# COURSE DETAIL

| FOURIER ANALYSIS AND STATISTICS |
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| **Country**<br>United Kingdom - Scotland |
| **Host Institution**<br>University of Edinburgh |
| **Program(s)**<br>University of Edinburgh |
| **UCEAP Course Level**<br>Upper Division |
| **UCEAP Subject Area(s)**<br>Statistics Physics |
| **UCEAP Course Number**<br>131 |
| **UCEAP Course Suffix** |
| **UCEAP Official Title**<br>FOURIER ANALYSIS AND STATISTICS |
| **UCEAP Transcript Title**<br>FOURIER ANALYS&STAT |
| **UCEAP Quarter Units**<br>8.00 |
| **UCEAP Semester Units**<br>5.30 |

**Course Description**

Topics include Fourier analysis: Fourier series, Fourier transform, Dirac delta function, sifting property, Fourier representation, convolution, correlations, Parseval's theorem power spectrum, sampling; Nyquist theorem, data compression, solving ordinary differential equations with Fourier methods, driven damped oscillators, Green's functions for 2nd order ODEs, partial differential equations, PDEs and curvilinear coordinates, Bessel functions, and Sturm-Liouville theory. Topics for probability and statistics include concept and origin of randomness, randomness as frequency and as degree of belief, discrete and continuous probabilities, combining probabilities, Bayes theorem, probability distributions and how they are characterized, moments and expectations, error analysis, permutations, combinations, and partitions, Binomial distribution, Poisson distribution, the Normal or Gaussian distribution, shot noise and waiting time distributions, resonance and the Lorentzian, growth and competition and power-law distributions, hypothesis testing, parameter estimation, Bayesian inference, correlation and covariance, and model fitting.

**Language(s) of Instruction**
English

**Host Institution Course Number**
PHYS09055

**Host Institution Course Title**
FOURIER ANALYSIS AND STATISTICS

**Host Institution Campus**
Edinburgh

**Host Institution Faculty**

**Host Institution Degree**

**Host Institution Department**
School of Physics and Astronomy

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