MA 537: Fourier Analysis And Applications (3-0-0:3)

Basic properties of Fourier series: uniqueness of Fourier series, convolutions, Cesaro and Abel summability, Fejer's theorem, Poisson kernel and Dirichlet problem in the unit disc,mean square convergence, example of continuous functions with divergent Fourier series.

Distributions and Fourier transforms: calculus of distributions, Schwartz class of rapidly decreasing functions, Fourier transforms of rapidly decreasing functions, Riemann Lebesgue lemma, Fourier inversion theorem, Fourier transforms of Gaussians.

Tempered distributions: Fourier transforms of tempered distributions, convolutions, applications to PDEs (Laplace, Heat and Wave Equations), Schrodinger-equation and uncertainty principle.

Paley-Wiennertheorems, Poisson summation formula: radial Fourier transforms and Bessel's functions. Hermite functions.

Text Books and References:

1. R. Strichartz, “A Guide to Distribution Theory and Fourier Transforms”, World Scientific Publishing Co Pvt. Ltd.
2. E. M. Stein and R. Shakarchi, “Fourier Analysis: An Introduction”, Princeton University Press
3. J. I. Richards and H. K. Youn, “The Theory of Distributions: A Nontechnical Introduction”, Cambridge University Press