RUTGERS
UNIVERSITY | NEWARK

Graduate Evening Courses in Chemistry, Fall 2021:

PHYSICAL • ORGANIC • BIOCHEMISTRY
X-RAY CRYSTALLOGRAPHY

- The Chemistry Department at Rutgers Newark (http://chemistry.rutgers.edu/) will offer Graduate Courses in Physical Chemistry, Organic Chemistry, Biochemistry, and X-ray Crystallography in Fall 2021.
- **Where:** The courses will be offered in person at the Rutgers-Newark campus in Smith Hall Room 242 (SMT-242), 101 Warren Street, Newark, NJ or in the adjacent Life Science Center I, Room 103, 225 University Ave, Newark, NJ.
- Register HERE or scan the code

Principles of Spectroscopy (26:160:540)

MONDAYS 6:00 - 9:00 PM **Smith Hall Room 242**

Instructor: Prof. Piotr Piotrowiak PIOTR@NEWARK.RUTGERS.EDU

The course lays down the general theoretical groundwork necessary for the understanding of the interaction between electromagnetic radiation (light) and matter. Practical illustrations will be drawn primarily from electronic and vibrational spectroscopy, however, the main objective is to provide broad conceptual and formal basis applicable to any type of spectroscopy, from routine UV-vis absorption to multidimensional NMR. The course begins with a brief review of undergraduate quantum mechanics and proceeds to introduce the concepts of transition probability, absorption, emission, dispersion, stimulated emission and laser action. Students will use scientific graphing and analysis software which will allow them to explore the response of equations to physically meaningful variables and parameters. In this fashion, a deeper and more intuitive understanding of the underlying physics is achieved.

Biochemistry (26:160:581)

TUESDAYS/FRIDAYS 6:00 - 7:20 PM **Synchronous Remote**

Instructor: Prof. Frank Jordan FRJORDAN@NEWARK.RUTGERS.EDU

This course introduces the structural aspects of the four major classes of biopolymers: nucleic acids, carbohydrates, proteins, and lipids, with a significant emphasis on proteins and enzymes. It also introduces methods for separation of proteins and nucleic acids, and some biological spectroscopy. Finally, the course introduces the important topic of metabolic pathways, concentrating on sugar metabolism and its utility in the citric acid cycle.

Organic Reaction Mechanisms (26:160:564)

WEDNESDAYS 6:00 - 9:00 PM **Smith Hall Room 242**

Instructor: Prof. Michal Szostak MICHAL.SZOSTAK@NEWARK.RUTGERS.EDU

This course will cover fundamental aspects of writing mechanisms for organic reactions. Basic principles and reaction types will be reviewed with a focus on mechanistic understanding and synthetic applications. The course is aimed to serve as a bridge between undergraduate and graduate curriculum. The course is aimed at both beginning graduate and advanced undergraduate students with interests in organic chemistry, reaction mechanisms, chemical engineering, biochemistry, and polymers. The course will begin with a brief review of undergraduate organic chemistry to introduce the basic reactions of alkenes, alkynes, nucleophilic substitution, elimination, carbonyl reactivity, aromatic reactions and amines. Attention will also be given to heterocycles, named reactions, and reactions of interest in

industry. Students are expected to become familiar with drawing reasonable mechanisms in organic chemistry, be able to recognize basic chemistry of functional groups, become familiar with different types of organic reactions and develop an approach to drawing mechanisms of common and new organic reactions.

Crystal and Molecular Structure (26:160:535)

THURSDAYS 6:00 - 9:00 PM **Smith Hall Room 242**

Instructor: Prof. Roger Lalancette ROGERLAL@NEWARK.RUTGERS.EDU

This course will cover the basics of X-ray structural analysis. Some of the topics discussed will be: symmetry, point groups, space groups, Bragg's law, Miller indices, reciprocal space, electron density and Fourier analysis, structure factors, Friedel's law, the phase problem, Laue groups, direct methods, least-squares structure refinement, statistics, "twinning", hydrogen atoms. Practical aspects of growing crystals and keeping them "alive", and choosing and mounting crystals will be given. A lecture by Dr. Pierre LeMagueres from Rigaku on the use of our new CrysAlisPro diffractometer will be scheduled. Discussion of how one presents structural results for publication is part of this course. Each student will be expected to collect a dataset on his/her own crystal (if they do not have one, an unknown material will be supplied), then solve the structure, and prepare a "for publication" writeup for this material.