Haward Technology Middle East

## Course Title
Practical Statistical Analysis of Lab Data

## Course Date/Venue
Session 1: January 25-29, 2026/Crowne Meeting Room, Crowne Plaza Al Khobar, KSA
Session 2: October 11-15, 2026/Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE

## Course Reference
LE0030

## Course Duration/Credits
Five days/3.0 CEUs/30 PDHs

*3.0 CEUs (30 PDHs) AWARD*

*H-STK© INCLUDED*

## Course Description

*This practical and highly-interactive course includes various practical sessions and exercises. Theory learnt will be applied using our state-of-the-art simulators.*

The purpose of any analytical measurement is to get consistent, reliable and accurate data. There is no doubt that incorrect measurement results can lead to tremendous costs. In addition, reporting incorrect analytical results at any particular time leads to loss of a laboratory's confidence in the validity of future results. Therefore, any laboratory should do its outmost to ensure measuring and reporting reliable and accurate data within a known level of confidence.

Statistics is an integral part of quality assessment of analytical results. The concept of a frequency distribution, which embodies the behaviour of chance/random fluctuations, is essential for the description of many pertinent aspects of measurement. Statistical Inference based on the theory of probability and random variables, allows reliable conclusions to be drawn from data which are subject to error and variability. A quantitative measurement is always an estimate of the real value of the measure and involves some level of uncertainty. The limits of uncertainty must be known within a stated probability; otherwise no use can be made of the measurement. Analysis must be done in such a way that can provide this statistical predictability.

This course is designed for those faced with analyzing data from laboratories in support of R&D programs, pilot plant studies, plant operations, hospitals, medical centres, municipalities, food manufacturers, environmental protection departments and independent laboratories. Its purpose is to provide information concerning contemporary statistical methodology for individuals in the chemical process and allied industries as well as those in the health care and food fields. Emphasis is placed on the practicality and applicability of the techniques presented.

You will have the opportunity to apply the principles learned to actual problems through the use of illustrative case studies under the guidance of the instructor. The importance of graphical presentation of statistical results is emphasized. More complex statistical analyses and the statistical design of experiments are also presented. Through a combination of lectures and problem-solving sessions, you will learn new statistical techniques that you can put to immediate use in the workplace.

## Course Objectives

Upon the successful completion of this course, each participant will be able to: -

- Apply the correct statistical techniques in analyzing the laboratory data and results

- Carryout measurements with accuracy and precision as well as recognize the sources of bias and variability

- Interpret graphical display of data as well as summarise numerical data

- Measure central tendency and variability as well as interpret their distribution and shapes

- Explain the confidence intervals for means and standard deviation as well as rates and percentages

- Carryout hypothesis tests, one-sample, two sample & paired sample tests as well as one-way & two-way ANOVA and multiple comparison testing

- Discuss experimental design, statistical process control and correlation and regression

## Exclusive Smart Training Kit - H-STK®

*Participants of this course will receive the exclusive "Haward Smart Training Kit" (**H-STK®**). The **H-STK®** consists of a comprehensive set of technical content which includes **electronic version** of the course materials conveniently saved in a **Tablet PC**.*

## Who Should Attend

This course provides an overview of all significant aspects and considerations of practical statistical analysis of lab data for laboratory managers, scientists, engineers, analysts, chemists, lab superintendents/supervisors, R&D managers, manufacturing & production managers and those who need to apply the traditional and modern methods of data analysis.

## Course Certificate(s)

Internationally recognized certificates will be issued to all participants of the course who completed a minimum of 80% of the total tuition hours.

## Certificate Accreditations

Certificates are accredited by the following international accreditation organizations: -

- **British Accreditation Council (BAC)**

  Haward Technology is accredited by the **British Accreditation Council** for **Independent Further and Higher Education** as an **International Centre**. BAC is the British accrediting body responsible for setting standards within independent further and higher education sector in the UK and overseas. As a BAC-accredited international centre, Haward Technology meets all of the international higher education criteria and standards set by BAC.

