

Instrument Training Modules, S&T, Dept. of Chem., Sept. 2, 2020

Training Module	Organization of Training	Content of Training
Shimadzu QP-2020 GCMS		
GCMS the VERY Basics for Dummies Lecture/Lab Combined	Training Period: 2 hours Capacity: 2-4 Students (TAs and Profs) Offered: Week before and First week of Fall and Spring Semesters	The very basics of use for the GCMS using a routine or standard method for the delivery of education. Access of the instrument, setting up a singular sequence and/or utilizing a preprogrammed sequence, automated sampling use, and protecting the instrument is covered. Changing columns and more complex sequences are not covered.
GCMS Basics – Lecture Co-Registration with lab portion required PM in Fall; AM in Spring	Training Period: Minimum of 8 hours in 2-3 hour blocks delivered over the course of 2 weeks. Capacity: 6-8 students Offered: Starts first week of Sept., Feb., and June respectively; details will be announced	Basics of GC and MS necessary to method development; sample preparation and solvent selection, GC and MS method development and how to protect the instrument; sample sequence building.
GCMS Basics - Lab Prerequisite: GCMS Basics – Lecture PM in Fall; AM in Spring	Training Period: Minimum of 12 hours in 2-2.5 hour blocks delivered over the course of 4 weeks. Capacity: 1-2 students	Lab housekeeping, hands-on introduction to the software, method and sequence building practice with a focus on how to get good data, analysis of actual liquid samples, data analysis, database searching and validation of results, report formatting and generation.
GCMS - Headspace Analysis Prerequisite: GCMS Basics – Lab	Training Period: 2 hours Capacity: 1-2 students Offered: Nov. and April	Use of the GCMS for headspace sample analysis.
GCMS - SPME Analysis Prerequisite: GCMS Basics – Lab	Training Period: 2 hours Capacity: 1- 2 students Offered: Nov. and April	Use of the GCMS for sample analysis using solid-phase microextraction.

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Thermo Nicolet iS50 FTIR		
FTIR General AM in Fall; PM in Spring	Training Period: 3 hours Capacity: 1-2 students Offered: Sept. & Oct., Feb. & March, and June, respectively; details will be announced	Lab housekeeping, a few fundamentals regarding FTIR, experiment configuration, data acquisition using the main sample compartment and the built-in ATR using liquid and solid samples; data display, formatting, and saving; a little data interpretation; analysis of user samples; cleanup.
FTIR – Pressing Solid Samples Prerequisite: FTIR General	Training Period: 1 hour Capacity: 1-2 students Offered: As needed.	Pressing of solid samples for analysis in transmission mode. (Due to the popularity of the ATR method, this topic is no longer covered in the general training.)
FTIR Advanced - Near-IR Prerequisite: FTIR General	Training Period: 2 hours Capacity: 1-2 students Offered: As needed.	Use of the FTIR in the near-IR range.
FTIR Advanced - Far-IR Prerequisite: FTIR General	Training Period: 2 hours Capacity: 1-2 students Offered: As needed.	Use of FTIR in the far-IR range.
Magritek Spinsolve Benchtop NMR		
Benchtop NMR – Basics	Training Period: 2 hours Capacity: 1-2 students Offered: As needed.	Lab housekeeping, sample prep, shimming the magnet, acquisition of ^1H and ^{13}C spectra, data interpretation, analysis of user samples.
Benchtop NMR – Advanced Prerequisite: FTIR General	Training Period: 3 hours Capacity: 1-2 students Offered: As needed.	Multidimensional and multinuclear experiments.

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Edinburgh Instruments FS5 Fluorescence Spectrometer		
Fluorescence – Basics	Training Period: 3 hours Capacity: 1-2 students Offered: Nov., April, July	Lab housekeeping, fundamentals regarding fluorescence, emission scans vs. excitation scans and Ex/Em mapping and acquisition of each, user samples and ways to look at the data.
Fluorescence – Lifetime measurement	Training Period: 2 hours Capacity: 1-2 students Offered: As needed.	Use of the instrument to measure fluorescence lifetimes.
Fluorescence – Phosphorescence	Training Period: 2 hours Capacity: 1-2 students Offered: As needed.	Use of the instrument to measure phosphorescence lifetimes.
Fluorescence – Quantum Yield	Training Period: 2 hours Capacity: 1-2 students Offered: As needed.	Use of the instrument to determine quantum yields.
Exeter CE-440 CHN Analyzer		
CHN – Basics	Training Period: 1 day Capacity: 1-2 students Offered: Scheduled on request.	Lab housekeeping; instrument theory, practice, and limitations; sample prep including use of the microbalance; preparation, calibration and checking of the instrument, student sample runs and data quality; troubleshooting.
CHN – Low-combustible Samples (Lecture only)	Training Period: 1 hour Capacity: Small group Offered: Scheduled on request.	Analysis of samples with low combustible content.

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Sartorius ME5 Microbalance		
Microbalance Use	Training Period: 1 hour Capacity: 1-2 students Offered: Scheduled on request.	Proper use of the microbalance (for anyone using it not in conjunction with instruments in the Shared Instrument Lab).
Abbe Mk II Refractometer		
Refractometer Use	Training Period: 1 hour Capacity: 1-2 students Offered: Scheduled on request.	Proper use of the refractometer, including limitations on measurement, sample application and cleanup.
Electrothermal Digital Melting Point Apparatus		
Melting Point Measurement	Training Period: 2 hours Capacity: 1-2 students Offered: Scheduled on request.	Proper use of the digital melting point apparatus.
TA Instruments Q50/Q500 (TGA) Thermogravimetric Analyzer		
<i>DoC Q50 is out of service. Dr. VanDeMark's Q500 will eventually be incorporated into the Shared Instrument Lab</i>		
Thermal Decomposition	Training Period: Two 1 hour sessions/same day separated by sample run time Capacity: 1-2 students Offered: Scheduled on request.	<u>Session 1:</u> Lab housekeeping, sample prep, instrument ops guidelines, basic method development, method editing. <u>Session 2:</u> Basic data analysis, pan cleaning, instrument shutdown.

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<p>TA Instruments Q2000 (DSC) Differential Scanning Calorimeter <i>Prior to using DSC, decomposition temperature must be determined via TGA or other method and documentation shown.</i></p>		
Conventional DSC	Training Period: Two 1 hour sessions/same day separated by sample run time Capacity: 1-2 students Offered: Scheduled on request.	<u>Session 1:</u> Lab housekeeping, sample prep, instrument ops guidelines, basic method development, method editing. <u>Session 2:</u> Basic data analysis, instrument shutdown.
Modulated DSC Prerequisite: Conventional DSC	Training Period: Two 1 hour sessions/same day separated by sample run time Capacity: 1-2 students Offered: Scheduled on request.	<u>Session 1:</u> Sample prep, modulation parameters, method development. <u>Session 2:</u> Data analysis, shutdown.
<p>Agilent Cary-5000 UV-Vis</p>		
Solutions Spectrum	Training Period: 1.5 hours Capacity: 1-2 students Offered: Scheduled on request.	Lab housekeeping, sample preparation, dilution, instrument parameters and operation.
Diffuse Reflectance	Training Period: 1.5 hours Capacity: 1-2 students Offered: Scheduled on request.	Baselines, sample preparation, instrument parameters and operation.
<p>Frigimat Cub Dry Ice Maker</p>		
Dry ice generation	Training Period: 0.5 hours Capacity: 1-2 students Offered: Scheduled on request.	Safety, operation, block formation, handling, liquid CO ₂ monitoring.