Math 2130

- Classes: Mon, Wed, Fri; 11:00-12:15. Classes start Wed Jan 21.
- Location: Mathematical Sciences Building, M-403.
- Office Hours: Mon, Wed, Fri; 12:15--1:00.
- Exams:
  - **The first midterm exam will be held on Friday the 6th of March. Practice questions are here.**
  - **The second midterm exam will be held on Wednesday the 15th of April. Practice questions are here.**
  - **The final exam will be held on Friday the 8th of May between 1:00 and 3:00PM in M-403. Practice questions are here.**
- Homework: Will be set once a week on Friday -- to be handed in the following Friday.
- Syllabus:
  - Textbook: Multivariable Mathematics, Fourth Edition, Williamson-Trotter.
  - Outline: The purpose of the course is to develop calculus for functions having more than one variable and to apply it to typical problems in geometry such as calculating the length of a curve or the area of a surface. We will work our way through the above textbook. The topics that I intend to cover are:
    - 1.1 Coordinate Vectors
    - 1.2 Geometric Vectors
    - 1.3 Lines and Planes
    - 1.4 Dot Products
    - 1.5 Euclidean Geometry
    - 1.6 The Cross Product
    - 3.1 Linear Functions on n-Dimensional Space
    - 4.1 Functions of One Variable
    - 4.2 Several Independent Variables
    - 4.3 Partial Derivatives
    - 4.4 Parameterised Surfaces
    - 5.1 Limits and Continuity
    - 5.2 Real-Valued Functions
    - 5.3 Directional Derivatives
    - 5.4 Vector-Valued Functions
    - 5.5 Newton's Method
    - 6.1 Gradient Fields
    - 6.2 The Chain Rule
    - 6.3 Implicit Differentiation
    - 6.4 Extreme Values
    - 6.5 Curvilinear Coordinates
    - 7.1 Iterated Integrals
    - 7.2 Multiple Integrals
    - 7.3 Integration Theorems
    - 7.4 Change of Variable
    - 7.5 Centroids and Moments
    - 7.6 Improper Integrals
    - 7.7 Numerical Integration
    - 8.1 Line Integrals
    - 8.2 Weighted Curves and Surfaces of Revolution
    - 8.3 Normal Vectors and Curvature
    - 8.4 Flow Lines, Divergence and Curl
    - 9.1 Green's Theorem

- 9.2 Conservative Vector Fields
- 9.3 Surface Integrals
- 9.4 Gauss' Theorem
- 9.5 Stokes Theorem
- 9.6 The Divergence, Curl and Laplacian Operators
- **Note:** This syllabus may be subject to modest alterations in content as the semester progresses.

- Assessment:
  - Homework assignments will contribute to 10% of your grade. It is important that you hand them in **on time**.
  - There will be two mid-sessional exams. The first will be worth 20% of your grade and the second 30%.
  - There will be a final exam, which will be worth 40%.
- Additional Resources:
  - Software for plotting curves and surfaces as well as implementing Newton's method is available here.

Homework

Questions set	**Due**
1.1 Q4c, 12, 24. 1.2 Q28. 1.3 Q2, 4, 6, 8, 12, 18.	Fri 6th Feb.
1.4 Q2, 6, 14, 18. 1.5 Q2, 4, 6, 14, 28. 1.6 Q8, 10, 16.	Mon 16th Feb.
4.1 Q2, 16, 18. 4.2 Q2, 4, 14, 18; (p192). 4.3 Q2, 6, 8, 14, 16, 30, 32.	Mon 23rd Feb.
4.4 Q4, 10, 14, 20. 5.1 Q22.	Fri 27th Feb.
5.2 Q2, 8, 13. 5.3 Q2, 6. 5.4 Q2, 10, 22, 24.	Fri 20th March.
5.5 Q4. 6.1 Q2, 8, 16, 24. (p257) 6.2 Q2, 8. (p270)	Fri 27th March.
6.3 Q2, 4, 8, 12. 6.4 Q2, 6, 10, 16, 20, 26. (p292) Q4, 10, 12. (p297)	Fri 3rd April.
6.4 Q4. (p303) 6.5 Q2, 6, 8. 7.1 Q4, 8, 12, 20.	Fri 10th April.

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