- **The International Accreditors for Continuing Education and Training (IACET - USA)**

  Haward Technology is an Authorized Training Provider by the International Accreditors for Continuing Education and Training (IACET), 2201 Cooperative Way, Suite 600, Herndon, VA 20171, USA. In obtaining this authority, Haward Technology has demonstrated that it complies with the **ANSI/IACET 2018-1 Standard** which is widely recognized as the standard of good practice internationally. As a result of our Authorized Provider membership status, Haward Technology is authorized to offer IACET CEUs for its programs that qualify under the **ANSI/IACET 2018-1 Standard**.

  Haward Technology's courses meet the professional certification and continuing education requirements for participants seeking **Continuing Education Units** (CEUs) in accordance with the rules & regulations of the International Accreditors for Continuing Education & Training (IACET). IACET is an international authority that evaluates programs according to strict, research-based criteria and guidelines. The CEU is an internationally accepted uniform unit of measurement in qualified courses of continuing education.

  Haward Technology Middle East will award **3.0 CEUs** (Continuing Education Units) or **30 PDHs** (Professional Development Hours) for participants who completed the total tuition hours of this program. One CEU is equivalent to ten Professional Development Hours (PDHs) or ten contact hours of the participation in and completion of Haward Technology programs. A permanent record of a participant's involvement and awarding of CEU will be maintained by Haward Technology. Haward Technology will provide a copy of the participant's CEU and PDH Transcript of Records upon request.

## Course Fee

**US$ 5,500** per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

## Course Instructor(s)

This course will be conducted by the following instructor(s). However, we have the right to change the course instructor(s) prior to the course date and inform participants accordingly:



**Dr. Ian Kaloudis**, PhD, MSc, PGrad, BSc, is a **Senior Analytical Chemist** with almost **30 years** of extensive experience. His expertise widely covers in the areas of **Chemical Analysis**, **Chemical Laboratory**, **Laboratory** Management, **Laboratory** Supervision & Management, **Analytical Laboratory** Management, **Modern Analytical Laboratory**: Management, **Laboratory Consumables Management**, **Laboratory Instrument Calibrations** & Troubleshooting Techniques, Safety and Quality in **Scientific Laboratory**, **Laboratory** Skills, **Pesticides** Application, **PAH**, **VOC**, Advanced Oxidation Processes (**AOP**), **Phenols**, **Cyanotoxins**, Gas Chromatography (**GC**), Mass Spectrometry (**MS**), **GC/MS** Technology & Problem Solving, High Performance Liquid Chromatography (**HPLC**), **HPLC-ICP-MS/ICP-MS**, **Analytical Instrumentation**, Equipment, Safety & Quality (ISO 17025), **Analytical Instrumentation** for Laboratory, **Analytical Chemistry**, **Analytical Laboratory Quality Management System**, **Waste Water Treatment**, **Elucidation** of Mechanisms, **Statistical Analysis of Data**, Statistical Quality Control (**SQC**), Statistics Methods & Measurement Uncertainty, **ISO 17025:2017**, **Food Safety** and **Environmental** Management Systems. He is currently the **Head of Organic Micropollutants Laboratory** of Athens Water Supply and Sewerage Company wherein he is responsible for the development & validation for the determination of organic pollutants in water, research projects related to water quality and development of cyanotoxins analysis laboratory.

All throughout his career life, Dr. Kaloudis had occupied several challenging positions and dedication as **Quality Manager**, **Head of Industrial Waste Water Control Section**, **Consultant**, **Senior Researcher**, **Collaborating Researcher**, **Research Associate**, **Lecturer**, **Trainer** and **Auditor** for various companies such as the KEK DIASTASI - Hellenic Food Authority Training Programs, University of the West of Scotland, Institute of Nanoscience and Nanotechnology (INN), Hellenic Accreditation System (E.SY.D.), Institute of Physical Chemistry, Food Industrial Research and Technological Development Company and Athens Water Supply and Sewerage Company (EYDAP SA).

