



**MathsNET**

A joined up approach to  
teaching and learning  
mathematics

# Portfolio Marking: AMA4004

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One of the components of the assessment for this module is a portfolio of work that you must produce over the course of the semester. This portfolio counts for 20 percent of your final module mark. It should contain:

- (A) 10 reports describing what you have worked on each week. These reports are due by 16:00 on Tuesday in weeks 2 through 12 of the semester. See the self study section of the markscheme below.
- (B) A computer programming exercise on modelling a lattice system. You can find the markscheme for this exercise online.
- (C) Multiple essays on the theory parts of statistical mechanics.
- (D) (optional) Some additional and more difficult programming exercises.

Notice that classes for this module are compulsory and that you will be awarded a mark of zero for the portfolio project if you do not attend 70 percent of the sessions for the module. In addition, notice that your portfolio will be awarded a mark of zero if it does not contain 10 weekly reports, a programming exercise on a lattice system (B) and three essays on statistical mechanical theory. Notice also that additional marks are only given if you also try the optional but more difficult programming exercise.

## 1 Self study

The first component of the assessment is based on how you have studied for the module. You must hand in a report that is at least half a page in length every week in which you detail what, when and how you intended to study during the week and what you actually achieved during the week. You may choose to detail what resources you have used and what parts of the material you found easy and what you found difficult. You might also want to talk about any conversations you had the lecturer/teaching assistants. You should also explain what resources you studied from and what resources were particularly useful. Lastly, you should demonstrate that you have thought about what you did this week and how you might study more effectively in the future.

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| Classification | Range | Quality  |
|----------------|-------|--|
| Excellent      | 3     | The student outlines a clear plan detailing what and when they will study each week. There is evidence that the student thinks about how well their plan has worked at the end of each week and evidence that they have thought how to refine their plans in subsequent weeks. They reflect well on their previous work and feedback and learn by evaluating both positive and negatives. Excellent notes are kept and there is evidence that these are used in subsequent work. They contribute fully to the group and offer peers an opportunity for improved performance. |
| Good           | 2     | The student outlines a clear plan detailing what and when they will study each week but evidence that they have thought about how well this plan is working is absent. The student reflects on previous work and feedback and learns by evaluating both positive and negatives. Notes are kept but there is no evidence that these have been used in subsequent work. They contribute to the group but there is little evidence that they have responded to the feedback given.  |
| Adequate       | 1     | Some evidence that the student plans what items to study each week. There is some evidence to support reflection although there could be more reference to previous work. Group contribution is inconsistent and offers little opportunity for improved performance.   |
| Fail           | 0     | No evidence of regular self study. No evidence of reflection. Less than 75   |

## 2 Statistical mechanics applications projects

The second project of the assessment is based on some programming exercises that you must perform. These exercises lead you some key ideas that we use to understand the simulations that we perform on physical systems. You must produce python notebooks that contain the code that you used to solve these problems. In addition, you should provide some short explanation as to what the code that you have written is doing within the notebook using the markup language. You can find descriptions of the projects on the mathNET website.

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| Classification | Range | Quality  |
|----------------|-------|--|
| Excellent      | 9-10  | The student produces an assignment on the lattice system and also produces solutions to both of the two final projects on the math-NET website. The solutions the student provides demonstrates an understanding of statistical mechanics that goes well beyond the module content and shows clear evidence of independent thought, originality and creative use of a wide range of learning resources |
| Good work      | 5-8   | The student produces an assignment on the lattice system and also makes an attempt at at least one of the two final projects on the mathNET website. The student provides a partial solution of the problem in question that demonstrates a good understanding of the module content.  |
| Adequate       | 5     | Student produces an assignment on lattice system. See markscheme for details of marking of these projects. The mark from the mark scheme, which is out of 15, is divided by three.   |
| Fail           | 0     | Student produces no programming work during semester   |

## 3 Essays on statistical mechanics theory

The third component of the assessment is based on a number of longer form problems. In answering these problems you will need to write continuous prose answers that have a substantial length. These pieces of continuous prose will contain some mathematics but if your answers contain mathematics with no explanation you will be given a very low mark. The principle aim in writing these essays is for you to demonstrate that you have some physical understanding of the equations that you are writing. All essays should be typeset using latex.

| Classification | Range | Quality  |
|----------------|-------|--|
| Excellent      | 6-7   | The essay is extremely well argued and demonstrates that the student has a thorough and systematic understanding of the module content. The student demonstrates an understanding of statistical mechanics that goes well beyond the module content and shows clear evidence of independent thought, originality and creative use of a wide range of learning resources. |
| Good work      | 3-5   | The essay is well argued and demonstrates a good understanding of the module content. There is evidence that resources other than those that were provided have been used.   |
| Adequate       | 1-2   | The essay gives a partial answer to the questions that were asked. The essay is poorly argued and confused suggesting that the student has only a partial understanding of the module content.   |
| Fail           | 0     | The student hands in fewer than three essays on statistical mechanic theory during the course of the semester. Essays are handed in that contain basic grammatical errors and/or spelling errors. Essays are handed in that contain mathematical symbols that are undefined.   |