

**SCHOOL OF MATHEMATICS AND APPLIED STATISTICS
WOLLONGONG CAMPUS**

**MATH201 Multivariate and Vector Calculus
Autumn Session 2005**

Subject co-ordinator/Lecturer: Dr Rod Nillsen, Room 15.G25; 4221 3835;
email: nillsen@uow.edu.au

Timetable: Lecture 1 Wednesday 13:30 to 14:30, Room 19.G026
Lecture 2 Wednesday 14.30 to 15:30, Room 19.G026
Lecture 3 Thursday 15:30 to 16:30, Room 35.G20

Tutorial lists, once allocated will be on the Mathematics 200-level Notice Board in building 15.

Preamble:

This subject is commonly called Advanced Calculus in that it extends the calculus of one variable to the calculus of more than one variable. Thus it includes differentiation, the chain rule, rates of change, maxima and minima and integration, which are now applied to functions of more than one variable. The simplest of these functions is $z = f(x,y)$ which can also be taken as representing a surface in three dimensions. Hence, three dimensional vectors are also incorporated into the subject and links are made with the calculus of more than one variable.

Content:

Multivariate Calculus will define partial differentiation and the chain rule for functions of more than one variable, followed by an examination of maxima and minima with applications; it will also develop the understanding of multiple integrals, and finish with the introduction to Jacobians, with applications in two and three dimensions.

Vector Calculus will include the discussion of vector functions of several variables, the concept of line, surface and volume integrals, together with the general integral theorems, followed by applications of these to geometrical problems.

Objectives:

A student who successfully completes this subject should be able to:

- i) distinguish space curves and surfaces;
- ii) contrast scalar and vector functions in three-dimensions;
- iii) differentiate functions of more than one independent variable;
- iv) differentiate vectors;
- v) determine rates of change of multivariable and scalar and vector functions;
- vi) manipulate derivative and integral formulations in two or more dimensions where the variables undergo transformation;
- vii) analyse surfaces for maxima and minima;
- viii) differentiate and integrate over three-dimensional space curves and
- ix) differentiate and integrate over three-dimensional surfaces and throughout three-dimensional volumes.

Assessment:

One assignment, handed out at the lectures on 4th May in week 10, due at the beginning of the first lecture on 18th May in week 12. This is worth **10% of the final assessment**. There will be a cover sheet for receipts. Assignments cannot be submitted by Fax or email.

Also, there will be one mid-session exam, held Wednesday of week 8, 20th April, starting at 13.35 pm. The exam will last 1 hour 30 mins, and will be worth **20% of the final assessment**. It will be on material up to and including the Wednesday lectures of week 7. It will be held in Room 19.G026.

There is one end of session exam, 3 hours 15 minutes, **70% of the final assessment**.

Books/Notes:

‘Companion Volume to MATH201 Multivariate and Vector Calculus’, by Des Clarke, \$11.54 from the UniCentre Bookshop.

Reference books:

Adams R.A. Calculus of several variables. Addison-Wesley, 1987. 515.84/4

Kreyszig, E. Advanced Engineering Mathematics. Wiley, 7th Ed., 1993. 510.262/5

Kaplan W. Advanced Calculus. Addison-Wesley, 4th Ed., 1991. 515/223

Consultation times with the Subject co-ordinator:

Tuesday 10:30 to 12:30

Wednesday 11:30 to 12:30

Thursday 14:30 to 15:30

Attendance: Records of attendance at tutorials will be maintained. These may influence final grades in borderline cases (see below).

Special consideration:

Substantial medical, compassionate or other reasons that affect your performance must be thoroughly documented and submitted to the University within 7 days of the event. Requests must be in writing and provide complete details. The medical certificate or other official documentation must stipulate *precisely and legibly* the degree to which the event has affected, or is likely to affect, your performance, and the exact period of time of the incapacity.

Late submission of assignments is generally not accepted. If you believe there are medical or compassionate reasons for late submission, you must put your request in writing at the earliest opportunity to the coordinator. Such requests will be considered on their merits.

If you *miss* the formal examinations in this subject, you are not guaranteed a special examination, even with reasonable documentation for medical or other compassionate misadventure. *Your participation in tutorials and performance in assignments and other work would then be taken into account in determining the final assessment in MATH201.* In fact, a special examination is unlikely unless such participation and performance has reached a level deemed acceptable to the Subject Co-ordinator. This principle applies, in general, to candidates who request any form of special consideration.

Should your application for special consideration be successful and you are either (i) in the case of a Mid-session test or exam, granted a special test or exam, this will normally be held within 7 days of the original test date, or (ii) in the case of the end-of-session examination, that you are granted a special examination, this will normally be held in the week immediately after the official examination period.

Any Special Examination will be expected to involve an *oral* component, which will also include the principles involved within the list of objectives outlined above.

