

**ME 502 – ADVANCED NUMERICAL METHODS FOR ENGINEERS**  
**(3 0 3 / ECTS 7.5)**  
**2015-2016 Spring**  
**Course Syllabus**

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**Office Hours:** Check the lecturer's web page at <http://academic.cankaya.edu.tr/~endery/> for his schedule.  
Appointments are accepted.

**Web site:** <http://me502.cankaya.edu.tr>, <http://webonline.cankaya.edu.tr>  
All grades, attendance ratings, announcements and other course materials will be posted on <http://webonline.cankaya.edu.tr>. Please check <http://webonline.cankaya.edu.tr> regularly.

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**Course Description:** This course covers solution of non linear equations, Newton Raphson method, improved Newton-Raphson method, and secant method, numerical solution of non linear boundary value problems of ordinary differential equations, numerical solution of linear and nonlinear partial differential equations, parabolic equations, hyperbolic equations, elliptic equations, iteration methods, nonlinear boundary conditions, 2D and 3D elliptic and parabolic partial differential equations.

**Course Material:** Text book and reference books are listed below.

**Examinations:** There will be 1 mid-term examination and 1 final examination. The schedule of exams will be announced during the semester.

**Homework:** There will be 5 homework assigned throughout the semester. Students are expected to use MATLAB in solution of their homework. Source codes (as m-files compatible with MATLAB R2012b) and a supplement pdf file (if required) should be submitted via [webonline.cankaya.edu.tr](http://webonline.cankaya.edu.tr). Please follow the links to access ME502 page on webonline.

**Attendance:** According to the university regulations, students must attend at least 70 % of the lecture hours. Otherwise, the student gets NA (Not attended). Valid excuses are exempt from computation of this percentage. Apart from the university regulations, it is of student's benefit to attend all of the lecture hours.

**Grading:** Final grade will be over 100 points. Weight of each grading item will be as below.

Homework	(6 % each)	30 %
MT-1		30 %
Final		40 %
Total		100 %

All the announcements, including the examination dates will be posted on [me502.cankaya.edu.tr](http://me502.cankaya.edu.tr).

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**Text Book:**

**Applied Numerical Methods for Engineers and Scientists**, Singiresu S. Rao, Prentice Hall, 2002  
Library Call No: TA345 R36 2002

**Reference Books**

**Applied Numerical Methods with Matlab for Engineers and Scientists**, Steven. C. Chapra, McGraw Hill, 2012.  
Library Call No: QA297C43 2012

*There are many other reference books related to numerical methods available at Çankaya University Library.*

**Tentative weekly course schedule:**

week	Lecture Topic
1-3	Introduction Solution of nonlinear equations, and simultaneous linear algebraic equations Curve Fitting and Interpolation
4-5	Numerical differentiation Numerical integration
6-10	Ordinary Differential Equations (Initial value and boundary value problems)
11-14	Partial differential equations