

## Engineering Mathematics II (09820MS 201201) Spring, 2010

**Class Time:** T5T6 F5F6

**Class Room:** R216, Eng. IV

**Instructor:** Ta-Jen Yen (嚴大任)  
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**Textbooks:** Advanced Engineering Mathematics (2<sup>nd</sup> edition), *Michael D. Greenberg*, 滄海書局

**Grading:** Quizzes (x3, 25%)  
Midterms (x2, 50%)  
Final (25%)

**TAs:** 葉庭佐 [u941049@oz.nthu.edu.tw](mailto:u941049@oz.nthu.edu.tw)  
郭于寧 [missy8@pchome.com.tw](mailto:missy8@pchome.com.tw)

**TA Hours** 7-9 pm, Wednesday (R107, MSL Building)

**Content:**

This subject is comprised of five parts within two semesters:

1. Ordinary Differential Equations
2. Linear Algebra
3. *Multivariable Calculus and Field Theory*
4. *Fourier Methods and Partial Differential Equations*
5. *Complex Variable Theory*

In the second semester, we focus on “*Multivariable Calculus and Field Theory*”, “*Fourier Methods and Partial Differential Equations*”, and “*Complex Variable Theory*” to cover the rationale and of particular the engineering applications. The detailed schedule of this semester is listed below:

### Class Schedule of Engineering Mathematics (2010S)

Week	Date	Chapters	Content
1	2/23 - 2/26	<b>SYLLABUS</b>	Syllabus
2	3/2 - 3/5	<b>Ch. 13. DIFFERENTIAL CALCULUS OF FUNCTIONS OF SEVERAL VARIABLES</b>	partial derivatives, chain differentiation
			implicit fns and Jacobians maxima and minima, Leibniz rule
3	3/9 - 3/12	<b>Ch. 14. VECTORS in 3-SPACE</b>	dot and cross product, multiple products
			differentiation of a vector fn of a single variable
4	3/16 - 3/19	<b>Ch. 15 CURVES, SURFACES, AND VOLUMES</b>	Quiz (1/3): ch. 13 - 14
			curve and line integrals, double and triple integrals
			surfaces & volumes, surface and volume integrals
5	3/23 - 3/26	<b>Ch. 16. SCALAR AND VECTORS FIELD THEORY</b>	divergence, gradient, curl, Laplacian
			Non-Cartesian systems, divergence theorem
6	3/30 - 4/2		Stokes's theorem, irrotational fields
			4/1 & 4/2 : holidays
7	4/6 - 4/9	<b>Ch. 17. FOURIER SERIES, FOURIER INTEGRAL, FOURIER TRANSFORM</b>	FS of a periodic fn, half-/quarter-range expansion
			SL theory, Fourier integral
8	4/13 - 4/16	<b>MIDTERM (1/2)</b>	<b>Multivariable Calculus and Field Theory: Ch. 13 - 16</b>
9	4/20 - 4/23		Fourier transform
10	4/27 - 4/30	<b>Ch. 18. DIFFUSION EQUATION</b>	definition about PDE, separation of variables
			FT and LT, the method of images numerical solution
11	5/4 - 5/7	<b>Ch. 19. WAVE EQUATION</b>	Quiz (2/3): ch. 17 - 18
			separation of variables: vibration string and membrane
			d'Alembert's solution
12	5/11 - 5/14	<b>Ch. 20. LAPLACE EQUATION</b>	separation of variables: Cartesian (and non-) coordinates
			numerical solution
13	5/18 - 5/21	<b>MIDTERM (2/2)</b>	<b>Fourier Methods and PDE: Ch. 17 - 20</b>
14	5/25 - 5/28	<b>Ch. 21. FUNCTIONS OF A COMPLEX VARIABLE</b>	complex numbers and plane, elementary fns
			polar form, additional elementary fns
15	6/1 - 6/4	<b>Ch. 22. CONFORMAL MAPPING</b>	Multi-valuedness, differential calculus and analyticity
			conformal mapping, bilinear transformation additional mappings and applications, more general BSc
16	6/8 - 6/11	<b>Ch. 23. THE COMPLEX INTEGRAL CALCULUS</b>	Quiz (3/3): ch. 21 - 22
			complex integral, Cauchy's theorem
			complex integral calculus, Cauchy integral formula
17	6/15 - 6/18	<b>Ch. 24. TAYLOR SERIES, LAURENT SERIES, AND THE RESIDUE THEOREM</b>	complex series and TS, Laurent series
			residue theorem
18	6/21 - 6/25	<b>FINAL EXAM</b>	<b>Complex Variable Theory: Ch. 21 - 24</b>

This schedule is subject to being adjusted based on actual instruction progress and students' feedback.