ANAT5105 Fluorescence in Bioanalytical Research 2015 4 ECTS

Responsible teacher: Professor Pekka Hänninen
Study objectives: Starting from the basics of fluorescence the students are familiarized with fluorescence measurement techniques, instrumentation, related chemistry and biochemistry and applications of fluorescence in bioanalytical research.
Content: Fluorescence basics, Instrumentation and optical components, Spectroscopy, Light detectors and light sources, Labels and label chemistry, Fluorescence applications: FRET, FCS, FRAP, microscopy, cytometry, immunoassays.
Modes of Study: Lectures, written essay, written exam
Evaluation: 1-5
Study Materials: Joseph R. Lakowicz "Principles of Fluorescence Spectroscopy" (Kluwer Academic/Plenum Publishers)

Lecture and topics	Time	
Lecture 1 Chapter 1: Introduction to fluorescence	16.09 10-12	2 hours
Lecture 2 Chapter 2: Instrumentation for fluorescence spectroscopy Detection	18.09 10-12	2 hours
Lecture 3 Chapter 3: Fluorophores Chapter 20: Novel fluorophores Nanoparticles and examples	23.09 10-12	2 hours
Lecture 4.1 Chapter 4: Time-Domain Lifetime Measurements Chapter 5: Frequency-Domain Lifetime Measurements	25.09 10-11	1 hour
Lecture 4.2 Chapter 13: Energy Transfer Chapter 22: Fluorescent lifetime Imaging Microscopy	25.09 11-12	1 hour
Lecture 5 Chapter 6: Solvent and Environmental Effects Chapter 7: Dynamics of Solvent and Spectral Relaxation Chapter 8: Quenching Fluorescence Chapter 9: Mechanisms and Dynamics of Fluorescence Quenching Chapter 19: Fluorescence sensing Aqsens	30.09 10-12	2 hours + 1hour
Lecture 6.1 Chapter 10: Fluorescence Anisotropy Chapter 11: Time-Dependent Anisotropy Decays Chapter 12: Advanced Anisotropy Concepts	02.10 10-11	1 hour
Lecture 6.2 Chapter 16: Protein Fluorescence Chapter 17: Time-Resolved Protein Fluorescence	02.10 11-12	1 hour
Lecture 7 Chapter 23: Single-Molecule Detection Chapter 24: Fluorescence Correlation Spectroscopy Super resolution	07.10 10-12	2 hours

Lecture 8 Fluorescence as a tool of microscopy	09.10 10-12	2 hours
Lecture 9 Chapter 18: Multiphoton Excitation and Microscopy	14.10 10-11	1 hour
Lecture 10 Chapter 21: DNA Technology Microarrays	14.10 11-12	1 1our
Lecture 11 High Content Screening	16.10 10-12	1 hour
Lecture 12 Biosensors	21.10 10-12	2 hours
Q&A	23.10	1 hour

All the lectures will be held in DataCity, auditorium Bra2101.

Registration for the course by 9th of September, 2015 to tbi-office@bioimaging.fi

Contact: tbi-office@bioimaging.fi