



# SPECIALIST MATHEMATICS

## AIMS

The aim of the Specialist Mathematics subject is to prepare students for higher university mathematics, such as that required in engineering degrees. It would also be advantageous for students entering degree programs with an emphasis on mathematical skills such as Mathematics, Computer Science, Finance, Design Studies and some Science courses, such as Chemistry and Physics that have a substantial mathematical content. This subject satisfies the mathematics prerequisite requirements of the University of Adelaide Bachelor of Engineering degree programs.

## LEARNING OUTCOMES

After successfully completing this subject students should be able to:

- Have knowledge of content and 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
- Apply mathematical models to data in order to make predictions
- 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
- Develop and test conjectures, with some attempt at proof
- 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.  
Co-requisite: Mathematical Studies.

## SUBJECT CONTENT

| WEEK    | TOPIC AND ASSESSMENT SCHEDULE                                    |
|---------|--|
| 1       | Orientation week   |
| 2 - 5   | Trigonometric functions  |
| 6       | Introductory Complex Numbers                                     |
| 7 - 9   | Polynomials  |
| 10 - 12 | Relations and functions  |
| 13 - 17 | Complex numbers  |
| 18 - 19 | Exam revision  |
| 20      | Examinations   |
| 20 - 22 | Vector Algebra   |
| 23 - 27 | Applications of Vectors to Geometry, Kinematics and Vector Proof |
| 28 - 29 | Trigonometric Calculus   |
| 30 - 31 | Integration  |
| 32 - 35 | Rates of change and differential equations                       |
| 36 - 37 | Exam preparation   |
| 38 - 39 | Exams  |
| 40      | Graduation and transcript collection                             |



## ASSESSMENT

General weightings for each assessment item are outlined below

| ASSESSMENT ITEM            | WEIGHTING | DUE DATES                            |
|----------------------------|-----------|--------------------------------------|
| <b>Tests</b>               | 40%       | As per assessment schedule           |
| <b>Assignments (8)</b>     | 7%        | As per assessment schedule           |
| <b>Projects (2)</b>        | 8%        | As per assessment schedule           |
| <b>Midyear examination</b> | 15%       | As per College examination timetable |
| <b>Final examination</b>   | 30%       | As per College examination timetable |