

Mathematics with Maple (MAS100)

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- ▶ We will learn how to use Maple, a powerful software package for solving mathematical problems.
- ▶ In the process, we will review and extend many parts of A-level mathematics, from a new perspective.

Tutors



Vladimir Bavula



Tom Cottrell



Philip Eve



Tom Fricker



Moty Katzman



Lakshmi Krishnamoorthy



Yi Li



Jayanta Manoharmayum

The web page

- ▶ The course web page is <http://www.shef.ac.uk/nps/MAS100> (or you can just Google MAS100).
- ▶ Visit the web page for
 - ▶ Administrative arrangements
 - ▶ Course material in electronic form (notes, lecture presentations, tutorial problems, solutions, ...)
 - ▶ Information about online tests
 - ▶ Information about the exam
- ▶ We will not use MOLE at all for this course; everything will be on the course web page instead.
- ▶ Announcements will be sent out by email, and will also appear on the web page.

Arrangements

- ▶ Eleven lectures, one per week until December 7th.
- ▶ One tutorial and one lab session per week; you have been assigned to one of seven tutorial groups (A-G) and one of ten lab groups (1-9,X).
- ▶ Some groups meet **today**. Names of people in those groups were displayed at the beginning of the lecture, and will be displayed again at the end.
- ▶ You can find out all your tutorial groups on the website of the School of Mathematics and Statistics, under Current Students. You should have received instructions by email already.
- ▶ Lab and tutorial problem sheets will be distributed in lectures and online; solutions online only.
- ▶ Four hours private study per week, working through notes and doing online tests.

- ▶ There will be ten online tests, each counting for 2% of the final grade for the course. The remaining 80% comes from a written exam in January.
- ▶ There will be no computers in the final exam, but many questions will ask how you would do something with a computer.
- ▶ Online tests can only cover certain topics; be sure to learn the rest as well.
- ▶ Questions on the online tests are taken from the lab and tutorial problem sheets. You can enter your answers whenever you like over the week.
- ▶ If you get something wrong on an online test, then the system will let you try again, but will apply a penalty. Penalties are very high for multiple choice questions.
- ▶ Deadlines for the online tests are set at 3.00AM on Monday mornings. Solutions are released immediately after the test closes, and no credit is given for work submitted after the deadline.

Arrangements

- ▶ For lab sessions, you will need the “Maple reference” notes as well as the lab problem sheet.
- ▶ You will also need your University user name (eg pma09aza) and password. Go to User Registration (up the ramp on Leavygreave Rd) if you do not have these yet, or if you have lost them.
- ▶ To access the online tests (at <http://magic.shef.ac.uk/AiM>), you need your University email address, and a special password that will be sent to you by email. Do not use your normal password.
- ▶ At the end of this lecture, you should pick up the problem sheet (tutorial problems on one side, lab problems on the other) and the Maple reference notes.
- ▶ In future weeks you should pick up problems sheets on your way in. Next week you can also collect a copy of Maple to install on your own computer.
- ▶ Problem sheets are printed densely to avoid killing trees. If you find the type too small, print a copy from the course web page instead.

- ▶ It will help you to concentrate and follow the thread of the lecture if you take some notes.
- ▶ It will help you to consolidate your understanding if you re-read your notes later on, and perhaps rewrite them in your own words.
- ▶ However, it does not matter if you miss some part of what is on the screen, because the slides will appear on the course web page after the lecture has finished.

- 0 **Introduction to Maple:** The main features.
- 1 **Solving equations:** Symbolic and numerical solutions. Problems with no solutions or many solutions. Using solutions in further calculations.
- 2 **Special functions:** Exponentials, logarithms, and trigonometric functions.
- 3 **Plotting:** Maple plot commands. Graphical investigations.
- 4 **Differentiation:** The geometric and numerical meaning of differentiation. Derivatives of some standard functions. Rules for calculating derivatives.
- 6 **Integration:** Techniques and patterns.
- 5 **Taylor series:** Higher-order derivatives and polynomial approximation.