# Assignment 3: An object-oriented Ising model

**PUY33C01 Computational Simulation I - Computational Physics (Christie)**

## 1. Length of the report

The main body of the report should be a maximum of 6 pages long and should have single line spacing and 12pt font. No pages after a sixth page of the main body of the report will be read.

Submit the report to BlackBoard as a PDF file using the report structure below. Add your last name to the file name: assignment_3_lastname.pdf

## 2. Report structure

**Assignment 3. An object-oriented Ising model**

**Student name here**

**PUY33C01 Computational Simulation I - Computational Physics (Christie)**

**Abstract** *(on same page as title information)*

*This is a one-paragraph summary written for busy people who need to decide if they have enough time or interest to read the whole report. It should contain the main results and conclusions. Write it last.*

1. **Introduction** (following on from the executive summary on the same page). Lay out the context and motivation for the report and write it to accommodate the knowledge level of the anticipated readers. A detailed explanation of the Metropolis Monte Carlo method or large-language models is not required, you may assume that these are already familiar to the reader. No results are to be presented here. Write it as the penultimate section, just before you write the executive summary.

2. **Methods.** This should include a description of your prompt(s) to the AI, its response(s), and how you improved on the code in order to solve the assignment

3. **Results.** This should include the plots specified above together with a discussion of their physical meaning

4. **Conclusions.** This should include a critical assessment of your GenAI assistant's capability as a tool to assist with computer simulation.

**Your report should include:**

- A general introduction to the Ising model & generative AI, and why they are interesting/relevant (in the Introduction section)
- Your initial AI prompt(s) and a description of its response(s) (in the Methods section)

- You may include short snippets of code in the report if you wish, you will submit the full code generated initially by your GenAi assistant in a separate file (see Submission below)
- Well-presented plots including descriptive figure captions and labelled axes (in the Results section). Any claims you make should ideally be substantiated with quantitative results
- A critical evaluation of the role of the AI in the process – where was it useful, and where did its output require human improvement/intervention? (in the Conclusions)

**Your report should <u>not</u> include:**

- Any AI-generated text without explicitly citing/acknowledging the source.
- Long sections of code – use short snippets if you want to specifically illustrate something within the report, otherwise refer to your code that you will also submit (see Submission below).
- A detailed explanation of the Metropolis Monte Carlo method or large-language models, you may assume that these are already familiar to the reader.

## 3. Submission

Your submission should include (at least) 3 files:

- Your report in PDF format (assignment_3_lastname.pdf)
- The code initially generated by the GenAI assistant as a .py file.
- Your final code that was used to generate the results and plots. This should be one or more executable Python files (.py or .ipynb) that, when run, generate all plots shown in the report.

You will have two weeks to submit the report, see BlackBoard for the submission deadline.