

RES513 Data Analysis

Level: 5

Credit Units: 5 Credit Units

Language: ENGLISH

Presentation Pattern: EVERY JULY

Synopsis:

RES513 Data Analysis introduces the graduate student to a range of methods for analyzing, interpreting and processing of experimental and computational data at graduate level as well as for the practicing scientists and engineers. This data analysis course focuses on the application of mathematical techniques with special emphasis on establishing relationships between investigated parameters.

Topics:

- Introduction to Data Analysis
- Statistical Data Analysis
- Numerical Differentiation of Data
- Basic Numerical Interpolation by Curvature Matching
- Advanced Numerical Interpolation by Curvature Matching
- Numerical Integration using Interpolated Data
- Boundary and Surface Data Analysis of Equilibrium Systems
- Empirical Modelling from Experimental Data

Textbooks:

by David Livingstone.: A Practical Guide to Scientific Data Analysis (eTextbook) John Wiley
ISBN-13: 9780470684818

Learning Outcome:

- Assess, evaluate, measure and value the variance, covariance and correlation coefficient of a set of data, and also to scale and reduce a given set of data.
- Appraise, assess, critique and evaluate the various data display and mapping, and to choose, construct, design and improve display of data.
- Construct and formulate the generic numerical differential form of discrete data, and to estimate and evaluate the derivative from any given set of data.
- Formulate and construct the generalised curved interpolation of discrete data, and to evaluate and estimate the curved interpolation from any given set of data.
- Estimate and evaluate the internal physical properties of an equilibrium problem based on a given set of boundary data.
- Construct, design and formulate predictive empirical equations from a set of data by means of curve fitting in 2D space, surface fitting in 3D space, and other fittings of higher order.

Assessment Strategies:

| Continuous Assessment Component | Weightage (%) |
|--|----------------------|
| TUTOR-MARKED ASSIGNMENT | 30 |
| Sub-Total | 30 |

| Examinable Component | Weightage (%) |
|-----------------------------|----------------------|
| Written Exam | 70 |
| Sub-Total | 70 |

Weightage Total **100**