BASC0080 Computer Simulations in Science and Engineering: Essay Questions, guidance, and outline of marking criteria

<u>Project Submission Deadline:</u> Wednesday 23rd of April 2025, 5pm

Assignment.

Complete an academic essay of **1,500 words** on one of the following questions:

1. Critically analyse the claim that computer simulations enhance our understanding and predictive capabilities in scientific and engineering disciplines.

2. Examine the epistemic challenges associated with computer simulations in Science and Engineering, focusing on issues of validation and the interpretation of results.

3. What ethical considerations arise in the development and use of computer simulations in scientific and engineering contexts? Discuss this question using a contemporary example that highlights potential societal impacts.

4. Critically assess the extent to which the integration of artificial intelligence into computer simulations represents a true paradigm shift in Science and Engineering, or simply an evolution of existing methodologies.

5. To what extent do computer simulations act as instruments for addressing complex societal challenges? Use a specific case study related to Science and Engineering to analyse their epistemic and practical contributions.

Guidance.

You must choose one of the essay topics that are specified (stated above). Please write the title of the essay at the beginning of the essay and *do not* adjust the wording of the title. Please save your essay PDF with a title that **includes your 8-digit Student ID** but excludes your name.

The stated word count *excludes* references or endnotes at the end of the document and the essay title but includes any footnotes you include. It also *excludes* the title. Please *write the word count* at the end of the essay on a separate line in brackets, e.g. "[1997 words]"**.** Use Word to do this - the Moodle word count will include the references.

Please use the standard Harvard referencing style and include a bibliography as follows:
https://www.ukessays.com/referencing/harvard/
https://www.ukessays.com/services/example-essays/referencing/harvard-style-essay.php

Penalties will be applied for late submission, exceeding the stated length of the essay and plagiarism. Please read carefully the BASC guidance on this:
https://www.ucl.ac.uk/basc/current/assessment

Rubric

Category	Weight	Mark	Excellent (70-100)	Good (50-69)	Moderate (40-49)	Fail (0-39)
Understanding of epistemological and/or ethical concepts and challenges in using computer simulations	35%		Excellent grasp of and explanation of key concepts and challenges, showing complex interplay of different concepts and ability to critically compare concepts relevant to the module.	Very good to good grasp of key concepts and challenges, showing some interplay of different concepts and some critical comparison of concepts relevant to the module.	Moderate to poor grasp of key concepts and challenges, with little attempt to inter-relate concepts and little critical assessment of concepts relevant to the module.	Poor to complete lack of grasp of key concepts and challenges, no attempt to inter-relate concepts and no critical assessment of concepts relevant to the module.
Argumentation relevant to essay topic.	45%		An excellent argument, which makes a valuable intervention, flows logically, and advances a clear and compelling case. Identifying clear causal mechanisms is an advantage. A novel approach to the topic may be present.	A very good to good argument, which may not be grounded or articulated as clearly as it could be. Some causal mechanisms will be identified. A novel approach may be somewhat present.	A moderate to poor piece, which may fail to ground or articulate the argument being made or does not progress logically. Does not follow the prescribed structure. Causal mechanisms may be mentioned. There will be limited novelty, if any.	A very poor piece, with no attempt to ground or articulate an argument. Severe problems of comprehensibility or incomplete work. Causal mechanism will be absent. There will be no novelty.
Writing	10%		Excellent writing, with no or few grammatical errors or moments of awkward phrasing.	Some grammatical errors or moments of awkward phrasing.	Significant grammatical errors or moments of awkward phrasing.	Grammatical errors or moments of awkward phrasing inhibit comprehension.
Research and referencing	10%		Flawless or nearly flawless referencing, with an appropriate range, number and quality of works cited.	Solid referencing. Works cited are slightly too few, of too narrow a range, or there may be an odd example of dubious quality.	Poor referencing, with potentially not enough evidence of research.	Very serious errors or lack of research.