

**Department of Mathematics**  
**Faculty of Mathematics & Computer Science**  
**PhD, Mathematics**

<b>Course Code</b>	AM 501
<b>Course Title</b>	Advanced Analysis
<b>Course Credits</b>	02

**Course objectives:**

The contents of this course form an essential setting for the well-posedness and weak solutions of initial and boundary value problems, finite element method, imbeddings etc.

**Minimum pre- requisites:**

Basic courses in real analysis and linear algebra. Knowledge of functional analysis will be useful.

**Course structure:**

Review of Lebesgue spaces of functions of one and several variables.

Test functions, distributions, distributional derivatives, operations with distributions, support and singular supports of distributions, convolution of functions and distributions, fundamental solutions, Fourier transform, Schwarz space, Fourier inversion formula, tempered distributions.

Idea of construction and basic properties of Sobolev spaces.

**Reading suggestions:**

- **L.C. Evans**, *Partial Differential Equations*, Graduate Texts in Mathematics, Vol 19, Amer. Math. Soc, 1998.
- **F.G. Friedlander**, *Introduction to the Theory of Distributions*, Cambridge University Press, Cambridge, 1982.
- **A.H. Zemanian**, *Distribution Theory and Transform Analysis*, McGraw Hill, New York, 1965.

**Evaluation and Weightage:**

- 20% for Assignments
- 20% for Quiz/Presentations

- 20% for Mid-Term examination
- 40% for End-Term examination