Dr. Kaloudis has a **PhD** degree in Chemistry (Honors) from the **National and Kapodistrian University of Athens**, a **Master** degree in **Quality Management** from the **University of the West of Scotland**, a **Postgraduate Programme** in **Production Management & Quality Management** from **Technical Educational Institute (TEI) of Piraeus**, a **Bachelor** degree in **Chemistry** (Honors) from **National and Kapodistrian University of Athens**. Further, he is a **Certified Instructor/Trainer**, a **Certified ISO 17025:2017 Auditor**, a **Registered Food Safety and Hygiene Trainer**, a **Certified ISO 9001 Lead Auditor** from International Register of Certificated Auditors (**IRCA**), a **Certified Environmental Management Systems Auditor** from Institute of Environmental Management and Assessment (**IEMA**), a member of the American Chemical Society (**ACS**), a senior member of the American Society for Quality (**ASQ**), a member of the International Water Association (**IWA**), a member of the European Water Platform, a member of the Hellenic Mass Spectrometry Society (**HMSS**), a member of the Italian Society of Toxicology and a member of the Association of Greek Chemists (**AGC**). He has further published numerous journals/books and delivered various trainings, seminars, conferences, workshops and courses globally.

Professor Fatti has **PhD**, **Master** and **Bachelor** degrees in **Statistics & Operations Research**. He is an **active member, ex President, ex Convenor** and **ex Chairman** of the **National Statistical Association**. He is also an active member of the **Institute for Operational Research & Management Sciences** and a **Fellow** of the **Royal Statistical Society**. Further, he held different senior positions in the **IFORS**, **Institute for Statistical Research**, **Water Research Commission's Working Group** on Research Needs in **Water Resources & Surface Hydrology**, **National Certification Council**, **Agrimetrics Institute** and the **Review Panel** for the Biostatistics Unit of the Medical Research Council. He is also an **External Assessor** for the **Academic Reviews** of the **Statistics & Actuarial Science Department** of the **University of Stellenbosch**, the **Statistics Department** of the **University of Port Elizabeth** and the Business Mathematics & Informatics Research Focus Area of the **University of the North-West**. Moreover, he has **63 articles** on **Applications on Statistics**, **18 articles** on **Statistical Methodology**, 1 article on **Statistical Computing** and **13 articles** on **Operations Research**. In addition to this, he has **co-authored two books** on **Environmental Management** and **Stochastic Processes**.

## Training Methodology
All our Courses are including **Hands-on Practical Sessions** using equipment, State-of-the-Art Simulators, Drawings, Case Studies, Videos and Exercises. The courses include the following training methodologies as a percentage of the total tuition hours:-

30%    Lectures
20%    Practical Workshops & Work Presentations
30%    Hands-on Practical Exercises & Case Studies
20%    Simulators (Hardware & Software) & Videos

In an unlikely event, the course instructor may modify the above training methodology before or during the course for technical reasons.

## Accommodation
Accommodation is not included in the course fees. However, any accommodation required can be arranged at the time of booking.

## Course Program
The following program is planned for this course.  However, the course instructor(s) may modify this program before or during the course for technical reasons with no prior notice to participants.  Nevertheless, the course objectives will always be met:

### Day 1

| | |
|---|---|
| 0730 – 0800 | Registration & Coffee |
| 0745 – 0800 | Welcome & Introduction |
| 0800 – 0815 | **PRE-TEST** |
| 0815 – 0900 | **The Importance of Statistics for the Analysis of Lab Data** |
| 0900 – 0945 | **Measurement, Accuracy and Precision** |
| 0945 – 1000 | Break |
| 1000 – 1045 | **Sources of Bias and Variability** |
| 1045 – 1200 | **Random Samples** |
| 1200 – 1215 | Break |
| 1215 – 1300 | **Data** |
| 1300 – 1420 | **Graphical Display of Data** |
| 1420 – 1430 | **Recap** |
| 1430 | Lunch & End of Day One |

### Day 2

| | |
|---|---|
| 0730 – 0830 | **Numerical Summary of Data** |
| 0830 – 0945 | **Measures of Central Tendency** |
| 0945 – 1000 | Break |
| 1000 – 1045 | **Measures of Variability** |
| 1045 – 1145 | **Distributions and Their Shapes** |
| 1145 – 1200 | **Transformations** |
| 1200 – 1215 | Break |
| 1215 – 1330 | **Outliers** |
| 1330 – 1420 | **Statistical Inference** |
| 1420 – 1430 | **Recap** |
| 1430 | Lunch & End of Day Two |

