

## MAST30010 Number Theory

<b>Credit Points:</b>	12.50
<b>Level:</b>	3 (Undergraduate)
<b>Dates &amp; Locations:</b>	2010, Parkville This subject commences in the following study period/s: Semester 2, Parkville - Taught on campus. Lectures and practice classes.
<b>Time Commitment:</b>	Contact Hours: 3 x one hour lectures per week, 1 x one hour practice class per week Total Time Commitment: Estimated total time commitment of 120 hours
<b>Prerequisites:</b>	Any second year level subject from the Department of Mathematics and Statistics.
<b>Corequisites:</b>	None
<b>Recommended Background Knowledge:</b>	None
<b>Non Allowed Subjects:</b>	None
<b>Core Participation Requirements:</b>	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 active and safe participation in a subject are encouraged to discuss this with the relevant subject coordinator and the Disability Liaison Unit.
<b>Coordinator:</b>	Dr John Groves
<b>Contact:</b>	Third Year Coordinator <b>Email: <a href="mailto:tycoord@ms.unimelb.edu.au">tycoord@ms.unimelb.edu.au</a> (mailto:tycoord@ms.unimelb.edu.au)</b>
<b>Subject Overview:</b>	This subject introduces the elementary concepts of divisibility; the basic theory and use of congruences; the properties of powers of elements in congruences, particularly Euler's theorem; the law of quadratic reciprocity; and basic properties of continued fractions and some applications. It develops applications of all of the above to primality testing, factorisation algorithms and cryptanalysis. This subject demonstrates the extent and uses of elementary number theory, its applicability in other parts of mathematics, and its potential for application outside of mathematics.  Topics include factorisation, primes and greatest common divisors; congruences; primitive roots; quadratic reciprocity; continued fractions and Pell's equation; compositeness testing and factorisation; and applications to cryptanalysis.
<b>Objectives:</b>	On completion of this subject, students should: <ul style="list-style-type: none"> <li># be familiar with the definitions and basic theory of numbers;</li> <li># be able to implement many of the standard algorithms of number theory;</li> <li># be able to prove simple results in number theory.</li> </ul>
<b>Assessment:</b>	Two written assignments due early in semester and at the end of semester amounting to a total of up to 25 pages and a 50-minute written test held mid-semester (equally weighted, with a total of either 0% or 20%), and a 3-hour written examination in the examination period (80% or 100%). The relative weighting of the examination and total assignment plus test mark will be chosen so as to maximise the student's final mark.
<b>Prescribed Texts:</b>	None
<b>Breadth Options:</b>	This subject potentially can be taken as a breadth subject component for the following courses: <ul style="list-style-type: none"> <li># <b>Bachelor of Arts (<a href="https://handbook.unimelb.edu.au/view/2010/B-ARTS">https://handbook.unimelb.edu.au/view/2010/B-ARTS</a>)</b></li> </ul>

	<p># <b><u>Bachelor of Commerce</u></b> (<a href="https://handbook.unimelb.edu.au/view/2010/B-COM">https://handbook.unimelb.edu.au/view/2010/B-COM</a>)</p> <p># <b><u>Bachelor of Environments</u></b> (<a href="https://handbook.unimelb.edu.au/view/2010/B-ENVS">https://handbook.unimelb.edu.au/view/2010/B-ENVS</a>)</p> <p># <b><u>Bachelor of Music</u></b> (<a href="https://handbook.unimelb.edu.au/view/2010/B-MUS">https://handbook.unimelb.edu.au/view/2010/B-MUS</a>)</p> <p>You should visit <b>learn more about breadth subjects</b> (<a href="http://breadth.unimelb.edu.au/breadth/info/index.html">http://breadth.unimelb.edu.au/breadth/info/index.html</a>) and read the breadth requirements for your degree, and should discuss your choice with your student adviser, before deciding on your subjects.</p>
<b>Fees Information:</b>	Subject EFTSL, Level, Discipline & Census Date, <a href="http://enrolment.unimelb.edu.au/fees">http://enrolment.unimelb.edu.au/fees</a>
<b>Generic Skills:</b>	<p>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:</p> <ul style="list-style-type: none"> <li># problem-solving skills: the ability to engage with unfamiliar problems and identify relevant solution strategies;</li> <li># 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;</li> <li># collaborative skills: the ability to work in a team;</li> <li># time-management skills: the ability to meet regular deadlines while balancing competing commitments.</li> </ul>
<b>Notes:</b>	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.
<b>Related Course(s):</b>	Bachelor of Science
<b>Related Majors/Minors/Specialisations:</b>	<p>Mathematics and Statistics (Discrete Mathematics specialisation)</p> <p>Mathematics and Statistics (Pure Mathematics specialisation)</p>