Changes: Any changes to arrangements, such as changes to assignment dates, will be notified by SOLS email. Please check your email regularly.

Workload:

MATH201 is a 6 credit point subject. A candidate of average ability would be expected to work 12 hours per week, including classes, to achieve an average result.

Cheating:

The University regards cheating very seriously. You may be failed in the subject, and perhaps even excluded or expelled from the University, for copying assignments; the person from whom you copied may also be failed.

Withdrawal:

Candidates may withdraw without penalty in this subject until 1st May 2005 (end of week 9), BUT HECS payment on Autumn session subjects is calculated on 31st March 2005.

Withdrawal from subjects after the prescribed date without substantial medical, personal or other reason, will result in a FAIL grade being recorded.

No withdrawal from a sessional subject will be permitted by the University after the completion of week 12 of the session of offer.

If you run into special difficulties affecting your performance in MATH201 (medical, compassionate, or otherwise) after either week 9 or week 12 have expired, you are strongly advised to consult the Subject Co-ordinator.

Candidates are reminded of the University's Minimum Rate of Progress (MRP) rules, which require a candidate to pass 50% of the credit points in which they are enrolled each semester. A candidate struggling with this subject should consider withdrawal by 1st May 2005, to minimise the risk of having a 'fail' grade being recorded and of having a penalty under the MRP rules.

Grades in MATH201 Assignment: The assignment must be submitted at the nominated lecture. Late assignments will not be accepted without adequate certification, e.g., broken writing wrist, etc. Assignments will be returned in tutorials.

Scaling: Scaling of marks is not a standard procedure in this subject.

Final grade: Final grades are 85-100% HD; 75-84% D; 65-74% C; 50-64% P; 45-49% PC; 0-44% F.

Calculators: Note that single-line-display calculators are permitted in examinations for this subject. They must not have alphanumeric keyboards (or capabilities) and they must not be programmable in any way. If you are not sure, have it checked well before any exam.

Email and Internet Quota:

The University provides Email and Internet Access for all students. This access is for academic purposes only. Students should be aware that quotas are strictly enforced and students are expected to use the free email account provided by the University. Students are warned that use of HotMail (and other non-UoW web mail accounts) consumes quota at a high rate. Quotas will not be renewed for students using their access for non-academic purposes such as downloading music, entertainment or recreation or access to other mail accounts such as HotMail. Details of the University Policy and Guidelines for Email and Internet Access are available at <http://www.uow.edu.au/student/sols/> under "email and internet". The Guidelines clearly explain the quota system that the University applies.

More information regarding the use of computer facilities on campus can be found at <http://www.uow.edu.au/its/userguides/pdf/rules.pdf>

Faculty Student Reception and Resource Centre:

The Faculty of Informatics has a "one stop shop" for all student enquiries. This is located on the first floor in Building 3. If you have any enquiries or you are not sure what your options are this is your first point of contact. Staff are available to assist with helpful advice, such as "what course of action is open to you" or "who to see". Any forms you are required to complete will be available, as well as material on all courses offered by the Faculty. The staff will be able to make appointments for you to see the Sub-Dean, International Officer, the Dean and other relevant academic advisors. The contact number is 4221 3606. However, enquiries about this subject should be directed to your lecturer or tutor in the first instance.

Appropriate Language:

The University of Wollongong is committed to the use of non-sexist and non-racist language in all work submitted for assessment by students.

More Information:

Further information regarding University policies such as Plagiarism, Special Consideration, Withdrawal and Minimum Rate of Progress, can be found in the University Handbook. In particular, you are referred to the following:

<http://www.uow.edu.au/handbook>

University Policies and Resources:

Acknowledgement practice and plagiarism:

<http://www.uow.edu.au/handbook/courserules/plagiarism.html>

Rules and Policies other aspects:

<http://www.uow.edu.au/handbook/courserules/other.html>

Code of Practice Students' (Responsibilities):

http://www.uow.edu.au/handbook/codesofprac/cop_students.html

Student disabilities and Disability Liaison Officer:

<http://www.uow.edu.au/student/services/ds/>

Teaching and assessment:

http://www.uow.edu.au/handbook/codesofprac/cop_students.html

Special consideration:

<http://www.uow.edu.au/handbook>

Non discriminatory language:

<http://staff.uow.edu/eo/nondiscrimlanuage.html>

Occupational health and safety:

<http://staff.uow.edu/ohs/commitment/index.htmlhandbook/courserules/plagiarism.html>

Intellectual property:

<http://www.uow.edu.au/handbook/courserules/ownershipofwork.html>

Aboriginal education centre:

<http://www.uow.edu.au/aec/>

Learning Resource Centre:

<http://www.uow.edu.au/student/services/ld/>

Academic grievance policy:

<http://www.uow.edu.au/handbook/courserules/studacgrievpol.html>

Faculty grievance policy:

Can be obtained from the Faculty Resource Centre
