JC1004 Advanced Mathematics I-1

Course Description Form

2022-2023

Course Co-ordinator:

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# General

Students are asked to make themselves familiar with the information on key institutional policies which have been made available within MyAberdeen as well as SCNU

<https://www.abdn.ac.uk/staffnet/teaching/key-education-policies-for-students-11809.php>;

<http://xsb.scnu.edu.cn/a/20200313/4017.html>.

These policies are relevant to all students and will be useful to you throughout your studies. They contain important information and address issues such as what to do if you are absent, how to raise an appeal or a complaint and how seriously the University takes your feedback. You should also read the Joint Institute Student Handbook. (See the Course Material on MyAberdeen)

These institutional policies should be read in conjunction with this Course Description Form, in which School-specific policies are detailed. Further information can be found on the University’s Infohub webpage <http://www.abdn.ac.uk/infohub/>.

# Attendance

You should attend classes regularly and do the work of the course. The University operates a monitoring system throughout the academic year to identify students who may be experiencing difficulties with their studies and to ensure that students remain on track for their degree and satisfy the minimum attendance requirements.

If you fail to hand in two or more of the weekly homework or fail to complete a continuous assessment (including a quiz) without good reason then you will be entered as C6 At Risk. Please read <http://www.abdn.ac.uk/infohub/study/student-monitoring.php> for full information.

# Absence

You should submit an absence report (via MyAberdeen) every time you miss a class for good reason. You will need to provide supporting evidence if you are absent for more than 7 consecutive days. You should make yourself aware of the full policy at

<http://www.abdn.ac.uk/staffnet/teaching/aqh/appendix7x5.pdf>

**Syllabus**

* Sets and functions.
* Limits.
* Continuity. The intermediate value theorem.
* The derivative and its geometric significance. Higher derivatives.
* Rules of differentiation (linearity, Leibnitz rules).
* Elementary properties of the trigonometric functions, the inverse trigonometric functions, the exponential and logarithmic functions, and their derivatives.
* Finding the equation of a tangent to a curve given explicitly or implicitly.
* The first and second derivatives in connection with the shapes of graphs of functions.
* Critical points of differentiable functions. Minima and maxima problems.
* Optimization problems and curve sketching.
* Methods of integration: integration by parts, trigonometric substitution, partial fraction decomposition.

# Course Website

You should check the course website on MyAberdeen frequently. Lecture notes, homework problems and other course material will be available to download on MyAberdeen.

**Teaching**

There are a separate exercise course designed to complement the lecture course JC1004. Information on these is given in a separate document.

Two lectures are presented for each week on Tuesday at 2:00 pm and Friday at 2:00 pm from 20th September 2022 to 23th December 2022 except holiday. There are typeset notes for the course on MyAberdeen. For the start of each week, the related notes for this week’s teaching plan will be shown on MyAberdeen. You should spend some time to read the relevant content.

For the lectures, slides and blackboard-writing will be applied explain the key and difficult points of relevant notes. And homework will be assigned each week to enhance the study effect. You should finish the homework in time and upload it to MyAberdeen before Monday of the following week. See **Assessment** below for more details. Finally, some common mistakes of homework will be explained in the course.

Notice that the solution of homework and exercise assignments will be not given. But a common mistakes document of them will be posted on MyAberdeen on the following week.

More details will be given in the introduction ppt that will be uploaded on MyAberdeen after the first class.

# Reference Book

‘*Calculus, International Metric Edition*’ by James Stewart.

*’Thomas’ Calculus*’ by Thomas, Weir, Hass and Giordano).

# Assessment

There will be not less than ten homework assignments (we will mark the score of each assignment and make the average about them with 20% in total) and a final exam (80%) for this course. The homework assignment will be handed out on Tuesday of each week and due Monday of the following week at 5pm 20th September 2022 to 23th December 2022. You should submit your homework assignment solutions on MyAberdeen as a single pdf file. The homework mark will be for completeness and effort. And the solution of homework will be not given. But a common mistakes document of them will be posted on MyAberdeen on the following week.

The assessment of exercise course are described in a separate document.

**Resit** Resits will be held in the spring. If you fail the course, you will do a replacement resit exam.

# Individual Work

You are encouraged to discuss homework assignments for this course with other students, for example in small groups. You may shop around for ideas but it is expected that you possess and use your own critical faculties, to write up your own solutions. You must not copy sentences from fellow students. If you do not understand the solution of another student, do not attempt to use it as your own solution.

**Private Study**

In addition to lectures, you should aim to spend some time studying the lecture notes and working on assessments.

# Course Aims

To further develop understanding of the concepts, techniques, and tools of calculus. Calculus is the mathematical study of variation. This course emphasises differential and integral calculus in one variable.

# Learning Outcomes

By the end of this course the student should:

* be familiar with basic mathematical language such as sets and functions;
* be able to apply the basic logic underpinning mathematical reasoning;
* be able to state and understand the main definitions and theorems of the course;
* understand the definitions of limit, continuity and derivative, and their geometric significance;
* be able to determine appropriate techniques to compute limits and derivatives;
* be able to determine appropriate techniques to differentiate exponential, logarithmic, trigonometric and inverse trigonometric functions;
* be able to determine appropriate techniques to find the equation of the tangent to a curve;
* understand the relationship between first and second derivatives of a function and the shape of its graph;
* be able to determine appropriate techniques to determine maxima and minima of a function;
* be able to determine appropriate techniques to compute definite and indefinite integrals.