

200-level SUBJECT HANDBOOK ENTRY 2008 – New Generation Subjects

Subject Code	620-2xx
Title of the subject	Vector Calculus
Credit points	12.5
Coordinator	Karen Baker
Semester of offer	1, repeat 2
Prerequisites	620-155 and 620-156, or one of [07]620-113, [07]620-123, [07]620-143, [05]620-193
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 demonstrates the fundamental concepts of vector calculus and the relations between line, surface and volume integrals. Students should develop the ability to manipulate partial derivatives and vector differential operators, to obtain extrema of functions of several variables, to calculate line, surface and volume integrals, and to work in curvilinear coordinates.</p> <p>Functions of several variables: limits, continuity, differentiability, matrix version of chain rule, Jacobian, Taylor polynomials, Lagrange multipliers. Vector calculus: vector fields, flow lines, curvature, torsion, gradient, divergence, curl and Laplacian. Integrals over paths and surfaces: line, surface and volume integrals, change of variables. Green's theorem, Divergence theorem in the plane, Gauss' divergence theorem, Stokes' theorem, general orthogonal curvilinear coordinates.</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>Students may only gain credit for one of 620-2xx Vector Calculus, 620-2xx Multivariable and 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: [08]431-201 Engineering Analysis A and [08]431-202 Engineering Analysis B.</p>
Subject objectives	
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

	<p>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.
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