



Faculty of Science
School of Mathematics and Statistics
School of Geography, Environment, and Earth Sciences

MATH 321: *Applied Mathematics I (T1 & T2)*
MATH 322: *Applied Mathematics II (T1 & T2)*
MATH 323: *Mathematics for Earth Sciences (T1 & T2)*
MATH 466: *Topics in applied mathematics (T1)*
MATH 467: *Topics in applied mathematics (T2)*

Course Information T1 & T2, 2016

All three undergraduate courses, and the related honours courses,
are offered in both Trimester 1 & 2
Lectured modules are offered in one trimester only.
Reading modules may be done in either trimester.

Course Coordinator

Matt Visser (SMS, CO321, ph 463-5115, Matt.Visser@sms.vuw.ac.nz)

Lecturers

Matt Visser (SMS, CO321, ph 463-5115, Matt.Visser@sms.vuw.ac.nz)

Dimitrios Mitsotakis (SMS, CO361, ph 463-6739, Dimitrios.Mitsotakis@sms.vuw.ac.nz)

Mark McGuinness (SMS, CO323, ph 463-5059, Mark.McGuinness@sms.vuw.ac.nz)

John Townend (SGEES, CO537, ph 463-5411, john.townend@vuw.ac.nz)

Martha Savage (SGEES, CO529, ph 463-5961, martha.savage@vuw.ac.nz)

Jim McGregor (SGEES, CO530, ph 463-5278, jim.mcgregor@vuw.ac.nz)

Course Objectives

To develop interest, understanding and further mathematical knowledge in various advanced areas of applied mathematics and earth sciences.

Prescription

For 32*: Two topics in applied mathematics, not including any taken by the same candidate in any of the other 32* courses. Topics may include: Cartesian tensors and applications, classical mechanics, fluid mechanics, inverse theory, meteorology, fractals, quantum mechanics, special relativity.

For 46*: Two topics in applied mathematics, not including any taken by the same candidate the other 46* course, nor are you allowed to take any topic substantially similar to anything you took at 32* level. Topics may include: Cartesian tensors and applications, classical mechanics, fluid mechanics, inverse theory, meteorology, fractals, quantum mechanics, special relativity.

Course Format

A number of topics are offered, either as lecture modules (L), reading modules (R), project modules (P), or combinations. Each of these is equivalent to a 12-lecture block spread over six weeks. *TWO* modules are to be chosen for *ONE* course, subject to certain minimal constraints noted below. Note that it is possible to do all three courses (MATH 321, 322 and 323) simultaneously by doing a total of six modules; also, a student with a particular interest not covered by the listed options can propose a suitable R or P module with a willing lecturer. You may attempt more than two modules for one course, and then we would choose the best two module marks to decide your grade. You can do a module without being enrolled in any course; we will then keep a record of your module mark to be used when you want to complete a course by doing the second module.

Note that some modules are only offered in Trimester 1, some only in Trimester 2, others can be done in either Trimester. However, the MATH 32* courses may be taken in Trimester 1 or in Trimester 2. You can do a module before you enroll in a course; we will then just “bank” or hold over that module result until you complete with a second module, and register for a course. But you must *complete* a course in or before the Trimester you enroll for. For example, to do the combination of Cartesian tensors and inverse theory, you would do the tensors in Trimester 1, but not register until Trimester 2 when you do inverse theory.

The honours version of the course (Math 466 in T1, Math 467 in T2) will require approximately 20% extra effort as compared to the 321/322/323 versions. This might be in the form of an additional assignment, or in the form of a radically modified module.

If you suspect you might not do two modules this trimester, you should immediately withdraw from the course, then enroll in it later. You must successfully complete two modules, or already have successfully completed two modules, to be given a passing grade for MATH 321, 322 or 323, or MATH 466/467. You must be assigned a grade in the trimester you are enrolled in. You can do a module without being enrolled at all.

Lectures: The times for lectured modules in Trimester 1 are:
Monday 13:10--14:00 in New Kirk 203.
Wednesday 15:10--16:00 in New Kirk 203.
Thursday 13:10--14:00 in New Kirk 203.
Friday 10:00--10:50 in New Kirk 202.

Class meeting for all students: During the first lecture time in Trimester 1, Monday 29 February 2016 at 13:10 in New Kirk 203. Discuss modules and timing. Elect a class representative.

Lectures for Trimester Two are from Monday 11 July to Friday 14 October, with a mid-trimester break from 22 August to 4 September.

