Training Courses

- Bruker Optics Course Offer

Innovation with Integrity
The fast progress in the fields of analytics and R&D requires the knowledge of the current methods of the IR spectroscopy and its latest developments.

Next to on-site individual customer trainings Bruker Optics performs for almost 30 years international customer training courses.

You learn the functionality of the Mid-IR, Near-IR and Raman spectroscopy under expert guidance as well as how to use it with different and optimized measurement techniques.
Our Course Offer

The courses are divided and treated in two weeks. The major subject areas (M) IR, NIR and Raman applications.

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On the next pages get more detailed information about our courses.
**Near-IR Users Training**

- **OPUS Basics for Near-IR User**
  The course OPUS for NIR Applications addresses to all users who do not have much experience with the spectroscopy software OPUS. Special attention will be paid to the requirements of those users who work in the field of NIR applications, i.e., only functions being relevant for the NIR spectroscopy are taken into consideration.
  - NIR spectroscopy
    - Measurement techniques, accessories
    - Applications
  - Introduction into OPUS and OPUS/LAB
    - General operations
  - Simple functions for spectra processing
    - (e.g., normalization, derivatives)
  - User administration
    - Setting up users
    - Customizing the user interface
    - Working according to GMP
  - Overview of the OPUS packages

- **OPUS/QUANT Quantitative Analysis with PLS**
  The practical course for the OPUS/QUANT software package offers a short introduction into the theory of multivariate calibration. The attendees learn the use of the OPUS/QUANT software with the help of many practical NIR examples.
  - Quantitative Analysis
    - Basic theory of PLS
    - Sample selection
    - Impacts of reference methods
  - OPUS/QUANT
    - Setting up a QUANT method
    - Calibration and optimization
    - Method Validation
    - Displaying and plotting the calibration results
    - Quantitative analysis
  - QUANT examples with exercises on the PC data stations

- **OPUS/IDENT and related qualitative Methods**
  The basics of NIR spectra identification are explained with the help of practical examples and the possibilities of the IDENT software are shown. The attendees learn to build up multilevel IDENT libraries and to validate them.
  - Basics
    - Pre-treatment of data
    - Comparison of spectra
    - IDENT algorithms
    - Factorization
  - IDENT software
    - Library structure
    - Validation
  - Practical applications of the IDENT software
    - Raw material control

- **CMET Process Software**
  The CMET software is explained step-by-step. The attendees are working in parallel at laptops on different examples with increasing complexity. Different strategies for creation of a process scenario are explained.
  - CMET Configurator
    - Spectrometer setup
    - Product setup
    - IO setup
    - Scenario setup
  - CMET Runtime
  - Trend Chart

- **Qualification and Validation Topics**
  - Qualification of NIR spectrometer
  - Software validation
  - Compliance to 21 CFR part 11
  - Use of OPUS in a GMP compliant environment
**Introduction into IR Spectroscopy**
The training mediates the basics of the Infrared spectroscopy.
Next to theoretical introduction into the principals of the FTIR spectroscopy, the training covers the typical MIR sampling techniques.
- Principals of the FTIR spectroscopy
- Basic construction of an FTIR spectrometer
- Sample preparation and basic measurement techniques (Transmittance, ATR, Reflectance)
- Practical exercises

**OPUS Basics for IR User**
The basic knowledge of the OPUS spectroscopic software will be trained. MIR example spectra (from quality control applications) will be used for the exercises in data processing and data evaluation.
- Main functions of spectra treatment
- Identification by use of correlation functions
- Identification with spectra libraries
- Quantification by use of Lambert-Beer

**Sample Preparation and Surface Techniques**
- Basic sample preparation
  - KBr/PE-pellets
  - Nujol suspensions
  - Liquid cells
- Attenuated total reflection (ATR)
  - Micro-ATR units
  - ATR materials
- Specular reflection and IRRAS
  - Kramers-Kronig-transformation
  - Polarisation modulation technique (PMA 50: PM-IRRAS and Vibrational Circular Dichroism (VCD))
- Diffuse reflection (DRIFT)
  - Measurement accessories
  - Effects of dilution and morphology
- Photoacoustic spectroscopy (PAS)
- Practical exercises
Coupling Techniques
- Thermogravimetric FTIR coupling TGA-/DSC-IR
- Chromatographic FTIR coupling, GC-, GPC-, HPLC-IR
- OPUS/CHROM and OPUS/3D
- Digital library search