*Day 3*

| 0730 – 0830 | **Confidence Intervals - General Philosophy** |
|---|---|
| 0830 – 0945 | **Confidence Intervals for Means and Standard Deviations** |
| 0945 – 1000 | Break |
| 1000 – 1100 | **Confidence Intervals for Rates and Percentages** |
| 1100 – 1200 | **Hypothesis Testing** |
| 1200 – 1215 | Break |
| 1215 – 1420 | **One-Sample Tests** |
| 1420 – 1430 | **Recap** |
| 1430 | Lunch & End of Day Three |

*Day 4*

| 0730 – 0830 | **Two-Sample Tests** |
|---|---|
| 0830 – 0945 | **Paired-Sample Tests** |
| 0945 – 1000 | Break |
| 1000 – 1045 | **One-Way ANOVA** |
| 1045 - 1200 | **Multiple Comparisons Testing** |
| 1200 – 1215 | Break |
| 1215 – 1300 | **Randomized Blocks** |
| 1300 – 1420 | **Two-Way ANOVA** |
| 1420 – 1430 | **Recap** |
| 1430 | Lunch & End of Day Four |

*Day 5*

| 0730 – 0945 | **Introduction to Experimental Design** |
|---|---|
| 0945 – 1000 | Break |
| 1000 – 1100 | **Statistical Process Control** |
| 1100 – 1200 | **Correlation and Regression** |
| 1200 – 1215 | Break |
| 1215 – 1345 | **Summary & Open Forum** |
| 1345 - 1400 | **Course Conclusion** |
| 1400 – 1415 | **POST-TEST** |
| 1415 – 1430 | Presentation of Course Certificates |
| 1430 | Lunch & End of Course |

## Simulator (Hands-on Practical Sessions)

Practical sessions will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using our state-of-the-art simulator "SPC for Excel Software".



**SPC for EXCEL SOFTWARE**
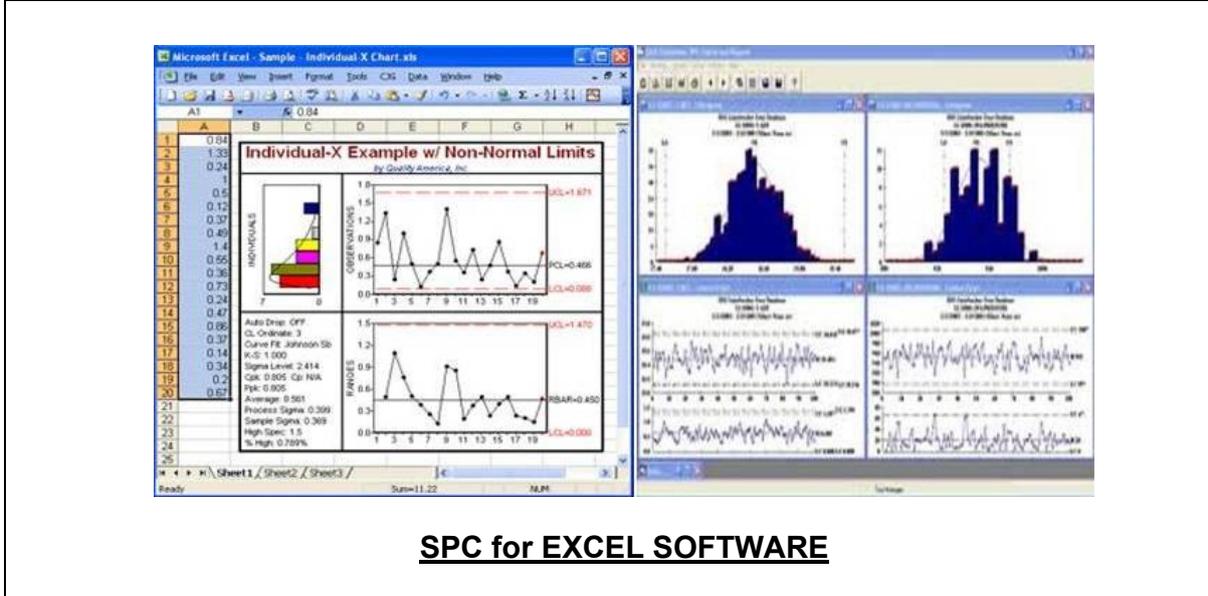
## Course Coordinator

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