All module assessment materials must (at the very least) be handed in by the last day of lectures. That is, Friday 3 June 2015 in T1, Friday 14 October in T2. Individual lecturers may (and typically will) set earlier deadlines for specific pieces of work

Modules

1. (L) *Cartesian tensors* (Martha Savage, Trimester 1), not offered in Trimester 2.
2. (R) *Fluid mechanics and the mathematics of Tsunamis* (Dimitrios Mitsotakis, Trimester 1 or 2).
3. (TBA) *Inverse theory* (John Townend, Trimester 2, if enough interest).
4. (R) *Meteorology* (Jim McGregor, Trimester 1 or 2).
5. (P) *Meteorology project* (Jim McGregor, by arrangement only).
6. (R) *Fractals* (Mark McGuinness, Trimester 1 or 2).
7. (R) *Special relativity* (Matt Visser, Trimester 1 or 2).
8. (R) *Quantum Physics* (Matt Visser, Trimester 1 or 2).
9. (R) *Lagrangian and Hamiltonian mechanics* (Matt Visser, Trimester 1 or 2).

For each Module, the lecturer will issue a specific outline of their module and arrangements for tutorials or consultation, either at the first meeting of the class or when the module begins. It is the student's responsibility to contact the specific lecturer and familiarize themselves with the specific requirements of each module.

Prerequisite

Lots of calculus; if in doubt check with the specific lecturer.

Choice of Modules

For each of MATH 321 and 322, you must do two modules, and any combination of two modules is permitted. A module may only be used towards one course. Module results may be banked to count towards a course enrolled in later on.

For MATH 323, any two of Modules 1, 2, 3, 4 are required.

The Course Coordinator will seek to confirm the personal programme of study with each student later. A preliminary indication is asked for at the first meeting of the class.

Assessment

L modules are examined with internal tests and/or assessment assignments,
R modules are examined with assessment assignments and a brief test, and
P modules have a project that is marked.

The final mark for the course, which determines the grade, is the average of the two percentage marks obtained. If you do extra modules, we will count the best combination of two, for each course you take. Each course consists of two non-overlapping modules. There are no formal exams during the Victoria University exam periods for the modules. Some modules do have informal tests.

Student Feedback

The website

http://www.cad.vuw.ac.nz/feedback/feedback_display.php

provides a summary of course feedback provided by students previously for this course.

Mandatory Course Requirements

To be eligible to pass a course, you must obtain at least 40% in each of 2 modules (per course); and your average grade will have to be over 50%. It is each student's responsibility to make contact with the appropriate lecturer and to ensure that all necessary work is completed on time. One module can only count towards one course. Workload is intended to be five hours a week per module on average over 12 weeks, for a total of 60 hours per module and 120 hours per course. **MATH 466/467 students** (ie, honours level) must do extra work, worth 20% of the total grade, to be arranged with a lecturer and notified to the Course Coordinator.

Noticeboard

Notices and results will be posted on the MATH Courses noticeboard opposite the School Office in CO 358. A course website is set up at http://msor.victoria.ac.nz/Courses/MATH321_2016T1/, which most modules will use. A course forum is operating on that course website, for you to ask questions online.

Penalties

At the discretion of the person in charge of a specific module, staff can simply refuse to grade any work that is handed in after the specified hand-in date.

Withdrawal dates – information on withdrawing from a course may be found at:

<http://www.victoria.ac.nz/home/admisenrol/payments/withdrawalsrefunds.aspx>

UNIVERSITY POLICIES ON PLAGIARISM, CONDUCT, GRIEVANCES, DISABILITIES AND STUDENT SUPPORT

Students should familiarize themselves with the University's policies on these and other matters. For details, see the webpage

<http://msor.victoria.ac.nz/Main/StudentInformation - Policies>

Communication of additional information

Any additional or updated information will be placed on the course website as soon as practicable.

See http://msor.victoria.ac.nz/Courses/MATH321_2015T1/

General University policies and statutes

Find key dates, explanations of grades and other useful information at www.victoria.ac.nz/home/study.

Find out about academic progress and restricted enrolment at

<http://www.victoria.ac.nz/home/study/academic-progress>.

The University's statutes and policies are available at

<http://www.victoria.ac.nz/home/about/policy> , except qualification statutes, which are available via the Calendar webpage at <http://www.victoria.ac.nz/home/study/calendar>

(See Section C).

Further information about the University's academic processes can be found on the website of the Assistant Vice-Chancellor (Academic) at

http://www.victoria.ac.nz/home/about_victoria/avcacademic/default.aspx.