THE UNIVERSITY of ADELAIDE COLLEGE

Foundation Studies Program

MATHEMATICAL METHODS

AIMS

The aim of the Specialist Mathematics course is to prepare students for higher university mathematics, such as that required in engineering degrees and other degrees with an emphasis on mathematical skills.

Mathematical Methods introduces the students to calculus and statistics and then develops an increasingly complex and sophisticated understanding of these topics. By using functions and their derivatives and integrals, and by mathematically modelling physical processes, students develop an understanding of the physical world through a knowledge of relationships involving rates of change. Students use statistics to describe and analyse phenomena that involve uncertainty and variation.

Mathematical Methods provides the foundation for further study in mathematics, economics, computer sciences, and the sciences. It prepares students for courses and careers that may involve the use of statistics, such as health or social sciences. When studied together with Specialist Mathematics, this subject can be a pathway to engineering, physical science, and laser physics.

LEARNING OUTCOMES

After successfully completing this subject students should be able to:

- Have knowledge of content and an understanding of mathematical concepts and relationships.
- Use mathematical algorithms and techniques (implemented electronically where appropriate) to find solutions to routine and complex questions.
- Apply knowledge and skills to answer questions in applied and theoretical contexts, including some attempts at proof.
- Develop solutions to mathematical problems set in applied and theoretical contexts.
- Interpret mathematical results in the context of the problem.
- Understand the reasonableness and possible limitations of the interpreted results, and recognise any assumptions made.
- Communicate mathematical ideas and reasoning to develop logical arguments, including some attempt at proof in applied and/or theoretical contexts.
- Use appropriate mathematical notation, representations, and terminology.

PREREQUISITES AND ASSUMED KNOWLEDGE

Mathematics to an Australian Year 11 standard.

SUBJECT CONTENT

WEEK	TOPIC AND ASSESSMENT SCHEDULE
1	Orientation week
2 - 4	Algebraic preliminaries, introduction to graphics calculator, exponents and logarithms
5 - 6	Functions and their graphs
7 - 9	Differential calculus
15 - 17	Solving linear systems
18 - 19	Exam revision, exams
20	Solving linear systems
21 - 24	Integration
25 - 29	Applications of integration
30 - 31	Discrete random variables
32	Continuous random variables
33 - 34	The normal distribution, sampling distribution
35	Confidence intervals for the mean
36 - 39	Revision and exams
40	Graduation

ASSESSMENT

General weightings for each assessment item are outlined below.

ASSESSMENT ITEM	WEIGHTING
Tests	40%
Assignments (8)	7%
Projects (2)	8%
Mid-year examination	15%
Final examination	30%

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