# 620-157 Accelerated Mathematics 1

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| **Credit Points:** | 12.50 |
| **Level:** | 1 (Undergraduate) |
| **Dates & Locations:** | 2009,<br>This subject commences in the following study period/s:<br>Semester 1, - Taught on campus.<br>Lectures, practice classes and computer laboratory classes. |
| **Time Commitment:** | Contact Hours: 48 one-hour lectures (four per week), 11 one-hour practice classes (one per week), 11 one-hour computer laboratory classes (one per week). Total Time Commitment: 120 hours total time commitment. |
| **Prerequisites:** | A study score of at least 38 in VCE Specialist Mathematics 3/4 or equivalent; or permission from the Director of the Mathematics and Statistics Learning Centre; or *Accelerated Mathematics 2*. |
| **Corequisites:** | None |
| **Recommended Background Knowledge:** | None |
| **Non Allowed Subjects:** | Students may only gain credit for one of 620-122 (prior to 2008), 620-142 (prior to 2009), *Linear Algebra*, *Accelerated Mathematics 1* (620-157 Mathematics 1 prior to 2009), 620-190 (UMEP Mathematics for High Achieving Students), 620-192 (prior to 2006), 620-194 (prior to 2006) or 620-211 (prior to 2008). |
| **Core Participation Requirements:** | It is University policy to take all reasonable steps to minimise the impact of disability upon academic study and reasonable steps will be made to enhance a student's participation in the University's programs. Students who feel their disability may impact upon their participation are encouraged to discuss this with the subject coordinator and the Disability Liaison Unit. |
| **Coordinator:** | Dr Paul Timothy Norbury |
| **Subject Overview:** | This subject develops the concepts of vectors, matrices and the methods of linear algebra and introduces students to differentiation and integration of functions of two variables. Students will be exposed to methods of mathematical proof. Little of the material here has been seen at school and the level of understanding required represents an advance on previous studies. Underlying concepts developed in lectures will be reinforced in computer laboratory classes.<br>Topics covered include systems of linear equations, matrices and determinants, vector geometry, lines and planes, vector spaces, subspaces, linear independence, bases, dimension, inner products, linear transformations, eigenvalues and eigenvectors, complex eigenvalues and exponentials as well as techniques of proof, partial derivatives, chain rule for partial derivatives, directional derivatives, tangent planes, extrema for functions of several variables and double integrals. |
| **Objectives:** | Students completing this subject should:<br># be able to use matrix techniques to represent and solve a system of simultaneous linear equations;<br># understand the extension of vector concepts to abstract vector spaces of arbitrary finite dimension;<br># understand linear transformations, their matrix representations and applications;<br># be able to differentiate and integrate functions of two variables;<br>and will be exposed to standard methods of mathematical proof. |
| **Assessment:** | Up to 40 pages of written assignments 15% (due during semester), one 45-minute written computer laboratory test 5% (held during semester), a 3-hour written examination 80% (in the examination period). |

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| **Prescribed Texts:** | Elementary Linear Algebra, Applications Version (H. Anton and C. Rorres), 9th edn, Wiley, 2005. |
| **Breadth Options:** | This subject potentially can be taken as a breadth subject component for the following courses:<br># **Bachelor of Arts (https://handbook.unimelb.edu.au/view/2009/D09)**<br># **Bachelor of Commerce (https://handbook.unimelb.edu.au/view/2009/F04)**<br># **Bachelor of Environments (https://handbook.unimelb.edu.au/view/2009/A04)**<br># **Bachelor of Music (https://handbook.unimelb.edu.au/view/2009/M05)**<br>You should visit **learn more about breadth subjects (http://breadth.unimelb.edu.au/breadth/info/index.html)** and read the breadth requirements for your degree, and should discuss your choice with your student adviser, before deciding on your subjects. |
| **Fees Information:** | Subject EFTSL, Level, Discipline & Census Date, http://enrolment.unimelb.edu.au/fees |
| **Generic Skills:** | In addition to learning specific skills that will assist students in their future careers in science, they will have the opportunity to develop generic skills that will assist them in any future career path. These include:<br># problem-solving skills: the ability to engage with unfamiliar problems and identify relevant solution strategies;<br># analytical skills: the ability to construct and express logical arguments and to work in abstract or general terms to increase the clarity and efficiency of analysis;<br># collaborative skills: the ability to work in a team;<br># time-management skills: the ability to meet regular deadlines while balancing competing commitments; and<br># computer skills: the ability to use an appropriate computing package. |
| **Notes:** | This subject is available for science credit to students enrolled in the BSc (both pre-2008 and new degrees), BASc or a combined BSc course.<br>This subject is suitable for students with a high level of achievement in VCE Specialist Mathematics 3/4 or equivalent.<br>This subject together with *Accelerated Mathematics 2* is equivalent, in content, to the three subjects *Calculus 2*, *Linear Algebra* and *Real Analysis with Applications*.<br>Students require access to a computer with the software package Matlab installed, currently in every open-access campus laboratory.<br>Students are expected to use the software package Matlab but no programming knowledge is expected. |
| **Related Majors/Minors/ Specialisations:** | First year mathematics and statistics |