Summer Session 2014 Professional Science Master’s Courses

We are offering 1 and 2 credit laboratory modules during this summer session. Laboratory modules span 2 or more days and combine hands-on experiments with lectures on the theoretical background. Any number and combination of modules may be taken and the credits applied toward undergraduate or graduate degrees. **Graduate tuition rates apply.** These sections are **not** open to enrollment through the Center for Continuing Studies (CCS).

The modules are listed below. Please contact elaine.mirkin@uconn.edu for permission numbers. Seats are limited.

MCB 5670-03 and MCB 5671-02 utilize the Illumina MiSeq, an extremely useful and cost-effective Next Generation Sequencing instrument for a wide range of uses applicable to eukaryotic and prokaryotic genomics. Our advanced modules focus on microbiological applications including small genome sequencing, ultra-deep 16S rRNA gene sequencing and transcriptomes. The chemistry, library preparation, and data analysis is identical to the Illumina HiSeq instrument. Please contact joerg.graf@uconn.edu for additional information on these courses.

MCB 5429-1 utilizes the Next Generation Sequencing application of RNA-Seq using Ion Torrent Proton™ chemistry. This advanced module focus on RNA-Seq application of whole transcriptome sequencing. Please contact bo.reese@uconn.edu for additional information on this course.

Please keep the following in mind. A request for a permission number and registration in any one of the courses is a commitment to complete the course. Please do not request a permission number until you are sure of your commitment. All of the courses are very popular and once a permission number is issued that spot is no longer available to another student.

Information on graduate tuition and fees for summer session can be found on the Summer Session website under Fees and Dates.

**INTRODUCTORY LEVEL (appropriate for any student, including those with little or no research experience)**

MCB 5427-001 Laboratory Techniques in Functional Genomics (Course ID 002558)
Topic - Introduction to Molecular Biology Techniques (Topic Link ID 271)
Dates: May 14 (4 to 6 p.m.), May 15, and May 16, 2014; 9 a.m. to 5 p.m.
1 credit
Enrollment Limit 12
Instructors: Brianna Flynn and Charles (Charlie) Giardina
Room Beach 204
Contact Elaine Mirkin for permission number.
This course is required for all intermediate level MCB modules for any students who have not had prior laboratory experience in molecular genetics techniques, including DNA gel electrophoresis and PCR.

MCB 5670-02 Theory and Practice of Laboratory Techniques in Microbiology (Course ID 016291)
Topic – Bacterial DNA & RNA Isolation and Quality Control (Topic Link ID 8244)
Dates: June 6, June 7, and June 8, 2014; 9 a.m. to 5 p.m.
1 credit
Enrollment Limit 12
Instructors: Joerg Graf and Emily McClure
Room TLS 207
Contact Elaine Mirkin for permission number.
In a comparative approach, where students compare the results using different methodologies, students will gain insight into DNA/RNA isolation and quality control. Students will isolate DNA and RNA using classical techniques and kits. If interested, students can bring their own samples. Quantification and quality assessment will be done using a Nanodrop, Qubit ( fluorometer), Bioanalyzer 2100, and QIAxcel. Students will compare different isolation and quantification methods. The course includes training on Bioanalyzer 2100, Qubit and QIAxcel.

“Bacterial DNA & RNA Isolation and Quality Control” is only offered once every two years. This module offers important insight into widely used molecular biology methods and provides participants with the knowledge required for quantifying DNA, RNA, and next-generation sequencing libraries.

**INTERMEDIATE LEVEL (requires prior research experience or completion of MCB 5427 Introduction to Molecular Biology Techniques)**

“Operations of the Illumina MiSeq” is the prerequisite for “Characterization of Microbial Communities by 16S rRNA Gene Sequencing” and preferential enrollment will be given to those students who enroll in both “Operations of the Illumina MiSeq” and “Characterization of Microbial Communities by 16S rRNA Gene Sequencing”.

MCB 5670-03 Theory and Practice of Laboratory Techniques in Microbiology (Course ID 016291)
Topic – Operations of the Illumina MiSeq (Topic Link ID 8242)
Dates: May 12 and May 13, 2014; 9 a.m. to 5 p.m.
1 credit
Enrollment limit 6
Instructors: Joerg Graf and Michael Nelson
Room BPB 401
Contact Elaine Mirkin for permission number.
In this module students will receive training on how to operate an Illumina MiSeq, Agilent Bioanalyzer, and Qubit. Theory of sequencing by synthesis, quality assessment, and data analysis will be discussed. Participants will be given an overview of the different applications for the MiSeq that include small genome sequencing, microbial transcriptome sequencing, and ultra-deep 16S rRNA gene sequencing. The successful completion of this module is required for users to gain independent access to the MiSeq. Prerequisite is MCB 5427 Introduction to Molecular Biology Techniques, relevant research lab experience, or permission of instructor.

**ADVANCED LEVEL (Please see prerequisite requirements for the individual courses listed below)**

MCB 5429-1 Theory and Practice of High Throughput Sequence Analysis (Course ID 015160)
Topic – Whole Transcriptome Sequencing (Topic Link ID 7179)
Dates: May 20, May 21, May 22, and May 23, 2014; 9 a.m. to 5 p.m.
2 credits
Enrollment limit 6
Instructor: Bo Reese
Location: Beach 201
Contact Elaine Mirkin for permission number.
In this module, each student will prepare an RNA-Seq library for whole transcriptome sequencing on the Ion Torrent Proton™ system. Students that wish to bring a sample of their own for sequencing can do so if the sample meets our preliminary QC requirements. (NOTE: please contact the instructor directly as soon as enrollment in confirmed to schedule the preliminary sample QC). The sequencing will be done using the Ion Total RNA-Seq library kit, v2. Students will also learn how to use an Agilent Bioanalyzer and Qubit instruments in addition to the Ion Torrent Proton ancillary equipment. Theory of sequencing by synthesis, quality assessment and data analysis will be discussed for Ion Torrent Proton™ and other NextGen platforms, in addition to all other major NextGen sequencing applications. The successful completion of this module is required for users to gain independent access to the Ion Torrent Proton™. The minimum prerequisite for this course is MCB 5427 Introduction to Molecular Biology Techniques. Relevant research lab experience and familiarity with Next Generation Sequencing is also highly recommended.
In this module, each student will sequence the 16S rRNA genes of a microbial community. Students will learn how to prepare the libraries for running on the MiSeq and analyze the data after the run is completed. The data analysis involves a QIIME pipeline specifically modified for using the larger Illumina data sets. Prerequisite is “Operations of the Illumina MiSeq” or permission from the instructor.