Unit 5: Emerging Technologies

Unit code: Y/601/0451
QCF Level 4: BTEC Higher National
Credit value: 15

Aim
To enable learners to explore current and cutting-edge technological developments, disciplines and advancements that have been, and are still being made, within the field of emerging technologies.

Unit abstract
Emerging technologies can be explored in terms of significant research and development that is ‘cutting-edge’, innovative and dynamic. In other words, technologies that push the boundaries and exceed expectations.

This unit will provide learners with ‘food for thought’. It will introduce a range of technologies that fall under this umbrella and explore the impact that such technologies could bring to society. The unit will provide learners with the opportunity to conduct research into this area and also enable them to draw their own conclusions about the benefits and also the concerns of having access to such technologies and their application in critical environments.

Learners will need to demonstrate a range of research and analytical skills. The information available to support certain technology developments might be limited, due to the stage of development. For example the technology might still be in a prototype stage with little to report on. Information available might also be confidential, due to the dynamics of the technology and findings of any experiments or tests.

On completion of this unit the learner will have an awareness and appreciation of emerging technologies, and how they can support the infrastructure of the environment and society in the future.

Learning outcomes
On successful completion of this unit a learner will:
1. Understand emerging technologies
2. Understand the impact of emerging technologies on society
3. Be able to conduct research into emerging technologies
4. Understand the ethical implications of emerging technologies.
Unit content

1 Understand emerging technologies

Definition: cutting edge developments, contemporary advances in technology, converging technologies, technical innovations; gaining competitive advantage; disciplines and domains emerging technologies cover

Environments: prototype and fully-developed technologies eg low carbon technologies and fuels, nanotechnologies, biotechnology, information technology, cognitive science, robotics, genetic engineering, artificial intelligence, optical computing, 4G technologies, swarm technologies, medicine, transportation

2 Understand the impact of emerging technologies on society

Current developments: current research; development stages; future plans; costs; prototype models eg analysis of predicted/outcome results, implementation or roll-out of the technology, testing, costs

Society: implications eg electric car - impact upon manufacturers of cars, fuel companies, fuel distributors, consumers; government initiatives and legislation

3 Be able to conduct research into emerging technologies

Emerging technology selection: initial emerging technology case studies, research or investigation; environment to provide the basis of in-depth research into an emerging technology eg low-carbon fuels

Research approaches: using primary and or secondary sources of information to gather the research material and evidence; using qualitative and quantitative data sources; using paper-based and electronic information sources

Research outcome: presenting research findings and outcome; target audience for delivery and feedback; presentation delivery eg research paper, formal report, oral presentation, discussion forum, blog; tools eg statistical analysis tools, application software and professional packages to support delivery

4 Understand the ethical implications of emerging technologies

Ethical implications: ethical considerations and implications associated with emerging technologies; exploring ethics associated with testing emerging technologies and their environments eg laboratories

Ethical committees: ethical committees or bodies eg 3TU Centre for Ethics and Technology, United Nations Educational, Scientific and Cultural Organisation (UNESCO Ethics of Science and Technology Programme)
# Learning outcomes and assessment criteria

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<th>Learning outcomes</th>
<th>Assessment criteria for pass</th>
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<td><strong>On successful completion of this unit a learner will:</strong></td>
<td><strong>The learner can:</strong></td>
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| **LO1** Understand emerging technologies | 1.1 examine the environments that utilise emerging technologies by identifying the emerging technologies and current developments in the field  
1.2 examine the environments that utilise emerging technologies by assessing the dependency of these environments on future enhancements |
| **LO2** Understand the impact of emerging technologies on society | 2.1 analyse emerging technologies and their impact on society |
| **LO3** Be able to conduct research into emerging technologies | 3.1 undertake research on an emerging technology  
3.2 present findings from the research  
3.3 evaluate the research process |
| **LO4** Understand the ethical implications of emerging technologies | 4.1 evaluate the ethical implications of emerging technologies discussing the role of ethical committees. |
UNIT 5: EMERGING TECHNOLOGIES

Guidance

Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

The learning outcomes associated with this unit are closely linked with:

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<th>Level 3</th>
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<td>Unit 7: Research Skills</td>
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This unit has links to the Level 4 and Level 5 National Occupational Standards for IT and Telecoms Professionals, particularly the areas of competence of:

- Human Needs Analysis
- Systems Design.

Essential requirements

Learners must have access to a range of resources that can provide both qualitative and quantitative data to support their investigations and research. Learners must also keep up-to-date with current research developments in the field regarding emerging technologies.

Learners will be required to conduct research on emerging technologies. As this subject area is quite vast and covers a number of environments and disciplines, learners will require some direction in terms of where to find the most up-to-date developments or appropriate technologies. Any research that embraces IT or the use of IT would be appropriate, for example Artificial Intelligence (AI) technologies that could be used in medicine, or technologies used to monitor, predict or control certain designs or innovations.

Resources

Websites

www.cesweb.org/emergingTech/default.asp
www.technologyreview.com/special/emerging/

Employer engagement and vocational contexts

To further enrich the content of this unit and to provide more of a vocational context, it would be beneficial to bring in guest speakers or use any conference footage that is available. The proceedings or coverage of any workshops may be quite engaging and informative.