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## Mathematics 221 - Vector Calculus Fall 2006

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This course will continue the study of multi-variable calculus begun in the first year and the goal is to understand and be able to use the integral formulae of Green, Stokes, and Gauss.

The course covers the following topics: double and triple integrals, including polar and spherical coordinates; parameterized curves and their velocities; vector fields and their divergence and curl; line integrals; path-independence of line integrals and Green's formula; oriented surfaces; flux integrals; the formulae of Stokes and Gauss; and some applications of these formulae.

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### General Information

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**Textbook:** There will be no official textbook for this course. Students are expected to have the textbook used in Math 120 or in Math121 and Apsc 172.

- *Calculus: Single and Multivariable* by Hughes-Hallett et al. (3rd or 4th edition).
- *Calculus: Early Transcendentals* by James Stewart (4th or 5th edition).

**Class Times:** Mon. 11:30, Tues. 13:30 and Thur. 12:30

**Location:** Jeffery Hall, Room 128

**URL:** <http://www.mast.queensu.ca/~math221>

**Instructor:** Ping Li (Jeff. 413) **Email:** [pingli@mast.queensu.ca](mailto:pingli@mast.queensu.ca)

**Office hours:** TBA

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### Evaluation

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Your grade will be determined by your performance in three basic areas:

- 1. Homework Assignments (24%)** There are eight homework assignments which will be posted on our website (usually a week before the due date). The assignments should be submitted in class.
- 2. Midterm Examination (16%)** There will be two one hour midterm exams which will be held in our class on Oct. 3rd and Nov. 7th respectively.
- 3. Final Examinations (60%)** The Final Exam will be held during the Exam Period and will be worth 60% of your final grade. The Final Exam will cover all material from this term. Exam schedules will be posted at <http://www.queensu.ca/registrar/exams> along with other general exam information.

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### Policies

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In addition to University Academic Regulations, please note the following:

- 1.** Assignments must be submitted in a legible form. Assignments that are illegible may be given a grade of zero. Please see the instructor if you foresee difficulty meeting this requirement.
- 2.** You are expected to attend all lectures. If you miss a lecture, it is your responsibility to understand all material from that lecture, and to get any handouts/information given.
- 3.** Late assignments will **not** be accepted.
- 4.** Calculators acceptable for use during quizzes, tests and examinations are the Casio 991 series and calculators with a Gold Applied Science approval sticker. Calculators with advanced features or substantial text storage capacity are not permitted.

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## Lecture Schedule

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This lecture schedule is tentative based on the textbook by Hughes-Hallett.

**Week 1:** 16.1-16.2

**Week 2:** 16.3-16.4; Homework 1 due

**Week 3:** 16.5; Homework 2 due

**Week 4:** 17.1-17.2; Midterm 1 (Tuesday, Oct. 3) on double and triple integrals

**Week 5:** Monday class cancelled; 17.3 Homework 3 due

**Week 6:** 18.1-18.2; Homework 4 due

**Week 7:** 18.3-18.4; Homework 5 due

**Week 8:** finish line integrals; 17.5; Homework 6 due

**Week 9:** 19.1-19.2; Midterm 2 (Tues., Nov 7) on line integrals

**Week 10:** 19.2, 20.1; Homework 7 due

**Week 11:** 20.2, 20.3; Homework 8 due

**Week 12:** 20.4; Review

NOTE: Following chart shows the corresponding sections from the texts by Hughes-Hallett and by Stewart.

	Hughes-Hallett	Hughes-Hallett	Stewart	Stewart
	2nd edition	3rd & 4th edition	3rd edition	4th & 5th edition
Double integrals	15.1, 15.2	16.1, 16.2	13.1-13.3	15.1-15.3
Double integrals in polars	15.4	16.4	13.4	15.4
Triple integrals	15.3	16.3	13.7	15.7
Triple integrals in sphericals	15.5	16.5	13.8	15.8
Curves	16.1, 16.2	17.1 17.2	9.1-9.3	13.1-13.3
Vector fields	17.1	17.3	14.1	16.1
Line integrals	18.1, 18.2	18.1, 18.2	14.2	16.2
Path independence of line integrals	18.3	18.3	14.3	16.3
Green's theorem	18.4	18.4	14.4	16.4
Surfaces		17.5	14.6	16.6
Flux integrals	19.1, 19.2	19.1-19.3	14.7	16.7
Divergence and curl	20.1, 20.3	20.1, 20.3	14.5	16.5
Gauss' theorem	20.2	20.2	14.9	16.9
Stokes' theorem	20.4	20.4	14.8	16.8