-minded

Research-minded

Work Ready

Problem-Solver

Effective Communicator

Ambitious

Successful

Autonomous

Resilient

Driven

Module Delivery Method	On-Campus[1] ☒	Hybrid[2] ☐	Online[3] ☐	Work -Based Learning[4] ☐
Campuses for Module Delivery	☐ Ayr ☒ Dumfries	☒ Lanarkshire ☐ London ☐ Paisley	☐ Online / Distance Learning ☒ Other (specify) NCL	

Terms for Module Delivery	Term 1	☐	Term 2	☒	Term 3	☐
Long-thin Delivery over more than one Term	Term 1 – Term 2	☐	Term 2 – Term 3	☐	Term 3 – Term 1	☐

Learning Outcomes	
L1	Demonstrate a critical understanding of systems programming within Linux, Windows and micro-controllers
L2	Critical understanding of programming language constructs in developing interactive programs, that take inputs from sensors and control a variety of physical outputs such as LEDs and Servos.
L3	Critically reflect on alternative system programming techniques to provide solutions to complex network or operating systems problems.
L4	N/A
L5	N/A

Employability Skills and Personal Development Planning (PDP) Skills	
SCQF Headings	**During completion of this module, there will be an opportunity to achieve core skills in:**
Knowledge and Understanding (K and U)	**SCQF 9** Knowledge and understanding of the scope and defining features of systems programming, and an integrated knowledge of its main areas and boundaries. A critical understanding of the principles, principal theories, concepts and terminology associated with systems programming.

[1] Where contact hours are synchronous/ live and take place fully on campus. Campus-based learning is focused on providing an interactive learning experience supported by a range of digitally-enabled asynchronous learning opportunities including learning materials, resources, and opportunities provided via the virtual learning environment. On-campus contact hours will be clearly articulated to students.

[2] The module includes a combination of synchronous/ live on-campus and online learning events. These will be supported by a range of digitally-enabled asynchronous learning opportunities including learning materials, resources, and opportunities provided via the virtual learning environment. On-campus and online contact hours will be clearly articulated to students.

[3] Where all learning is solely delivered by web-based or internet-based technologies and the participants can engage in all learning activities through these means. All required contact hours will be clearly articulated to students.

[4] Learning activities where the main location for the learning experience is in the workplace. All required contact hours, whether online or on campus, will be clearly articulated to students

Practice: Applied Knowledge and Understanding	**SCQF 9** Use the principle skills, techniques and practices related to systems programming. Practise routine methods of enquiry to practise in a range of contexts that include a degree of unpredictability.
Generic Cognitive skills	**SCQF 9** Undertake critical analysis, evaluation and/or synthesis of ideas, concepts, information and issues in systems programming. Identify and analyse routine professional problems and issues. Draw on a range of sources in making judgements.
Communication, ICT and Numeracy Skills	**SCQF 9** Use a wide range of skills in support of established practices; Present or convey, formally and informally, information about topics to informed audiences; Interpret, use and evaluate data.
Autonomy, Accountability and Working with Others	**SCQF 9** Exercise autonomy and initiative in activities. Manage complex ethical and professional issues in accordance with ethical codes or practices.

Prerequisites	**Module Code** COMP07027 COMP08074	**Module Title** Introduction to Programming Operating Systems
	Other	
Co-requisites	**Module Code**	**Module Title**

Learning and Teaching	
In line with current learning and teaching principles, a 20-credit module includes 200 learning hours, normally including a minimum of 36 contact hours and maximum of 48 contact hours.	
Learning Activities During completion of this module, the learning activities undertaken to achieve the module learning outcomes are stated below:	**Student Learning Hours** (Note: Learning hours include both contact hours and hours spent on other learning activities)
Lecture / Core Content Delivery	12
Tutorial / Synchronous Support Activity	12
Laboratory / Practical Demonstration / Workshop	24
Independent Study	152
Please select	
Please select	
TOTAL	200

Indicative Resources

The following materials form essential underpinning for the module content and ultimately for the learning outcomes:

Blum, J. (2013) Exploring Ardunio. Wiley. ISBN-10: 1118549368, ISBN-13: 978-1118549360

Kerrisk, M (2010) The Linux Programming Interface: A Linux and UNIX System Programming Handbook. ISBN-13: 978-1-59327-220-3

Mazidi, M et al (2019) Arduino Programming From Beginning to Advanced. MicroDigitalEd. ISBN-10:1970054204, ISBN-13: 978-1970054200

Oracle VirtualBox virtualisation software.

