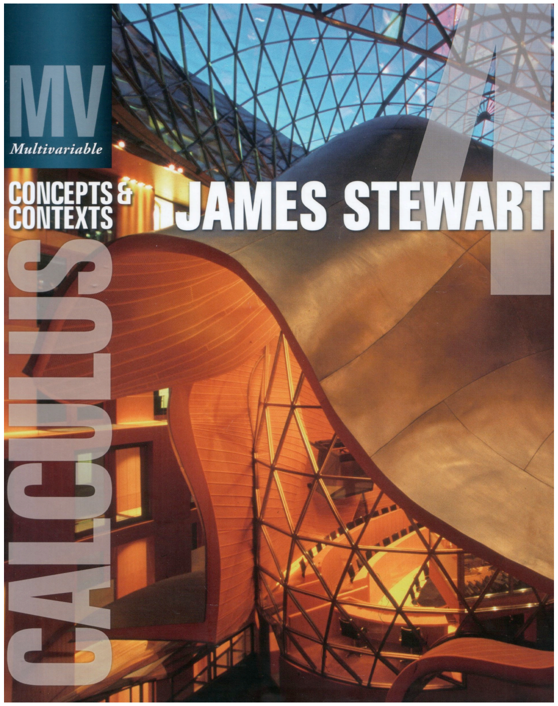
Harvard Summer School 2010

MATHS21A

SYLLABUS 2010

This standard multivariable calculus course extends single variable calculus to higher dimensions. It provides a vocabulary for understanding fundamental equations of nature like weather, planetary motion, waves, heat, finance, or quantum mechanics. It teaches important background needed for statistics, computer graphics, bioinformatics, etc. It provides tools for describing curves, surfaces, solids and other geometrical objects in three dimensions. It develops methods for solving optimization problems with and without constraints. You learn a powerful computer algebra system. The course will enhance problem solving skills and prepares you for further study in other fields of mathematics and its applications.

TEXTBOOK



You do not need a book. If you want a second opinion, I recommend

James Stewart, Multivariable Calculus, 5th edition 2009, ISBN-10:0-495-56054-5

ORGANISATION

Oliver Knill, office:Monday 3:30-4:30

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SC 434, Tel: (617) 495 5549

PROBLEM SESSIONS

Chris Phillips , Thu 1-2 PM,SC 507

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ROOM

Lectures and Section Hall E

IMPORTANT DATES

1.EXAM	2.EXAM	FINAL
JULY 8	JULY 22	AUG 5
8:30 AM	8:30 AM	8:30 AM
SC HALL E	SC HALL E	SC HALL E

GRADES

PART	GRADE 1
1. HOURLY	20
2. HOURLY	20
HOMEWORK	25
LAB	5
FINAL	30

CALENDAR

SU	MO	TU	WE	TH	FR	SA
20	21	22	23	24	25	26
27	28	29	30	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	27	29	30	31
1	2	3	4	5	6	7

- First class
- Mathematica project due
- Midterm exams
- Independence day
- Final Exam
- Review

SYLLABUS

1. Week: Geometry and Space

Lect 1-2 6/22 Space, Vectors, Dot Product

Lect 3-4 6/24 Cross product, Lines/Planes, Distances

2. Week: Surfaces and Curves

Lect 5-6 6/29 Implicit and Parametric Surface

Lect 7-8 7/1 Curves, Chain Rule, Arc Length

3. Week: Linearization and Gradient

Lect 9-10 7/6 Partial Derivatives, Review

Lect 11-12 First hourly. Gradient, Linearization

4. Week: Extrema and Double Integrals

Lect 13-14 7/13 Tangents, Extrema

Lect 15-16 7/15 Lagrange . Double integrals

5. Week: Multiple Integrals and Line Integrals

Lect 17-18 7/20 double and triple integrals

Lect 19-20 7/22 Second hourly. Line integrals

6. Week: Vector Fields and Integral Theorems

Lect 21-22 7/27 Curl, Greens theorem, Flux

Lect 23-24 7/29 Stokes and Divergence theorem

CHECKLIST

A solid single variable calculus background