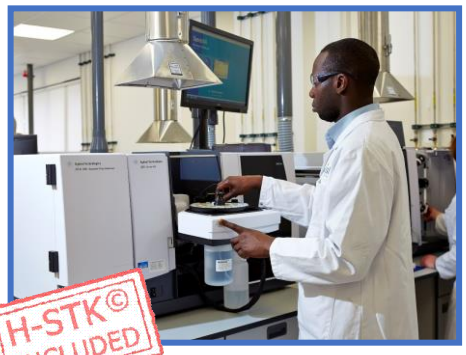
COURSE OVERVIEW LE0530
Inductively Coupled Plasma Application and Analysis

Course Title
Inductively Coupled Plasma Application and Analysis



Course Date/Venue
Session 1: May 11-15, 2025/Meeting Plus 9, City Centre Rotana, Doha, Qatar
Session 2: July 20-24, 2025/Meeting Plus 9, City Centre Rotana, Doha, Qatar
Session 3: October 19-23, 2025/Meeting Plus 9, City Centre Rotana, Doha, Qatar

Course Reference
LE0530

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

Course Description

This practical and highly-interactive course includes real-life case studies and exercises where participants will be engaged in a series of interactive small groups and class workshops.

This course is designed to provide participants with a detailed and up-to-date overview of the practices, techniques and applications of inductively coupled plasma (ICP). It covers the various methodology used for trace elemental analysis including the calibration strategies; the process of sample preparation for inductively coupled plasma spectroscopy and different extraction procedures; the different types of sample introduction procedures for inductively coupled plasmas; and the other resources that include direct current plasma, microwave-induced plasma and glow discharge.

During this interactive course, participants will learn the inductively coupled plasma in atomic emission spectroscopy and the features and functions of spectrometers, detectors and interferences; the latest methodological applications of inductively coupled plasma in mass spectrometry; the selected applications of inductively couple plasma technology and recognize their features and functions; and the data or information in the laboratory and the other selected resources of ICP.

Course Objectives

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

- Apply the latest practices, techniques and applications on inductively coupled plasma (ICP)
- Employ the various methodology used for trace elemental analysis including the calibration strategies
- Carryout the process of sample preparation for inductively coupled plasma spectroscopy and different extraction procedures
- Identify different types of sample introduction procedures for inductively coupled plasmas including the discrete & continuous sample introduction and the hydride & cold vapour techniques
- Introduce the inductively coupled plasma and other resources such as direct current plasma, microwave-induced plasma and glow discharge
- Describe inductively coupled plasma in atomic emission spectroscopy and explain the features & functions of spectrometers, detectors and interferences
- Use the latest methodological applications of inductively coupled plasma in mass spectrometry by identifying the various types of mass spectrometer, detectors and interferences and isotope dilution analysis & mass spectral interpretation
- List down the selected applications of inductively couple plasma technology and recognize their features and functions
- Record data or information in the laboratory and identify the other selected resources of ICP

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 is intended for laboratory personnel and technical staff such as chemists, analysts, chemical engineers, and anybody interested in chemical analysis, research and development, environmental studies, quality control, refineries, petrochemical plants, water and wastewater plants, hospitals and medical centres.

Course Fee

US$ 6,000 per Delegate. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

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 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:

Mr. Nikolas Karnavos, MSc, BSc, is a **Senior Analytical Chemist** with over **30 years** of extensive experience within the **Oil**, **Gas**, **Refinery** and **Petrochemical** industries. His expertise widely covers **Gas & Liquid Chromatograph Process Analysers**, **Process Analyzer Techniques** (**Online** & **Offline**), Laboratory Information Management System (**LIMS**), **Data & Method Validation in Analytical Laboratories**, Laboratory **Automation Techniques**, **Practical Problem Solving in Chemical Analysis**, **Practical Statistical Analysis of Lab Data**, **Chemical Laboratory**, **Analytical Laboratory & Instrumentation**, Laboratory **Health & Safety**, **GLP**, Laboratory **Quality Management** (**ISO 17025**), **ISO 9001** and Medical Laboratory Quality Management (**ISO 15189**). Further, he is also well-versed in Environmental **Online Analyzers** (**Air** & **Water**), **Gas Chromatography** and various instrumental methods of analysis such as **Water Analysis & Quality Control**, **Water and Wastewater Chemical** Analysis, **Statistical Data and Laboratory Analysis**, **Gas** Analysis, **Qualitative Fuel** Analysis, **Environmental Chemical** Analysis, **Laboratory Environmental** Analysis including Water Quality Testing, Process Water and **Wastewater Effluents**, Oily **Sludge Treatment**, Atomic Absorption and Spectroscopic Methods in Analytical Chemistry, **Analytical Method Development** and **Methods of Environmental Measurements** (**Water**, **Air**, **Liquid** & **Solid Wastes**).

Mr. Karnavos was the **Laboratory Manager** of **Exxon** wherein he was responsible for **ISO 17025 certification**, upgrading laboratory equipment in **refinery**, **petrochemical** and **polypropylene** plants, upgrading and extending LIMS, handling the transition plan process of the existing laboratory to a new as well as formulating and executing the plans for applied research and technology transfer. During his career life, he had occupied several significant positions as the **Laboratory Analyst**, **Laboratory Professor**, **Quality Manager**, **Partner & Managing Director**, **Environmental Engineer**, **Process Engineer**, **Environmental Management Corporate Department Head** and **Quality Control & Plastics Application Head** with different international companies like the **AQUACHEM**, **Hellenic Petroleum** (**EXXON**) and **Technological Institute**.

