LESSON 77

Ethics in Computing

80 minutes (2 periods) | Ethics, Society, and Emerging Technologies | Outcome 1.11 | Outcome 1.12 | Outcome 1.13 | Outcome 1.14

WHAT THIS LESSON DOES

Explore the vital role of ethics in technology with this lesson. You'll examine key concepts like privacy, cybersecurity, and AI bias, analyse real-world case studies, and reflect on moral dilemmas to make responsible decisions in computing.

CURRICULUM OUTCOMES

Outcome	What the specification asks for
1.11	discuss the complex relationship between computing technologies and society including issues of ethics
1.12	compare the positive and negative impacts of computing on culture and society
1.13	identify important computing developments that have taken place in the last 100 years and consider emerging trends that could shape future computing technologies
1.14	explain when and what machine learning and AI algorithms might be used in certain contexts

WHAT STUDENTS SHOULD BE ABLE TO DO

- Understand core ethical principles in technology, including privacy, intellectual property, and societal impacts.
- Analyse real-world case studies to evaluate the positive and negative effects of computing on society.
- Apply ethical frameworks like utilitarianism and deontology to navigate complex dilemmas.
- Develop critical thinking skills to assess technology's role in environmental and social contexts.
- Recognise the importance of professional ethics in making responsible decisions in computing.

BEFORE THE LESSON

- This is a discussion and theory lesson, so no software or accounts are needed. Have a board or projector ready for capturing the two sides of each case study.
- Line up one or two current Irish or EU examples, for instance a GDPR fine or a data breach in the news, so the concepts land on something concrete.

Ethics in Computing

HOW THE LESSON RUNS

- Introduction
- Ethics in Computing
- Privacy and Data Protection
- Intellectual Property and Copyright
- Cybersecurity and Ethical Hacking
- AI Ethics and Bias
- Environmental and Social Impacts
- Professional Ethics and Case Studies
- Wrap Up

TEACHING MOVES

- 2. Ethics in Computing. Anchor the whole lesson on the legal versus ethical distinction. Ask for something that is legal but feels wrong, and something illegal that some would defend. Keep that tension visible for every later domain.
- 3. Privacy and Data Protection. Tie GDPR to their own lives: what data does a phone app collect, and did they consent knowingly. Draw out consent and data minimisation as the two testable ideas.
- 4. Intellectual Property and Copyright. Make it concrete for coders: source code is automatically copyrighted the moment it is written. Ask what that means for copying from a tutorial or using open source with a licence.
- 5. Cybersecurity and Ethical Hacking. Stress the word authorised. White-hat hacking is only ethical with permission. Ask what separates a penetration tester from a criminal doing the identical actions.
- 6. AI Ethics and Bias. Show that bias enters through training data, not malice. Use a hiring or facial recognition example and ask who is accountable when the model gets it wrong.
- 7. Environmental and Social Impacts. Push past e-waste to data centre energy, a live Irish issue. Balance it with green tech and the digital divide so students see cost and benefit together.
- 8. Professional Ethics and Case Studies. Have students apply the ACM code to one case study, then apply utilitarianism and deontology to the same case. Draw out that the two frameworks can reach opposite conclusions.

WHAT TO WATCH FOR

- Students treat legal and ethical as the same thing, assuming that if something is allowed it must be acceptable. Return to a clear legal-but-harmful example and ask whether the law makes it right. Insist they name the ethical harm separately from the legal position.
- Students think all hacking is criminal and miss that ethical hacking is a legitimate profession. Contrast identical actions with and without authorisation. The permission, not the technique, is what makes it ethical.
- Students believe AI is neutral because it is a machine and cannot see how bias enters. Trace one example back to its training data. Show the model reproduces patterns in the data it was given.

DIFFERENTIATION

- Emerging: Give one domain and one case study rather than all six. Ask them to list only the harms, then only the benefits, before judging.
- Developing: Have them apply the ACM code to a case study by picking two principles it breaks, before moving to the abstract frameworks.
- Proficient: Ask them to argue the same case study from both utilitarian and deontological positions and reach opposite conclusions, the kind of balanced argument a Higher Level paper answer needs. This reasoning is strong evidence for an Applied Learning Task.