THE UNIVERSITY OF QUEENSLAND
AUSTRALIA

JKTech

Comparative Statistics & Experimental Design for Mineral Engineers

World-renowned professional development course on statistical methods.

JKTech offers three professional development courses to give metallurgists and allied disciplines the skills they need to apply methods to design and analyse experiments.

The courses cover the practical applications of statistics to process and laboratory data.

Metallurgists and assay chemists are often required to do experiments and analyse the results. They may range from simple laboratory tests to major plant trials costing hundreds of thousands of dollars.

Examples include:

- Laboratory tests of a new reagent
- Laboratory grinding and flotation tests of new ores
- Comparison of two assay or sampling methods
- Pilot plant tests for flow sheet design
- Plant trials of a new flotation reagent
- Plant trials of a new circuit configuration or item of equipment

One of the challenges of these experiments is that mineral processing data is usually imprecise and, especially in the case of plant data, subject to uncontrolled trends, cycles and variations, which make comparisons difficult.

Statistical methods solve these problems.

JKTech offers courses in:

- Comparative Statistics and Experimental Design (3-day course)
- Online Comparative Statistics and Experimental Design (self-paced online course over 4 weeks)
- Conducting and Analysing Plant Trials (2-day workshop)

Credit: Outotec SE Asia Pacific

Who should attend?

The courses are intended for metallurgists, chemists and other mine site professionals. Technical staff and students concerned with the planning and analysis of laboratory experiments, assay data and plant trials, will also find the course valuable.

Some knowledge of elementary statistics is useful, but not essential. Much more important is a sense of inquiry and a real desire to run better, more decisive, and more cost-effective experiments and to analyse data correctly.

3-Day Course

The 3-day course equips participants with the statistical tools necessary to make wise decisions in the face of uncertainty in the mineral processing environment.

Topics covered include:

- The nature and measurement of error. Where does error come from and how it is managed?
- Uncertainties and confidence limits; the propagation of error.
- Comparing quantities using the t-test, F-test and chi-square test.
- Deciding on the number of tests required.
- Experimental designs, including the randomised block and the factorial experiment.
- Developing process models using regression analysis.
- The practice of conducting and analysing plant trials.
- Time series modelling and cumulative sum charts for analysing plant trials.
- Selecting the best statistical method.

For all courses, a full set of notes is provided for each participant, plus Excel spreadsheets for many of the methods discussed.

A wide range of numerical examples taken from real mineral processing case studies are used to illustrate the methods described. Excel based examples allow participants to develop and refine their analytical skills. Tutorial questions and answers provide a library of additional case studies for future reference.

Online Course

The online course has the same content as the 3-day course but offers participants a flexible and self-paced delivery option. Features of the online course include:

- Self-paced learning.
- Discussion boards which are checked daily by the instructors over the duration of the course.
- Videos of the course creator presenting content with accompanying transcripts/captions.
- Interactive activities to reinforce key concepts.
- Follow along worked Excel examples and accompanying videos.
- Knowledge checks and auto-graded exercises to test learners' knowledge.
- Downloadable exercise spreadsheets and course notes.

2-Day Workshop

The 2-day workshop covers the conduct and analysis of mineral processing plant trials, including paired testing, randomised block designs, analysing trial data by modelling with regression analysis, and cusum charts. The practical aspects of running a trial are also discussed.

The first day covers statistical methodologies, and the second day involves participants working on real case studies in small groups.

Course creator

Professor Tim Napier-Munn has been making sense of mineral processing data for nearly 50 years. He has extensive experience in mineral industry statistics and experimental design, as a practitioner and teacher.

He has given statistics courses for more than 30 years, he consults to mining companies and vendors in the design and analysis of plant trials, and has published over 150 papers on and wrote Statistical Methods for Mineral Engineers.

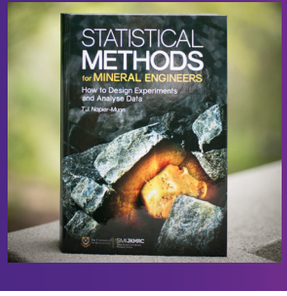
Tim is a recipient of the IOM3 Futer Medal (2009), the AusIMM President's Award (2011), the AusIMM Sir Willis Connolly Memorial Medal (2015), and was the 2016 AusIMM Delprat Distinguished Lecturer.

He is a member of the Editorial Board of Minerals Engineering journal and an Honorary Fellow of the AusIMM.

Prof Tim Napier-Munn

Statistical Methods for Mineral Engineers – How to Design Experiments and Analyse Data

One copy of this Monograph is given to each participant as part of the open course registration, with each in-house course receiving four copies per course delivery. Not included in online course registration.



Statistics training is offered as either an in-house course or an open course.

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