

MTH217e Numerical Methods and Advanced Calculus

Level: 2

Credit Units: 5 Credit Units

Language: ENGLISH

Presentation Pattern: EVERY JULY

E-Learning: BLENDED - Learning is done MAINLY online using interactive study materials in Canvas. Students receive guidance and support from online instructors via discussion forums and emails. This is supplemented with SOME face-to-face sessions. If the course has an exam component, this will be administered on-campus.

Synopsis:

MTH217 considers more advanced techniques to solve various problems in applied mathematics, and prepares students for higher level 3 studies in applied mathematics.

Topics:

- Functions of Several Variables.
- Classification of stationary points.
- Numerical Methods for Ordinary Differential Equations.
- Systems of differential equations.
- Fourier Series.
- Fourier series for even and odd functions, and for any periodic functions.
- Differential Equations.
- Heat transfer problems.
- Vector Calculus.
- Coordinate systems.
- Multiple Integrals.
- The scalar line integral, area integrals, volume integrals.

Learning Outcome:

- Use functions of several variables.
- Solve optimization points of functions of several variables.
- Identify appropriate numerical methods to solve a class of differential equations.
- Calculate and contrast exact and numerical solutions to a class of differential equations.
- Describe Fourier series of functions and periodic functions.
- Solve partial differential equations by separating variables.
- Determination of vector calculus problems in 3 dimensions.
- Identify force problems using potential fields.
- Solve multiple integrals, including area, centre of mass and inertial multiple integrals.
- Apply a range of mathematical techniques to solve a variety of quantitative problems.
- Analyze and solve problems individually and/or as part of a group.
- Solve a number of problem sets within strict deadlines.
- Solve problems related to numerical methods and advanced calculus using Mathcad.

Assessment Strategies:

Continuous Assessment Component	Weightage (%)
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PRE-CLASS QUIZ	2
COMPUTER MARKED ASSIGNMENT	8
PRE-CLASS QUIZ	2
COMPUTER MARKED ASSIGNMENT	8
PRE-CLASS QUIZ	2
COMPUTER MARKED ASSIGNMENT	8
Sub-Total	30

Examinable Component	Weightage (%)
Written Exam	70
Sub-Total	70

Weightage Total **100**