| Module Code: | COM745 |
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| Module Title: | Technological Horizon-Scanning |
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| Level: | 7 | Credit Value: | 20 |
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| Cost Centre(s): | GACP | JACS3 code: HECoS code: | V550 100338 |
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| School: | Arts, Science and Technology | Module Leader: | Prof. Vic Grout |
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| Scheduled learning and teaching hours | 21 hrs |
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| Guided independent study | 179 hrs |
| Placement | 0 hrs |
| **Module duration (total hours)** | 200 hrs |

| Programme(s) in which to be offered (not including exit awards) | Core | Option |
|---|---|---|
| MSc Computing | ✓ | ☐ |
| MSc Computer Science | ✓ | ☐ |
| MSc Computer Networks | ✓ | ☐ |
| MSc Cyber Security | ✓ | |

| Pre-requisites |
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| None. |

| Module Aims |
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| The aim of this module, always to be scheduled as close to the end of the overall Masters programme as possible, is to allow students to identify, critically examine and debate a range of current and future technical and social issues in computing, engineering and technology and, in so doing, develop a critical awareness of the impact of current and emerging research and development. It will enable students to gain a broad general knowledge of some current research areas in computing and engineering and their application in industry, commerce and further afield. In a general sense, the module will introduce students to the field of '*Futurology'*. Both the emphasis on *looking ahead* and the clear balance between technological advancement and social implications are essential features of the module. Finally, Masters students will be expected to make forecasts and judgements on the basis of this – often conflicting – information. |

| Intended Learning Outcomes |
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Key skills for employability

KS1     Written, oral and media communication skills
KS2     Leadership, team working and networking skills
KS3     Opportunity, creativity and problem solving skills
KS4     Information technology skills and digital literacy
KS5     Information management skills
KS6     Research skills
KS7     Intercultural and sustainability skills
KS8     Career management skills
KS9     Learning to learn (managing personal and professional development, self-management)
KS10    Numeracy

| At the end of this module, students will be able to | | Key Skills | |
| --- | --- | --- | --- |
| 1 | Assess emergent computing and engineering technologies at various stages of research, development and deployment | KS1 | |
| | | KS5 | KS6 |
| | | KS7 | KS8 |
| 2 | Identify, critically analyse and debate current and future issues in computing and engineering | KS1 | KS2 |
| | | KS5 | KS6 |
| | | KS7 | KS8 |
| 3 | Synthesise conflicting opinions and make judgements regarding emergent and future technologies and their wider social, ethical, legal, political, economic, environmental and demographic drivers and impact | KS1 | KS2 |
| | | KS5 | KS6 |
| | | KS7 | KS8 |
| 4 | Discuss and make informed forecasts regarding the directions taken by various aspects of computer technologies and their application and impact in the short, medium and long-term future | KS1 | |
| | | KS5 | KS6 |
| | | KS7 | KS8 |

| Transferable skills and other attributes |
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| Derogations |
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| *None.* |

| Assessment: |
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| Indicative Assessment Tasks: |

There are two connected components to the assessment for this module, requiring students to conduct an in-depth investigation into a topic within the broad scope of '*Emerging Technology'*, and to prepare (1) a group presentation and (2) an individual report. Students will, in small groups, choose or be otherwise allocated a topic within the broad scope of *Emerging Technology*. They will prepare and deliver a 25-35 minute group presentation to the rest of the class and other staff on this topic then, individually, submit a 3,500 (+/- 10%) word paper on the topic, possibly on a particular/extended subject/field/application within it, if they wish. The emphasis throughout will be on the future development of the subject and well-grounded speculation is encouraged. Alongside discussion of technological principles, full consideration of the wider social, ethical, legal, political, economic, environmental and demographic drivers and impact is expected in both components.  The group element of the assessment will be worth 40% of the overall module mark and the individual report 60%.

| Assessment number | Learning Outcomes to be met | Type of assessment | Weighting (%) | Duration (if exam) | Word count (or equivalent if appropriate) |
| --- | --- | --- | --- | --- | --- |
| 1 | 1 2 3 4 | Presentation | 40 | 30 mins | |
| 2 | 1 3 4 | Report | 60 | | 3,500 |

| Learning and Teaching Strategies: |
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| The module will be delivered through a combination of staff 'keynotes', formal lectures, tutorials, practical demonstrations and student labs. Use will be made of the University VLE to direct students to further reading, particularly to introduce students to current issues and topics that arise as the module progresses. Students will also be given reading lists and useful URLs to develop their work on the module. A key element in the learning process will be the independent study component. Industrial contacts will be used wherever possible to strengthen and validate key topics. |

**Syllabus outline:**

The purpose of this module, at level six, is to provide students with a thorough and up-to-date knowledge of current trends in computing and to reinforce this where possible with the involvement of staff 'keynotes' and local industry. By definition the syllabus will be reviewed regularly but the focus for students will always be how to identify and critically analyse current issues in computing and be able to put developed arguments supporting and refuting issues, otherwise known as 'Futurology'.

The syllabus will naturally be reviewed on a regular (probably twice-yearly) basis with redundant material being discarded and new introduced in its place. Typical content, based on current directions, could include:

- The 'Internet of Things' and Big Data Analytics
- Social implications of emerging technology
- The 'STEEPLED' model (BCS LSEPIs)
- Computers and the Environment/Green IT and environmental computing
- Computer Forensics
- Accessibility and Usability
- Optical, Quantum or Biological Computing
- Parallel and Grid Computing
- Interactive Television
- Intelligence in Future Imaging Technology
- AI, AGI and Robotics
- Models of Intelligence
- Human-Computer Interaction/Evolving interfaces
- Ethics, privacy, etc,
- Health and safety
- Security and threats
- Political aspects of technology
- Ethical hacking
- Computing in the developing world
- Philosophical principles/Computational philosophy
- Technology adoption
- New aspects of Computer Storage
- New Developments in CPU/Architecture
- New Platforms
- Radio Frequency Identification (RFID) and other technologies
- The Technological Singularity (and other 'singularities')
- Social Media and its Impact
- The perils of 'technocapitalism' and developing technology for profit

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| **Indicative Bibliography:** |
| **Essential reading** |
| Weinersmith, K. and Weinersmith, Z. (2017), *Soonish: Ten Emerging Technologies That Will Improve and/or Ruin Everything*. Particular Books. |
| **Other indicative reading** |
| Grout V. (2017). *Conscious*, Amazon Publishing, Paperback: ISBN: 978-1520590127, https://www.amazon.co.uk/Conscious-Vic-Grout/dp/1520590121, Kindle: https://www.amazon.co.uk/Conscious-Vic-Grout-ebook/dp/B06X3V8TFG <br><br> The British Computer Society (BCS), http://www.bcs.org.uk <br><br> The Institution of Engineering and Technology (IET), http://www.theiet.org <br><br> The Institute of Electrical and Electronic Enginerers (IEEE), www.ieee.org <br><br> IEEE Computer and Communication Societies, <br><br> http://www.computer.org and http://www.comsoc.org/ <br><br> The Association of Computing Machinery (ACM), http://www.acm.org <br><br> Media Technology websites such as the BBC, http://www.bbc.co.uk/news/technology/ <br><br> "Future Internet" (a scholarly open access journal on Internet technologies and the information society, published quarterly online by MDPI) http://www.mdpi.com/journal/futureinternet <br><br> "Turing's Radiator" ('Pleasantly warm topics in Computational Philosophy) http://vicgrout.net/ |