Math 300: Introduction to Complex Variables

1. Location and Time

- MWF at 8:00am in Buchanan A103

2. Instructor Information

- *Instructor:* Richard Froese
- *Email:* rfroese@math.ubc.ca
- *Office Location:* Math Annex 1106
- *Office Hours:* Wednesday, Friday 9:00am and Friday 1:00pm
- *Office Phone:* 604-822-3042

3. Textbook

- *Fundamentals of Complex Analysis with Applications to Engineering and Science (Third Edition),* by E. Saff and A. Snider.

We will cover sections from Chapters 1–6. See the outline below.

4. Outline and Timetable

4.1. Part 1: Complex numbers and analytic functions (11 hours)

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1.1   The algebra of complex numbers
1.2   Point representation of complex numbers
1.3   Vectors and polar forms
1.4   The complex exponential
1.5   Powers and roots
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1.6   Planar sets
1.7   The Riemann sphere
2.1   Functions of a complex variable
2.2   Limits and continuity
2.3   Analyticity
2.4   The Cauchy-Riemann equations
2.5   Harmonic functions
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4.2. Part 2: Elementary functions and complex integration (13 hours)

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3.1   Polynomials and rational functions
3.2   Exponential, trigonometric and hyperbolic functions
3.3   The logarithm
3.5   Complex powers and inverse trigonometric functions
4.1   Contours
4.2   Contour integrals
4.3   Independence of path
4.4   Cauchy's integral theorem
4.5   Cauchy's integral formula
4.6   Bounds for analytic functions
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4.3. Part 3: Series expansions and residue theory (11 hours)

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5.1   Sequences and series
5.2   Taylor series
5.3   Power series
5.4   Convergence
5.5   Laurent series
5.6   Zeros and singularities
5.7   The point at infinity
6.1   The residue theorem
6.2   Trigonometric integrals
6.3   Improper integrals
6.7   Argument principle
7.3   Moebius transformations
7.4   Moebius transformations, ctd.
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5. Homework, Tests and Grades:

There will be weekly homework assignments, usually due on Mondays. Late homework will not be accepted. I will drop the lowest two homework scores.

There will be two midterm exams, on **Friday October 6**, and **Friday, November 10**. There are no make-up midterms. If you miss a midterm for a valid medical reason, the weighting for the final will be adjusted. Other than this, no re-negotiating of the weights of the different components of the overall grade will be considered.

There will be a final exam during the December exam period.

Your grade will be computed as follows:

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Final Exam: 50%,
Midterm 1: 20%
Midterm 2: 20%
Homework (lowest 2 scores dropped):   10%.
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6. Assignments and Notes:

Check back here for homework assignments and solutions, notes and links as the term progresses.