

57th NACRW 2020 Short course on QA/QC

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Module outline

Focus audience: Experts of QA/QC and metrology from industry and academia, MSc students and PhD students of analytical chemistry. Representatives of QA/QC organisations and legislators.

The module consists of three sections that are devoted to the past, the current and future practices and procedures of QA/QC and metrology. It is anticipated that the audience is familiar with QA/QC to a level where they can take part in calculations and problem solving.

Aim of module. It is the aim that participants will be able to:

- Improve their understanding of the concepts of QA/QC
- Perform critical evaluation of QA/QC methodology
- Implement current and new methods of QA/QC
- Apply scientific methodology to laboratory work
- Validating methods and apparatuses
- Participate as expert witnesses in litigations that involve issues of QA/QC
- Managing QA/QC and metrology in the laboratory
- Managing laboratory of analytical chemistry, forensic chemistry, clinical chemistry etc.

Section A

Establish consensus on the current state-of-the art in QA/QC of analytical chemistry and metrology. The focus is ISO standards, fundamental constants and standard reference materials/certified reference materials and the importance of those tools to professional laboratories. Introducing examples and exercises to illustrating the advantages and drawbacks of the methodology. Concepts of error of measurement, uncertainty and confidence intervals are discussed with the aim of using them for purposes of decision making.

Section B

Introduction of new practices and procedures of QA/QC that is currently in progress in the industry. Evaluation of the additions to the current methodology in terms of traceability and

reliability. Performance of apparatuses from the time of commissioning to the end of product lifetime. Discussion of the new concepts of QA/QC that have been introduced by the BIPM/Eurachem publication of Vocabulary in Metrology and the impact it has on analytical chemistry. Adoption of concepts of BIPM and Eurachem/CITAC guides to assess the levels of uncertainty in analytical chemistry. There will be a focus of pitfalls and shortcomings to the practices and procedures of the BIPM Guide to the expression of Uncertainty in Metrology (GUM) and the Eurachem Guide to Quantifying Uncertainty in Analytical Chemistry (QUAM).

Section C

Demonstration of how issues of QA/QC and metrology can be resolved by introduction of extensions to the methodology of QUAM. By building on the principles of QUAM, it is suggested that practices and procedures of QA/QC can be simplified and improved. The application of standard reference materials is discussed with the aim of checking the validity of commercial products. Scientific methodology is introduced as a tool to understand concepts of QA/QC and to evaluate the impact on results of science. The principle of pooled calibrations and consensus science are concepts that may prove useful for QA/QC to be widely accepted by the scientific community. The role of chemometrics in relation to assessment of uncertainty and trueness is considered with focus on correction for the influence of interferences and interpretation of data.