MATH 2001 ADVANCED CALCULUS

Credit Points 10

Legacy Code 200028

Coordinator Matthias Fresacher (https://directory.westernsydney.edu.au/search/name/Matthias Fresacher/)

Description This subject is designed for students undertaking studies in mathematics, statistics, operations research and mathematical finance. It provides further mathematical training in the areas of multivariable and vector calculus, which is essential to the understanding of many areas of both pure and applied mathematics.

School Computer, Data & Math Sciences

Discipline Mathematics

Student Contribution Band HECS Band 1 10cp

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

Level Undergraduate Level 2 subject

Pre-requisite(s) MATH 1015

Equivalent Subjects LGYA 3785 - Advanced Calculus LGYA 3865 - Mathematics 4 LGYB 9666 - Mathematics 21

Incompatible Subjects MATH 1019 - Mathematics for Engineers 2

Restrictions

Students enrolled in Bachelor of Engineering, Bachelor of Engineering (Honours) or Bachelor of Engineering Science may not enrol in this subject.

Learning Outcomes

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

1. tackle and solve calculus problems in the multi-variable context
2. apply multi-variable calculus to practical situations
3. perform vector operations and apply to solving geometric problems
4. recognise continuous multi-variable functions
5. calculate limits of multi-variable functions
6. compute directional derivatives, partial derivatives, and gradients
7. find and classify critical points of differentiable multi-variable real valued functions
8. perform multi-variable integration and apply various techniques such as change of variables
9. apply integration to calculating arc lengths, surface areas, and volumes
10. recognise vector fields such as conservative vector fields
11. apply Fundamental Theorem and Green's Theorem to calculating line integrals and/or double integrals

Subject Content

multi-variable differential calculus: functions of several variables and their graphs
continuity, limits, directional derivatives, partial derivatives and vector-valued functions
chain rule, level sets, gradient, extreme values, Lagrange multiplier methods
multivariable integral calculus: multiple integration and iterated integrals, change of order
curvilinear coordinate systems
properties of vectors and vector fields
vector differentiation
gradient, divergence and curl of a vector
line, surface and volume integrals
Green's theorem in the plane
theorems of Gauss and Stokes

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
Report	10 hours	30	N	Individual
Quiz	1 hour	20	N	Individual
Final Exam	2 hours	50	N	Individual

Prescribed Texts

- Stewart, J., Clegg, D., Watson, S. (2020) Calculus: Early Transcendentals, Metric Version Edition 9 E. Publisher CENGAGE (Pacific Grove, Calif: Brooks/Cole).

Teaching Periods

Autumn (2024)

Campbelltown

On-site

Subject Contact Matthias Fresacher (https://directory.westernsydney.edu.au/search/name/Matthias Fresacher/)

View timetable (https://classregistration.westernsydney.edu.au/even/timetable/?subject_code=MATH2001_24-AUT_CA_1#subjects)

Penrith (Kingswood)

On-site

Subject Contact Matthias Fresacher (https://directory.westernsydney.edu.au/search/name/Matthias Fresacher/)

View timetable (https://classregistration.westernsydney.edu.au/even/timetable/?subject_code=MATH2001_24-AUT_KW_1#subjects)

Parramatta - Victoria Rd

On-site

Subject Contact Matthias Fresacher (https://directory.westernsydney.edu.au/search/name/Matthias Fresacher/)

View timetable (https://classregistration.westernsydney.edu.au/even/timetable/?subject_code=MATH2001_24-AUT_PS_1#subjects)