Please ensure the list is kept short and current. Essential resources should be included, broader resources should be kept for module handbooks / Aula VLE.

Resources should be listed in Right Harvard referencing style or agreed professional body deviation and in alphabetical order.

(N.B. Although reading lists should include current publications, students are advised (particularly for material marked with an asterisk*) to wait until the start of session for confirmation of the most up-to-date material)

Attendance and Engagement Requirements

In line with the Student Attendance and Engagement Procedure, Students are academically engaged if they are regularly attending and participating in timetabled on-campus and online teaching sessions, asynchronous online learning activities, course-related learning resources, and complete assessments and submit these on time.

For the purposes of this module, academic engagement equates to the following:

The School of Computing, Engineering and Physical Sciences considers attendance and engagement to mean a commitment to attending, and engaging in, timetabled sessions. You will scan your attendance via the scanners each time you are on-campus and you will login to the VLE several times per week. Where you are unable to attend a timetabled learning session due to illness or other circumstance, you should notify the Programme Leader that you cannot attend. Across the School an 80% attendance threshold is set. If you fall below this, you will be referred to the Student Success Team to see how we can best support your studies.

Equality and Diversity

The University's Equality, Diversity and Human Rights Procedure can be accessed at the following link: UWS Equality, Diversity and Human Rights Code.

Aligned with the University's commitment to equality and diversity, this module supports equality of opportunity for students from all backgrounds and learning needs. Using the VLE, material will be presented electronically in formats that allow flexible access and manipulation of content. This module complies with University regulations and guidance on inclusive learning and teaching practice. This module has lab-based teaching and as such you are advised to speak to the Module Co-ordinator to ensure that specialist assistive equipment, support provision and adjustment to assessment practice can be put in place, in accordance with the University's policies and regulations.

(N.B. Every effort will be made by the University to accommodate any equality and diversity issues brought to the attention of the School)

Supplemental Information

Divisional Programme Board	**Computing**

Overall Assessment Results	☐ **Pass / Fail** ☒ **Graded**
Module Eligible for Compensation	☐ **Yes** ☒ **No** **If this module is eligible for compensation, there may be cases where compensation is not permitted due to programme accreditation requirements. Please check the associated programme specification for details.**
School Assessment Board	Business & Applied Computing
Moderator	Paul Keir
External Examiner	M Davis
Accreditation Details	
Module Appears in CPD catalogue	☐ **Yes** ☒ **No**
Changes / Version Number	1.05

Assessment (also refer to Assessment Outcomes Grids below)
Assessment 1
There are three coursework assignments: Practical Assignment: Create a combined hardware and software solution to a given task. Practical & Written Assignment: Carry out specified laboratory tasks and maintain laboratory notes. Written Assignment: Analyse a case study and produce a written solution.
Assessment 2
Assessment 3
(N.B. (i) Assessment Outcomes Grids for the module (one for each component) can be found below which clearly demonstrate how the learning outcomes of the module will be assessed. (ii) An indicative schedule listing approximate times within the academic calendar when assessment is likely to feature will be provided within the Student Module Handbook.)

Component 1							
Assessment Type	**LO1**	**LO2**	**LO3**	**LO4**	**LO5**	**Weighting of Assessment Element (%)**	**Timetabled Contact Hours**
Labs Tasks & Case Study	☒	☒	☒	☐	☐	100	16

Component 2							
Assessment Type	**LO1**	**LO2**	**LO3**	**LO4**	**LO5**	**Weighting of Assessment Element (%)**	**Timetabled Contact Hours**
	☐	☐	☐	☐	☐		

Component 3							
Assessment Type	**LO1**	**LO2**	**LO3**	**LO4**	**LO5**	**Weighting of Assessment Element (%)**	**Timetabled Contact Hours**
	☐	☐	☐	☐	☐		
Combined total for all components						100%	16 hours

Change Control

What	**When**	**Who**
Attendance and Engagement and Equality and Diversity Statements	20/01/25	R Moffat
External Examiner updated	22/01/2025	A Adamson
Additional delivery campuses added	11/02/25	S. Devine
Assessments consolidated into one	4/3/25	S. Devine