

200-level SUBJECT HANDBOOK ENTRY 2008 – New Generation Subjects

Subject Code	620-2xx
Title of the subject	Multivariable and Vector Calculus
Credit points	12.5
Coordinator	Karen Baker
Semester of offer	1
Prerequisites	620-158
Mode of delivery	Lectures and tutorials
Contact hours	36 one-hour lectures (three per week), 11 one-hour tutorials (one per week)
Estimated total time commitment	120 hours
Description	<p>This subject introduces functions of several variables, the fundamental concepts of vector calculus, relations between line, surface and volume integrals, and selected applications of multivariable and vector calculus.</p> <p>Functions of several variables: surfaces, level curves, partial derivatives, chain rules for partial derivatives, directional derivative, tangent planes, differentiability, Taylor series, extrema, Hessian, constrained extrema, polar, cylindrical and spherical coordinates, coordinate transformations, double and triple integrals. Vector calculus: vector differential operators, vector fields, gradient, divergence and curl; space curves, line integrals, conservative fields; surface and volume integrals; the integral theorems of Green, Gauss and Stokes and selected applications.</p>
Assessment	Up to 50 pages of written assignments 20% (due during semester), a 3-hour written examination 80% (in the examination period).
Prescribed texts	Not decided
Notes	<p>This is the third subject of a three-subject sequence (620-157, 620-158 and 620-2xx Multivariable and Vector Calculus) for students with a very high level of achievement in VCE Specialist Mathematics $\frac{3}{4}$ or equivalent. This subject sequence is equivalent, in content, to the four subjects 620-154, 620-156, 620-2xx Vector Calculus and 620-2xx Real Analysis with Applications, presenting some topics from a more advanced perspective.</p> <p>Students may only gain credit for one of 620-2xx Multivariable and Vector Calculus, 620-2xx Vector Calculus, [07]620-231 or [07]620-233</p> <p>Students in the combined degree BE/BSc should note that credit exclusions exist between this subject and Engineering mathematics subjects.</p>

	Refer to entries for 431-201 Engineering Analysis A and 431-202 Engineering Analysis B for details.
Subject objectives	
Generic skills	<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"> • problem-solving skills: the ability to engage with unfamiliar problems and identify relevant solution strategies; • 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; • collaborative skills: the ability to work in a team; • time management skills: the ability to meet regular deadlines while balancing competing commitments.