



# AL117: Basic Spectroscopy Techniques (UV, IR, NMR & MS) & Molecule Identifying

## Training Description:

This intensive course covers the Spectroscopy, which has become an important tool in chemical analysis to identify unknown molecules. This course will serve as an introduction to UV, IR, NMR and MS-spectroscopy and their applications in industry and academic work. It is aimed at chemists and engineers who need a practical understanding of spectroscopy. Numerous example applications will be described including basic knowledge of instruments, instrument operation and spectrum identification.

The course also covers instrument and spectrum troubleshooting. The course material is a combination of presentations, documents, software training and instrumental demonstrations as well as case studies.

## Training Objectives:

By the end of the training, participants will be able to:

- ✓ Familiarize with the tools and techniques used in spectroscopy analysis and qualitative and quantitative methods
- ✓ Provide the skills, knowledge and understanding of principles and practices of spectroscopy analysis
- ✓ Understand the recent molecule identification methods
- ✓ Provide all the necessary tools for users to expand their knowledge of analysis using spectroscopy technology
- ✓ Solve instrumental and molecular identifying problems

## Training Designed for:

This course is intended for Chemists, Lab Technicians, Chemical Engineers, Instrument Engineers and Lab Supervisors.

## Training Program:

### FIVE DAYS:

- ❖ PRE-TEST
- ❖ Introduction
- ❖ Ultraviolet Spectroscopy
  - The nature of electronic excitations
  - Principles of absorption spectroscopy
  - Ultraviolet spectrum
  - Solvent effect
  - Effect of conformation and geometry
  - Fieser-Kuhn rules for polyenes
- ❖ Infrared Spectroscopy (IR):
  - Mode of vibration and bending
  - Bond properties and absorption trends
  - IR spectrometer
  - Reading of the spectra
  - A survey of the important functional groups with examples
  - Nuclear magnetic resonance spectroscopy



- Nuclear spin states and magnetic moments
  - Mechanism of energy absorption (resonance)
  - The chemical shift and shielding
  - Chemical equivalence integrals
  - NMR spectrometer
  - The <sup>1</sup>H and <sup>13</sup>C NMR spectra of important molecules
  - Two-dimensional NMR spectra
- ❖ **Mass Spectroscopy (MS):**
- Molecular formulas from isotope ratio data
  - Some fragmentation patterns
  - The mass spectrum
  - Mass spectrometer
  - Spectrum of many examples
  - Problems and troubleshooting
  - Exercises and discussion
  - More details of the course outline can be provided on request.
- ❖ **Course Conclusion**
- ❖ **POST-TEST and EVALUATION**

### Training Requirements:

“Hands-on practical sessions, equipment and software will be applied during the course if required and as per the client’s request.”

Please note that the above topics can be amended as per client’s learning needs and objectives. Further, it should be forwarded to us a month prior to the course dates.

### Training Methodology:

This interactive training course includes the following training methodologies as a percentage of the total tuition hours:

- 30% Lectures, Concepts, Role Play
- 70% Workshops & Work Presentations, Techniques, Based on Case Studies & Practical Exercises, Software & General Discussions
- Pre and Post Test

### Training Certificate(s):

Internationally recognized certificate(s) will be issued to each participant who completed the course.

### Training Fees:

**As per the course location** - This rate includes participant’s manual, hand-outs, buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Note: The 5% VAT (Value Added Tax), will be effective starting 01st of January 2018 as per the new regulation from the UAE Government. The VAT applies for all quotation both for local and abroad.



## Training Timings:

### Daily Timings:

07:45 - 08:00	Morning Coffee / Tea
08:00 - 10:00	First Session
10:00 - 10:20	Recess (Coffee/Tea/Snacks)
10:20 - 12:20	Second Session
12:20 - 13:30	Recess (Prayer Break & Lunch)
13:30 - 15:00	Last Session

### For training registrations or in-house enquiries, please contact:

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Training & Career Development Department