Mr. Karnavos holds a **Master** degree in **Chemical Engineering** and **Bachelor** degrees in **Mechanical Engineering** and **Petroleum Engineering** from the **Aristotelian University of Thessaloniki**, **Technological Institute** and **KATEE Kavala** respectively. He is an **Accredited Trainer** for the Organization for the Certifications & Vocational Guidance (**EOPPEP**), a **Certified Internal Verifier/Assessor/Trainer** by the **Institute of Leadership & Management** (**ILM**), a **Certified Instructor/Trainer** and an **Accredited Environmental Auditor** from the **IEMA**. Further, he is the **President** of Greek **Association of Chemical Engineers** and an active member of various professional engineering bodies internationally like the **IEMA**, **Technical Chamber** of Greece and the **CONCAWE**. He also **published numerous books** and **scientific papers** and delivered various trainings and workshops worldwide.

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*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0930	***Methodology for Trace Elemental Analysis*** *Analytical Terms and their Definitions • Units • Calibration Strategies • Presentation of Data: Tables*
0930 – 0945	*Break*
0945 – 1100	***Methodology for Trace Elemental Analysis (cont'd)*** *Presentation of Data: Graphs • Calculations: Dilution Factors • Quality Assurance and the Use of Certified Reference Materials*
1100 – 1215	***Sample Preparation for Inductively Coupled Plasma Spectroscopy (ICP)*** *Aqueous Samples • Solid Samples*
1215 – 1230	*Break*
1230 – 1420	***Sample Preparation for Inductively Coupled Plasma Spectroscopy (ICP) (cont'd)*** *Extraction Procedures*
1420 - 1430	***Recap***
1430	*Lunch & End of Day One*

Day 2

0730 – 0930	***Sample Introduction Procedures for Inductively Coupled Plasmas*** *Nebulizers • Spray Chambers and Desolvation Systems • Discrete Sample Introduction*
0930 – 0945	*Break*
0945 – 1100	***Sample Introduction Procedures for Inductively Coupled Plasmas (cont'd)*** *Continuous Sample Introduction • Hydride and Cold Vapour Techniques*

1100 – 1215	***The Inductively Coupled Plasma and Other Sources*** *Inductively Coupled Plasma • Direct-Current Plasma*
1215 – 1230	*Break*
1230 – 1420	***The Inductively Coupled Plasma and Other Sources (cont'd)*** *Microwave-Induced Plasma • Glow Discharge*
1420 - 1430	***Recap***
1430	*Lunch & End of Day Two*

Day 3

0730 – 0930	***Inductively Coupled Plasma-Atomic Emission Spectroscopy*** *Fundamentals of Spectroscopy • Plasma Spectroscopy*
0930 – 0945	*Break*
0945 – 1100	***Inductively Coupled Plasma-Atomic Emission Spectroscopy (cont'd)*** *Spectrometers • Fundamentals of Mass Spectrometry*
1100 – 1215	***Inductively Coupled Plasma-Atomic Emission Spectroscopy*** *Inorganic Mass Spectrometry • Detectors*
1215 – 1230	*Break*
1230 – 1420	***Inductively Coupled Plasma-Atomic Emission Spectroscopy (cont'd)*** *Interfaces • Interface • Mass Spectrometer*
1420 - 1430	***Recap***
1430	*Lunch & End of Day Three*

Day 4

0730 – 0930	***Inductively Coupled Plasma-Atomic Emission Spectroscopy- Mass Spectrometry (cont'd)*** *Detectors • Interferences*
0930 – 0945	*Break*
0945 – 1100	***Inductively Coupled Plasma-Atomic Emission Spectroscopy Mass Spectrometry (cont'd)*** *Isotope Dilution Analysis • Mass Spectral Interpretation*
1100 – 1215	***Selection Application of Inductively Coupled Plasma Technology*** *Forensic Science: Document Analysis • Industrial Analysis: Coal*
1215 – 1230	*Break*
1230 – 1420	***Selection Application of Inductively Coupled Plasma Technology (cont'd)*** *Clinical/Biological Analysis: Whole Blood and Urine • Materials Analysis: Gadolinium Oxide*
1420 - 1430	***Recap***
1430	*Lunch & End of Day Four*

Day 5

0730 – 0930	***Selection Application of Inductively Coupled Plasma Technology (cont'd)*** *Environmental Analysis: Soil • Food Analysis: Milk Products*
0930 – 0945	*Break*
0945 – 1100	***Selection Application of Inductively Coupled Plasma Technology (cont'd)*** *Pharmaceutical Analysis*

1100 – 1215	***Further Information: Recording of Data and Selected Resources*** *Recording of Information in the Laboratory*
1215 – 1230	*Break*
1230 – 1400	***Further Information: Recording of Data and Selected Resources (cont'd)*** *Selected Resources*
1400 – 1415	***POST-TEST***
1415 – 1430	*Presentation of Course Certificates*
1430	*Lunch & End of Course*

Practical Sessions

This practical and highly-interactive course includes real-life case studies and exercises:-

Course Coordinator

Reem Dergham, Tel: +974 4423 1327, Email: reem@haward.org