Cricos Prov

Staff

Position	Name	Email	Room
Lecturer-in-charge	Dr Dmitry Zanin	d.zanin@unsw.edu.au	Via appointment

Please refer to your Timetable on MyUNSW for your Lecture Tut, Lab enrolment days and times.
Timetable weblink: http://timetable.unsw.edu.au/2022/MATH5825.html

Administrative Contacts

Please visit the School of Mathematics and Statistics website for a range of information on School Policies, Forms and Help for Students.

For information on Courses, please go to "Student Life & resources page" and either Undergraduate Courses and/or Postgraduate Courses for information on all course offerings.

The "Student Notice Board" can be located by going to the "Student Life & Resources" page; Notices are posted regularly for your information here. Please familiarise yourself with the information found in these locations. The School web page is: https://www.maths.unsw.edu.au

If you cannot find the answer to your queries on the web you are welcome to contact the Student Services Office directly.

By email   Postgraduate   pg.mathsstats@unsw.edu.au
By phone: 9385 7053

Should we need to contact you, we will use your official UNSW email address of in the first instance. It is your responsibility to regularly check your university email account. Please state your student number in all   emails.

Course Information

Assumed knowledge   / Pre-Requisite:

24 units of level III mathematics or a degree in a numerate discipline or permission of the Head of Department.

Course Aims

Course Learning Outcomes (CLO)

- Demonstrate an appreciation of the basic concepts of measure theory. These methods will be useful for further study in a range of other fields, e.g. Quantum Theory, Stochastic calculus and Harmonic analysis.

Course Schedule

The course will include material taken from some of the following topics. This is should only serve as a guide as it is not an extensive list of the material to be covered and the timings are approximate. The course content is ultimately defined by the material covered in lectures.

Weeks	Topic	Reading (if applicable)
1	Problems of the Riemann integral. Lebesgue's "problem of measure" in R^d	Refer to Moodle
2	Abstract measure theory - -algebras, measurable sets, measures, outer measures, Lebesgue measure and its properties, completion of measures.	Refer to Moodle
3	Measurable functions, approximation by simple functions	Refer to Moodle
4	Lebesgue integral, Monotone Convergence Theorem, Dominated Convergence Theorem, co-incidence of Lebesgue and Riemann integral for Riemann integrable functions	Refer to Moodle
5	Probabilistic language. Random variables, expectation	Refer to Moodle
7	L^p spaces	Refer to Moodle
8	Signed measures, Hahn decomposition theorem, Jordan decompositions, absolute continuity of measures, Lebesgue decomposition, Radon–Nikodym Theorem, Radon–Nikodym derivatives, chain rule	Refer to Moodle
9	Weak convergence of measures. Convergence in measure	Refer to Moodle
10	Conditional expectations. Martingales. Martingale Convergence Theorems	Refer to Moodle

Textbooks

Notes and problem sheets will be available on Moodle.
There is no set textbook for this course, but the following books will be helpful:

- G.B. Folland, Real Analysis, Wiley 1984.

- W. Rudin, Real and complex analysis. McGraw-Hill, 1987.

- P. Billingsley, Probability and Measure, P519.1/492

- P.R. Halmos, Measure theory, P517.52/24

- W. Rudin, Functional analysis. McGraw-Hill, 1991.

- H.L. Royden, Real Analysis, McMillan, 1978.

- J.L. Doob, Measure theory, P517.52/171

- A.N. Kolmogorov

using the words or ideas of others and passing them off as your own. Nor is it permissible to sell copies of lecture or tutorial notes as students do not own the rights to this intellectual property.

If a student breaches the Student Code with respect to academic integrity, the University may take disciplinary action under the Student Misconduct Procedure.

The UNSW Student Code and the Student Misconduct Procedure can be found at: https://student.unsw.edu.au/plagiarism

An online Module "Working with Academic Integrity" (https://student.unsw.edu.au/aim) is a six-lesson interactive self-paced Moodle module exploring and explaining all of these terms and placing them into your learning context. It will be the best one-hour investment you've ever made.

Plagiarism

Plagiarism is presenting another person's work or ideas as your own. Plagiarism is a serious breach of ethics at UNSW and is not taken lightly. So how do you avoid it? A one-minute video for an overview of how you can avoid plagiarism can be found https://student.unsw.edu.au/plagiarism.

Additional Support

ELISE (Enabling Library and Information Skills for Everyone)sm

Equitable Learning Services (ELS)

If you suffer from a chronic or ongoing illness that has, or is likely to, put you at a serious disadvantage, then you should contact the Equitable Learning Services (previously known as SEADU) who provide confidential support and advice.

They assist students:

- living with disabilities
- with long- or short-term health concerns and/or mental health issues
- who are primary carers
- from low SES backgrounds
- of diverse genders, sexes and sexualities
- from refugee and refugee-like backgrounds
- from rural and remote backgrounds
- who are the first in their family to undertake a bachelor-level degree.

 Their web site is: https://student.unsw.edu.au/els/services

Equitable Learning Services (ELS) may determine that your condition requires special arrangements for assessment tasks. Once the School has been notified of these, we will make every effort to meet the arrangements specified by ELS.

Additionally, if you have suffered significant misadventure that affects your ability to complete the course, please contact your Lecturer-in-charge in the first instance.

Academic Skills Support and the Learning Centre

The Learning Centre offers academic support