MATH 3003 ANALYSIS

Credit Points 10

Legacy Code 200023

Coordinator Rehez Ahlip (https://directory.westernsydney.edu.au/search/name/Rehez Ahlip/)

Description Analysis provides the theoretical basis of real and complex numbers, including differentiation and integration. Topics include: field axioms and completeness, sequences, series, convergence, compactness, continuity, differentiability, integrability, and related theorems in both the real and complex number systems.

School Computer, Data & Math Sciences

Discipline Mathematics

Student Contribution Band HECS Band 1 10cp

Check your HECS Band contribution amount via the Fees (https://www.westernsydney.edu.au/currentstudents/current_students/fees/) page.

Level Undergraduate Level 3 subject

Pre-requisite(s) MATH 2001

Equivalent Subjects LGYA 3794 - Advanced Mathematical Topics

Learning Outcomes

On successful completion of this subject, students should be able to:

1. Explain the difference between pointwise and uniform convergence
2. Test for convergence sequences and uniform convergence of series of functions on a given interval
3. Apply interchange theorems for uniformly convergent sequences and series
4. Explain the definition of the Riemann integral
5. Calculate upper and lower sums and integrals of simple functions
6. Prove and apply theorems concerning classes of integrable functions and integrability of sums and products
7. Find limits of sequences via the use of Riemann sums
8. Test for differentiability of a function of a complex variable using the Cauchy-Riemann equations
9. Explain what is meant by an analytic function
10. Apply the Cauchy-Riemann equations to harmonic functions
11. Parametrize a path and then to evaluate some complex integrals directly
12. Evaluate complex integrals by using results such as the Cauchy integral formulae and residue theorem
13. Work out Taylor and Laurent series for some of the simpler functions

Subject Content

- field axioms
- completeness
- limits
- compactness
- cauchy sequences
- uniform Continuity
- uniform convergence
- Continuity
- differentiability
- Rolle's theorem and mvt
- Riemann integral
- differentiation of complex functions
- cauchy-Riemann equations
- analytic functions
- contour integrals
- Cauchy's theorem
- Taylor and Laurent series
- residues
- evaluation of certain real integrals

Assessment

The following table summarises the standard assessment tasks for this subject. Please note this is a guide only. Assessment tasks are regularly updated, where there is a difference your Learning Guide takes precedence.

Type	Length	Percent	Threshold	Individual/ Group Task
Quiz	50 minutes	20	N	Individual
Quiz	50 minutes	20	N	Individual
Final Exam	2 hours	60	N	Individual

Prescribed Texts

- Bartle D F & Sherbert D R Inroduction to Real Analysis. Wiley John, 2010
- Osbourne A D , Complex Variables and their Applications,1st Edition , 1999. Pearson Education

Teaching Periods

Autumn (2022)

Campbelltown

Day

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View timetable (https://classregistration.westernsydney.edu.au/even/timetable/?subject_code=MATH3003_22-AUT_CA_D#subjects)

Parramatta - Victoria Rd

Day

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On-site

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