Calculus SCI2018 UCM Block 2, 2017

Dr Rachel Cavill

Course Objectives

In this course we provide an introduction to calculus. Emphasis is on an understanding of the basic concepts and techniques, and on developing the practical, computational skills to solve problems from a wide range of application areas.

Textbook

The textbook is Applied Calculus by Waner and Costenoble. I am working from the International Edition of the 6th edition and the numbering of sections and questions will reflect that.

Topic Plan

Week	Lecture Topics	Textbook sections for tutorial 1	Textbook sections for
			tutorial 2
1	 Functions and 	• 1.1	• 3.1-3.3
	limits	• 9.1	
2	 Derivatives 	• 3.4-3.6	• 4.3-4.5
		• 4.1	• 9.2
3	• More	• 5.1-5.3	• 4.6
	differentiation		• 5.5
4	 Integration 	• 6.1-6.2	• 6.3-6.4
5	More integration	• 7.1	• 7.2-7.3
		• 9.3	
6	• Improper	• 7.5	• 7.6
	integrals and		
	differential		
	equations		
7		Exam	

Lectures

All lectures will be given by Dr Rachel Cavill. During the lectures the methods for each week will be formally introduced (often with simple proofs) and example questions will be presented.

Structure of tutorials

- Each class has some assigned sections of the textbook (see the table above), the lecture will
 cover the key aspects of each of these areas and will announce which questions we will go
 over in each tutorial class that week.
- You are expected to have attempted/prepared these problems before the tutorial class.
- You will be expected to be able to present your solution or to explain where you got stuck with each of these problems.
- You are strongly encouraged to look at further problems outside class, and to come to class prepared to discuss any difficulties you have with these problems.
- There will probably also be time in the tutorials to look at further problems together as a class or helping each other in teams, you are expected to take an active role in these activities, helping those around you where possible.

Grading

This course will be assessed by a final exam worth 60%, a participation grade reflecting your preparation for tutorial classes and how much you help fellow students during these classes, worth 10%, and two pieces of coursework worth 15% each.

Exam

The exam will take place in week 7 of the course.

The exam will be marked in a criterion referenced manner – this means that your exam mark is only determined by your performance, not in relation to how you do compared to the rest of the class (I am not grading to a curve).

A resit will be available for anyone who fails, the resit may cover topics from any part of the course and may also include applied questions to allow compensation for the coursework element. It will usually compensate for the entire grade.

The exams are closed book, a formula sheet will be provided with the common formulas used in the course. This formula sheet will be published on Eleum at least a week before the exam. A normal calculator should be used, but graphical calculators, watches and phones are not allowed in the exam hall.

Coursework

The coursework will assess how you can identify real problems to which calculus can be applied and correctly apply it. The course textbook contains a case study in each chapter, these should be the model for your coursework. The topics for the coursework are up to you, you can apply calculus to physics problems, economics problems, business problems, biological problems or any other field which interests you. The assignment is to write a problem statement, such as is found at the start of every chapter in the textbook, and then explore the solution, akin to the Case Study sections at the end of each chapter. The only restriction on topics is that one of the coursework assignments must use differentiation, and the other must use integration.

Any piece of coursework can be handed in at any point in the course via Eleum, however...

The first piece using differentiation must be submitted by the end of week 4 (24th November)

And the second piece using integration by the end of week 6 (8th December)

The coursework will be marked according to the following criteria;

- Clarity of problem statement
- Identification of assumptions
- Correctness of mathematical solution
- Difficulty of mathematical problem attempted
- Discussion of limitations
- Conclusions

Attendance

The usual UCM rules for attendance apply. Attendance at 85% of the tutorials is needed to pass the course, attendance of above 70% can be compensated with an extra assignment in the form of another piece of coursework as explained above.

Contacting me

I am happy to help students outside of classes. If you want to contact me you can email me; rachel.cavill@maastrichtuniversity.nl. Or come by my office in 8-10 Bouillonstraat, room 1.004, it's at the top of the stairs, and if I'm in, the door is generally open so you can see me as you come up the stairs.