Statistics for Engineering (SAFI-M1)

5 days (35 hours) within a three-week time span

Fees : from 2000 € HT to 3500 € HT

ONLINE TRAINING

Dates and detailed fees on aste.asso.fr

Target Audience

The course is broad in its aim and approach, and as such suitable for engineers with responsibilities in new product design, development and manufacturing, or current product quality management, who wish to develop advanced knowledge and skills in the application of statistical methods and tools to underpin model-based problem solving and data-driven product and process design decision-making.
The course covers methods to support statistical analysis and modelling based on numerical and categorical data.

Prerequisites

- Attendance of 'Introduction To Python With Coogle Colab (SAFI-M0) module would be advantageous.
- No significant previous coding experience is required but some experience would be beneficial.
- For delegates not attending SAFI M0 and not familiar with the Colab environment, attendance of the pre-course tutorial session is expected.

Instructor

Professor Felician CAMPEAN, Professor in Automotive Reliability Engineering and Director of the Automotive Research Centre of the University of Bradford.

Training Delivery Methodology

The delivery is designed as a workshop style with an approximate 50/50 split between technical sessions and hands-on exercises, designed to explain the concepts by leveraging relevant industrial case studies.
Delivered online. Learning materials including reading, tutorials and exercises will be provided in electronic format before the course, with example solutions to the exercises where appropriate. Introduction to Colab Python tutorial at introductory level will also be provided.

Technical equipment

The training is delivered as a virtual classroom, using Microsoft Teams.
Login information sent at the latest 2 days before the training.

Modes of Asessment

Attendance sheet signed each half day by the participants and co-signed by ASTE.
Learning assessment based on:
- individual or group presentation with argument on a miniIproject
- individual plan for application around a specific project in the workplace of the trainee (plan based on the methods and tools from the course)
Training performance: qualitative assessment of the training by attendants at the end of the session.
Delivery of a training certificate.

Access Deadline

Open training: registration at the latest 7 days before the training | In-house training: organisation within 4 weeks minimum.

Accessibility to Disabled people

Contact our Disability Officer : info@aste.asso.fr

LEARNING OUTCOMES

Upon completion of this module, the participant will be able to:

- Demonstrate a critical understanding of the fundamental principles of statistics in theory and practice that support a range of engineering activities, including design specification, concept selection and product design verification planning and reporting,
- Apply knowledge and skills to plan data collection and analysis activities appropriate to a wide variety of engineering scenarios (including CAE), and present data to underpin model-based problem solving and data-driven product and process design decision-making.
- Master the practice of skills in specialised statistical packages for data analysis using Python in a Google Colab environment
- Demonstrate his analytical and problem-solving skills and ability to communicate effectively in a project team and contribute to teamwork facilitation.

PROGRAMME

This course introduces methods for efficient engineering data collection and statistical analysis to support model based problem-solving and inform management decision-making in the design and engineering of complex product and process systems in a data rich environment.

The course is organised as follows:

Statistics Fundamentals

- Overview of statistical engineering methodologies in the product creation process and throughout the whole system lifecycle.
- Introducing discrete random data – Uniform, Bernoulli & Poisson distributions.
- Modelling continuous random data – the fundamental principles of statistical modelling including the Normal distribution.
- Data Visualisation and interpretation.

Decision-Making Models

- Confidence Intervals
- Hypothesis Testing
- Power & Sample Size,
- One-way ANOVA.

Univariate & Multivariate Models

- Correlation & Regression,
- Residual Analysis
- Multiple Regression

Categorical Data

- A introduction to dealing with survey and categorical data using examples
- Visualisation of categorical data
- Stratification in data
- Bayes Theorem with simple applications.

Mini Project

- Strengthening the delivered concepts through application to an industry case study.

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