Rapid Scan/Step Scan
- Time-resolved FTIR spectroscopy: Rapid Scan and Step Scan
  Based on examples, criteria are derived which help the user to choose the suitable technique for his application.
  - Technical preconditions
  - Step Scan: Reproducible kinetics
  - Step Scan: Trigger schemes, parameters and data acquisition
  - Rapid Scan: Time-resolved single event reactions
  - Rapid Scan: Method editor
  - Limits of time resolved spectroscopy
  - Practical sessions including OPUS/3D

IR Microscopy
- IR microscopy with LUMOS and HYPERION:
  - Practical aspects of IR microscopy
- IR microscopy measurements
  - Sample preparation and handling
  - Measurements in ATR, Reflectance, Transmittance and Gracing incidence (GIR) characteristics and procedures
  - System test and OVP
  - Two-dimensional measurements with OPUS Wizard
- Measurement exercises with LUMOS and HYPERION (in groups)
- Individual questions
- 3D Data evaluation

OPUS/3D Evaluation
- Evaluation and handling of spectral data of IR- and Raman microscopy:
  - Chemical Imaging
    - Properties and display options of the chemical imaging window
  - Representation of spatially resolved measurements
  - Evaluation functions for spatially resolved measurement data
  - Integration and live-Integration
  - Standard 3D manipulation functions
  - Traces and spectra calculator
  - Regression of components, chemical images and multi-component subtraction
  - Cluster analysis, factorization, RGB and WTA
  - Library search
  - Export of data
  - practical sessions
  - handling of user topics
  Handling of IR- or Raman microscope are not included - see training courses „IR Microscopy“ and „FT & dispersive Raman Spectroscopy“.

Life Science/Protein/Microbiology
- Protein analysis / Microbacterial Identification
  - Protein conformation analysis
  - Protein concentration
  - Secondary structure
  - Food relevant and clinical microorganisms

FT- & dispersive Raman Spectroscopy
- Introduction to Raman spectroscopy
  - The Raman effect
  - Configurations of dispersive and FT-Raman spectrometers
- Application areas
- FT-Raman spectroscopy
  - Instrumentation, components, accessories
  - Applications
- Raman microscopy
  - Instrumentation, components, accessories
  - Applications
  - Measurement and data evaluation
  - Acquisition of Raman spectra & images with the Video Wizard
  - Methods to suppress and avoid fluorescence
  - Data evaluation with OPUS/3D
General Hints to the Bruker Optics Training Courses

Venue:
Bruker Optics, Ettlingen, Seminar rooms

Time:
Lectures and practical exercises: 09.00 - 17.00 h
Two Coffee breaks
Lunch in the cafeteria of Bruker Optics

Lectures and Trainers:
Bruker Optics application specialists

Course Documentation:
The corresponding documentation will be handed over to the attendee during each course day.

Course Fees: (for 2018)
Per day:
€ 660,- Industry
€ 369,- University and non-commercial institutes (excluding VAT, travel costs and the hotel accommodation)

Including:
- Training possibilities at data stations and spectrometers
- Support of experts
- Documentation in English
- Subsequently certificate of attendance
- Lunch and snacks
- Taxi transfer: hotel -> Bruker Optics -> hotel

Attendance:
For efficient realization of the courses the minimum number of attendees is 8, the maximum number is 25 persons.

Registration and Confirmation:
For your course registration please get in contact with your local Bruker representative. He will send you the Bruker Optics Registration Form including all important topics like Personal Invitation Letter, VISA Application Form, Airport Transfer Information, etc.
Upon receipt of the written registration, you will receive an acknowledgment of receipt. A binding, written confirmation of participation with travel information will be sent to you at the latest 5 weeks before the start of the course. If the number of attendees is too small, a course can be cancelled no later than 5 weeks before beginning of the course. Force majeure or illness of several trainers allows the cancellation at any time.

Journey and Accommodation:
The organization of the journey is the responsibility of the participants. We will be happy to book your hotel accommodation. We ask you to pay the cost of accommodation directly at the booked hotel upon departure. Please notice that additional costs may arise, such as parking fees.

Hotel Recommendation:
Stadthotel Engel Kronenstr. 13, 76275 Ettlingen, Tel: +49 7243 330-0, www.stadthotel-engel.de
Price per night incl. breakfast: approx. EUR 80,-

Certificate of attendance:
For each performed course the attendees will get a certificate of attendance that can be used as training certificate.