Module Descriptor

Title	Emerging Topics in Computing		
Session	2025/26	**Status**	Published
Code	COMP11060	**SCQF Level**	11
Credit Points	10	**ECTS (European Credit Transfer Scheme)**	5
School	**Computing, Engineering and Physical Sciences**		
Module Co-ordinator	Muhammad Zeeshan Shakir		

Summary of Module

This module is research-informed and exposes students to the latest, start-of-the-art knowledge and developments in the field. The module will be delivered by research active academic staff from UWS. Leaders in research from other institutes or industry will also be invited to present seminars and/or lectures.

Students will have the unique opportunity to observe experiments conducted on our developed testbeds, fostering hands-on skills while enriching their understanding beyond lecture content. This practical approach enhances both the breadth and depth of knowledge, ensuring a comprehensive learning experience. In addition, this module complements the Research Design & Methods module by incorporating specific research and ethics issues in the context of the future computing technologies. Students will be encouraged to engage with existing research ideas and projects presented in this module as the basis for the assessment in the Research Design and Methods module. It is anticipated that such engagement will be developed into the student's MSc project, thereby providing a coherent pathway through the PgD and into the MSc.

Following are some of the topics we will cover in this module: Smart cities and IoT applications

5G Cyber security systems

Unmanned aerial systems for future connectivity

5G network applications e.g., Health care, multi-media networks, vehicular networks and smart grid Robotics and control

Artificial Intelligence / machine learning and big data analytics Cloud computing architectures

Blockchain and applications

Quantum computing and communications Digital twin and immersive technologies

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)	

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 comprehensive and systemic understanding of the latest computing technologies
L2	Develop skills of algorithms development and implementation and ability to evaluate the current state of the art in a critical manner.
L3	Demonstrate a critical understanding of the latest developments and applications of computation technologies.
L4	Recognise the legal, social, ethical and professional issues involved in the exploitation of advanced computing technologies.
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 11** Students will learn the latest technologies in computing by presentations from forefront researchers and critical review of the latest developments across the world. Students will be familiar with a depth of knowledge of few key technologies in the area and develop critical review of technologies in the future.
Practice: Applied Knowledge and Understanding	**SCQF 11** Students will gain in-depth and critical awareness of knowledge in computing technologies, and apply this in planning, implementing, deploying and managing smart cities. They will also develop capability in

[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

	applying a range of standard and specialized research skills, tools/software, development kit and related techniques in response to application requirements for their written assignment and lab tasks. In addition, presentation skills and critical review skills are to be developed through presentation and literature review.
Generic Cognitive skills	**SCQF 11** Students will build skills to integrate information and apply knowledge from various sources including technology advances informed by research and industry so as to complete their written reports and related tasks.
Communication, ICT and Numeracy Skills	**SCQF 11** Working in interacting groups, students will develop communication skills as well as the ability to write technical reports and documentation. Presentation skills will be developed through presentation. Literature review of the latest technologies will further develop critical thinking and review skills.
Autonomy, Accountability and Working with Others	**SCQF 11** Each student in each group will be responsible for finding and summarizing information about the assigned tasks in the classroom. Students will elect a coordinator and develop a sense of accountability to the group members.

Prerequisites	**Module Code**	**Module Title**
	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. The module will be delivered by means of lectures and lab demonstration, and tutorials on implementing algorithms and hardware systems. The lectures will introduce the concepts, theories, and algorithms of the technologies. The lab demos will enhance the learning by demonstrating technologies and systems/test-beds developed by the researchers at UWS and allow students to exploit some technologies for their projects. The tutorial sessions will help consolidate both the lecture material and the skills practiced during the lab demos.	
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	18
Asynchronous Class Activity	12
Personal Development Plan	6
Independent Study	64
Please select	

Please select	
TOTAL	100

Indicative Resources

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

Core references:

Module resources: Follow module site (AULA) for the most up-to-date information on material/topics and references.

Shakir, M. Z., & Ramzan, N. (Eds.) (2020). AI for Emerging Verticals: Human-Robot Computing, Sensing and Networking. IET. ISBN-13: 978-1-78561-982-3 UWS Library: https://uws-primo.hosted.exlibrisgroup.com/permalink/f/1a10t95/44PAI_ALMA5159263000003931

McClellan, S., Jimenez, J., Koutitas, G. (2018). Smart Cities Applications, Technologies, Standards, and Driving Factors, Springer International Publishing. DOI: 10.1007/978-3-319-59381-4 UWS Library: https://uws-primo.hosted.exlibrisgroup.com/permalink/f/1a10t95/44PAI_ALMA5153593000003931

Other references:

IEEE Future Directions https://www.ieee.org/about/technologies/index.html

IEEE Transactions on Emerging Topics in Computing
http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=6245516

IEEE Communications Magazine
http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=35

IEEE Computational Intelligence Magazine
http://ieeexplore.ieee.org/xpl/tocresult.jsp?isnumber=33585

IEEE Robotics & Automation Magazine
http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=100

IEEE Systems Journal http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=4267003

IEEE Vehicular Technology Magazine
http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10209

(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	Shahriar Al-Ahmed
External Examiner	R Menzies
Accreditation Details	
Module Appears in CPD catalogue	☐ **Yes** ☒ **No**
Changes / Version Number	2.04

Assessment (also refer to Assessment Outcomes Grids below)

Assessment 1
The module will be assessed by written assignment (report) and presentation. Students are required to write technical reports to review the latest technologies in the field, and demonstrate learnt skills of algorithms/systems development and implementation and ability to critically evaluate the current state of the art.
Assessment 2
Then each student will present his/her findings to the lecturers and fellow students.
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**
Case study	☒	☒	☒	☒	☐	60	0

Component 2							
Assessment Type	**LO1**	**LO2**	**LO3**	**LO4**	**LO5**	**Weighting of Assessment Element (%)**	**Timetabled Contact Hours**
Presentation	☒	☐	☒	☐	☐	40	0

Component 3							
Assessment Type	**LO1**	**LO2**	**LO3**	**LO4**	**LO5**	**Weighting of Assessment Element (%)**	**Timetabled Contact Hours**
	☐	☐	☐	☐	☐		
Combined total for all components						100%	0 hours

Change Control

What	**When**	**Who**
Attendance Update & EDI Update	21/01/2025	A Adamson