

## **Module Title: Advanced Engineering Mathematics**

**Module Code:** 24-18-601-01

**Module Credit:** 3

**Term:** First Term 1397-98

**Lecturer:** Prof. Farhad Shahraki  
fshahraki@eng.usb.ac.ir

**Lecturing time:** Sat. (07:30-09:30)  
Mon. (07:30-09:30)

**Assessments:** 40% mid-term exam  
40% final exam  
10% Quiz  
10% home works

**Class attendance:** REGULAR ATTENDING IS IMPORTANT  
AND EACH SESSION YOUR ATTENDANCE WILL BE CHECKED

**References:** Advanced Engineering Mathematics (10th edition)  
by Erwin Kreyszig  
Wiley

Partial Differential Equations for Scientists and Engineers  
by S.J. Farlow  
Wiley

Mathematical Methods in Chemical Engineering  
by V.G. Jenson and G.V. Jeffreys  
Academic Press

Mathematical Methods in Chemical Engineering  
R. Aris and N.R. Amundson  
Prentice Hall

Schaum's outline of Theory and Problems of Partial Differential Equations  
by P Du Chateau and D.W. Zachmann  
Mc Graw-Hill

Advanced Engineering Mathematics  
by M. Greenberg  
Prentice Hall

Applied Mathematical Methods for Chemical Engineers  
Loney N.  
CRC Press

The topics covered and the approximate time devoted to them is in the list below. The order of presentation and coverage will likely be altered.

Every effort will be made to make the material relate to the different disciplines spanned by the students attending the class.

- Review Scalar and Vector Field Theory. (~1 week)
- ODE: Linear equations with variable coefficients (Bessel, Legendre equation and etc). Sturm Liouville Theory. Green Functions. Similarity transformations. **Mid-term Exam** (~ 4 weeks)
- PDE: Separation of variables. Parabolic Elliptic and Hyperbolic Equations. Fourier series solutions. Fourier Transform. Laplace Transform. Hankel Transform. Legendre Transform. (~ 8 weeks)
- Complex Analysis: Function in the complex Domain (logarithm, etc). Poles and zeros. Line integrals. Fourier Transform. Integrals of singular integrals, and if there is time, conformal mapping. (~3 weeks)