PHYS 210 MATHEMATICAL METHODS IN PHYSICS II

Spring Semester: 20132

Instructor:

Assoc.Prof. Seçkin Kürkçüoğlu, Room 110, Phone: 3117, e-mail: kseckin@metu.edu.tr

Course Web Page:

http://www.metu.edu.tr/~kseckin/PHYS210.html

Schedule:

Monday: 10:40-12:30 P4
Wednesday: 10:40-12:30 P3

Teaching Assistant: Alireza Behtash e-mail: proof.beh@gmail.com

Recitations: Tuesdays 17:40

Text Book:

- M. L. Boas, Mathematical Methods in Physical Sciences, 3rd Edition, Wiley, 2006.

Suggested Books:

- F.B. Hildebrand, Advanced Calculus for Applications, 2nd Edition, Prentice-Hall, 1976.
- J.W.Brown & R.V. Churchill, Complex Variables & Applications, 6th Edition, McGraw-Hill, 1996.

Grading:

There will be three midterm examinations and a final. Your midterm average will comprise 50% each of the best two and 10% of the lowest of your midterm examinations. If your midterm average is greater than your final, the midterm average and the final will contribute 60% and 40 %, respectively, to your final grade; otherwise the midterm average and the final will contribute 50% each to your final grade.

Exam Dates and Places:

1st Midterm Exam: 1 April 2014, Tuesday, 17:40:19:40,
2nd Midterm Exam: 30 April 2014, Wednesday, 17:40:19:40,
3rd Midterm Exam: 24 May 2014, Saturday,
Final Exam: TBA

Course Contents:

Fourier Series, Fourier Transforms and Dirac Delta Function.

Vector Analysis:
Elementary properties of vectors,
Vector multiplication and triple products.
Differentiation of vectors.
Geometry of a space curve.
Vector fields, directional derivative, gradient, divergence and curl.
Line Integrals and potential functions.
Surface integrals.
Divergence theorem, Green's theorem & Stokes' theorem.
Orthogonal curvilinear coordinates and special coordinate systems.

Partial Differential Equations:

Partial differential equations and some elementary methods of solutions.
Method of separation of variables
Laplace's equation
Heat flow equation
Wave equation

Functions Of Complex Variables:

Complex variables
Analytic functions
Cauchy's integral theorem
Taylor and Laurent series
Singularities of analytic functions & the residue theorem
Methods of finding residues
Evaluation of definite integrals using residue theorem