Math-22A 2018

This vector calculus and linear algebra course is a more mathematical approach in which some linear algebra is introduced earlier. The material and time commitment is similar to 21a but it also gives a gentle introduction to proofs. Vector calculus and linear algebra provides a vocabulary for understanding fundamental processes of nature like weather, planetary motion, waves, diffusion, finance, or quantum mechanics. It helps to visualize processes and data. It teaches important background needed for statistics, discrete mathematics, computer graphics, bio medical sciences, bio-informatics or economics. It provides tools for describing curves, surfaces, solids and other geometrical objects in space. It develops methods for solving optimization problems with and without constraints. The course will enhance problem solving skills and prepares you for further study in other fields of mathematics and its applications.

Lectures

Science Center, 507

Tue/Thu 9:00-10:15 AM

1.Exam	2.Exam	Final
Oct 2	Nov 6	Dec 19
9 AM	9 AM	9 AM
SC 507	SC 507	TBA

Part	Grade
1. Hourly	20
2. Hourly	20
Homework	20
Proofs	10
Final	30

Proof Seminar

Fri 12:30 and 3 Pm, (David)

Accessibility

We are committed to an accessible academic community. For details see the Accessibility Office.

Text

The handouts and lectures are all you need.

Organisation

Oliver Knill, office hours TBA SC 432

knill@math.harvard.edu,Tel: (617) 495 5549

TF's

David Yang (dyang@math.harvard.edu)

Aditya Dhar, Elliot Parlin

Academic Integrity

We strictly follow the Harvard College school policies. Students are responsible to know the rules and guidelines.

Prerequisites

Arithmetic,Algebra,Geometry Trig, Exp and Log, Single Variable Calc

CALENDAR

SU	MO	TU	WE	TH	FR	SA
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	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
28	29	30	31	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	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

Exams Start/Stop

SYLLABUS

1. Week: Vectors and Matrices

Lect 1 9/4 Pythagoras

Lect 2 9/6 Gauss-Jordan

2. Week: Area and Volume

Lect 3 9/11 Area and Volume

Lect 4 9/13 Surfaces

3. Week: Length and Curvature

Lect 5 9/18 Curves and Length

Lect 6 9/20 Curvature

4. Week: Parametrizations

Lect 7 2/25 Other coordinates

Lect 8 9/27 Parametrizations

5. Week: PDE's

Lect 9 10/2 First hourly

Lect 10 10/4 Partial differential equations

6. Week: Taylor

Lect 11 10/9 Chain rule

Lect 12 10/11 Taylor formula

7. Week: Extrema

Lect 13 10/16 Extrema

Lect 14 10/18 Lagrange

8. Week: Double integrals

Lect 15 10/23 Double integrals

Lect 16 10/25 Other coordinates

9. Week: Integration

Lect 17 10/30 Triple integrals

Lect 18 11/1 Vector fields

10. Week: Line integrals

Lect 19 11/6 Second hourly

Lect 20 11/8 Line integral thm

11. Week: Integral Theorems 1

Lect 21 11/13 Green's Theorem

Lect 22 11/15 Curl and Flux

12. Week: Integral Theorems 2

Lect 23 11/20 Stokes theorem

13. Week: Integral Theorems 3

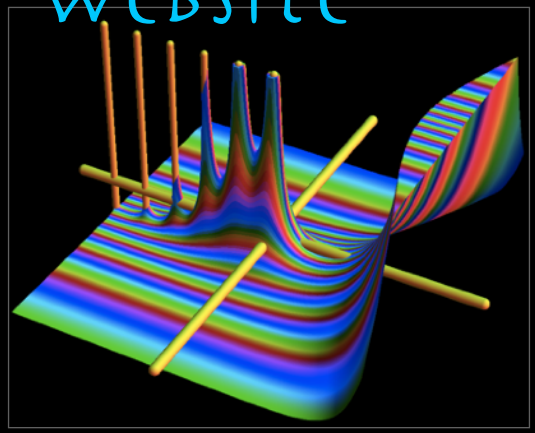
Lect 24 11/27 General Stokes

Lect 25 11/29 Gauss Theorem

14. Week: Integral Theorems 4

Lect 26 12/4 Overview

WEBSITE



math.harvard.edu/~knill/teaching/math22a2018