CET139 – Emerging Technologies Module Handbook (2023-24)

Faculty	Faculty of Technology	Credits	20
School	School of Computer Science	Study hours	200

Teaching team:

Module Leader	Ronald Mo
Module Teachers	Mriganka Biswas (Main Teacher)
	Qiang Huang (Main Teacher)
	Rob Adams
	Basel Barakat
	Martin Davies
	Neil Eliot
	Elizabeth Gandy
	David Nelson
	Ashley Williamson

Learning Outcomes:

By the end of this module, successful students will be able to do the following:

1. Recognize the emergence of novel tools and techniques within Computer Science

2. Discuss the potential impacts of a range of emerging technologies on industry and society

3. Consider the issues associated with end-user adoption of new and emerging technologies

Content:

Topics covered in this module will be selected to converge with new and emerging technologies as they begin to take a foothold in the computing landscape. This will include the following possible themes:

Automation: Robotics, autonomous control, decision-making, etc.

Cybersecurity: cryptocurrencies, cybersecurity, authentication, certification, immutable ledgers, secure transactions, etc.

The Internet-of-Things: Smart homes, transportation, wearable technologies, energy management, environmental monitoring, etc.

Communication: 5G, 6G etc.

Data Science: Database technology, Artificial Intelligence, etc.

This module aims to be practically focused and will allow students to experiment and interact with examples of a range of emerging technologies covered in the taught sessions. Students will then share evidence of their research and practical activities in a summative presentation.

Teaching pattern:

Type	Hours
Independent Learning	152
Lecture	12
Practical	36
Total (hrs):	**200**

Assessment:

Type	Percentage	Name	Description
Coursework	100	Presentation	Present evidence of research and interaction with a range of emerging technologies and discuss a single emerging technology and its potential impacts in depth. Assesses all learning outcomes.

Programmes using this module / Co- and Pre-requisites:

BSc (Hons) Computer Science (Core)
BSc (Hons) Cybersecurity and Digital Forensics (Core)

Other module information:

Available for Study Abroad students: Yes

Work-based learning / Apprenticeship: No

Has professional accreditation?   No

Delivered...   - On campus
                                         - Off-campus

Learning resources	
University provision **Library Resources and Academic Support**	Library Services at the University of Sunderland offers resources, high-quality services, and professional expertise to enable the effective discovery and use of information and to support teaching, learning, and research across the institution. The Library is located on the St. Peter campus. This library is spread across two floors, offering students access to print and electronic resources. Each floor offers a different study environment, from flexible group study areas to individual study pods. All students are automatically members of the Library – the ID card is also the library card. Self-service machines are available at all sites, allowing for independent borrowing when service desks are not staffed. PC workstations, printing facilities, and Wi-Fi access are also provided. Library Services offers a range of study spaces for group and individual study and is open 24/7 during term time. The library provides access to print and electronic material including books, e-books, journals and databases, music scores, and more. Each School/College has an Academic Support Librarian to support students and staff with finding, evaluating, and referencing information sources. https://library.sunderland.ac.uk/about-us/opening-hours/
Student learning resources (Reading Lists)	**Emerging technologies in computing: theory, practice, and advances** Sharmila, R.,; Kumar, Pramod,; Tomar, Anuradha, CRC Press, 2022 **Multimodal interface for human-machine communication** Yuen, P. C.; Tang, Y. Y., 1943-; Wang, P.S.P. 2002 **Artificial intelligence** Wallace, Richard J. 2021 **Research methods for cyber security** Edgar, Thomas W.; Manz, David O., 2017 **Cyber Security: Power and Technology** Lehto, Martti; Neittaanmäki, Pekka, 2018

	Advanced security issues of IoT based 5G plus wireless communication for industry 4.0 Thayananthan, Vijey, 2019 **When 5G meets industry 4.0** Wang, Xiwen, author.; Gao, Longxiang, 2020 **Internet of Things and big data applications: recent advances and challenges** Balas, Valentina Emilia; Solanki, Vijender Kumar; Kumar, Raghvendra, 2020 **The Internet of Everything: Advances, Challenges and Applications** Dey, Nilanjan; Mahalle, Parikshit; Olesen, Henning; Shinde, Gitanjali; Knowledge Unlatched funder, 2019 **Robotics, AI, and Humanity: Science, Ethics, and Policy** von Braun, Joachim; S. Archer, Margaret; Reichberg, Gregory M; Sánchez Sorondo, Marcelo; Sánchez Sorondo, Marcelo; S. Archer, Margaret; von Braun, Joachim; Reichberg, Gregory M, 2021 **Data Science in Engineering and Management: Applications, New Developments, and Future Trends** Polkowski, Zdzislaw ; Mishra, Sambit Kumar ; Vasilev, Julian, 2021 **Emerging Technologies in Computing: Theory, Practice, and Advances** Kumar, Pramod ; Tomar, Anuradha ; Sharmila, R, 2021

Regulations

Avoidance of Plagiarism

All students are expected to observe scholarly conventions associated with writing, in which it is important for a reader to easily identify what is the writer's own work and what is someone else's. To ensure this is the case:

- Students should use suitable annotation and quotation marks to acknowledge the source where there is any use of another person's words.
- Even when the writer is not copying directly but is still relying substantially on another person's words or work, then this too should be acknowledged by citing that person in the text and providing the full reference in the reference list.
- If drawing on another's work for a general approach or occasional insight that too should be acknowledged in the text by citing the author(s) and providing the full reference in the reference list.

There are specific University regulations governing assessment which can be found at:

https://services.sunderland.ac.uk/academicregistry/studenthandbook/?slug=academic-misconduct

In any cases where students are believed to have infringed these regulations, the appropriate procedures will be followed.

Ethical Considerations & Approval
If your project has ethical considerations such as involving human participants and/or data you will need University of Sunderland's ethical approval for your project. This should be identified in the Ethical Considerations section. All projects should obtain ethical approval, it is typically rapid and straightforward and will be undertaken after you have been allocated a supervisor and your project is more clearly defined.

Extensions
The **Module Leader** has the authority to grant an extension to the deadline for the submission of an assignment of up to **7 calendar days** provided they are satisfied that a genuine reason exists. In the absence of the Module Leader the **Programme Leader** has the authority to make the decision.

Students must seek an extension from the Module Leader and only refer to the Programme Leader in the absence of the Module Leader. The Programme Leader/Manager will refer any requests to the Module Leader when the Module Leader is available[1].

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1. https://sunderlandac.sharepoint.com/sites/cs_public-documents/Academic%20Registry/Forms/AllItems.aspx?id=%2Fsites%2Fcs%5Fpublic%2Ddocuments%2FAcademic%20Registry%2FAQH%2FProgramme%20Regulations%2FExtenuating%2FRegulations%20for%20Consideration%20of%20Extenuating%20Circumstances%2Epdf&parent=%2Fsites%2Fcs%5Fpublic%2Ddocuments%2FAcademic%20Registry%2FAQH%2FProgramme%20Regulations%2FExtenuating&p=true&ga=1

Additional Important Information:

Ethical Approval: You should have ethical approval in place before you start your practical research work. Also please note that your dissertation and viva will NOT be assessed if you do not have ethical approval in place.

Academic Integrity Statement: You must adhere to the university regulations on academic conduct. Formal inquiry proceedings will be instigated if there is any suspicion of plagiarism or any other form of misconduct in your work.