Graduate Evening Courses in Chemistry, Fall 2023
INORGANIC • ORGANIC • MATERIALS

- The Chemistry Department at Rutgers Newark (http://sasn.rutgers.edu/chemistry) will offer Graduate Courses in Inorganic, Organic, and Materials Chemistry in Fall 2023.
- **When/where:** Courses will be held in Smith Hall once a week from 6:00 to 9:00 PM
- Register [HERE](http://sasn.rutgers.edu/chemistry) or scan the code

**Special Topics in Inorganic Chemistry (26:160:579): Coordination Chemistry Applied to Catalysis**
**THURSDAYS 6:00 - 9:00 PM**
**SMITH 240**

**Instructor:** Prof. Demyan Prokopchuk DEMYAN.PROKOPCHUK@NEWARK.RUTGERS.EDU

This course will cover classical and modern aspects of coordination chemistry to transition metals and its impact on catalysis. Fundamental ligand design principles such as coordination number, binding mode, charge, and steric effects will be presented. The coordination of different ligand classes to transition metals will be correlated with reactivity trends and catalytic activity. Transition metal catalyzed reactions such as olefin metathesis, cross-coupling, hydrogenation, and N₂ reduction will be discussed in detail, particularly focusing on how the surrounding ligand environment dictates product selectivity and catalytic activity. The thermodynamics of M-H bonds and their relationship to (electro)catalysis will be covered. To sharpen their writing skills, students are expected to write an essay on a selected literature topic that describes modern advances in a research field that is relevant to the course content. To build presentation skills, students are expected to give a presentation to the class, summarizing their essay in a clear and concise manner.

**Special Topics in Materials Chemistry (26:160:590): Templated Materials & Solid-State Chemistry Science**
**TUESDAYS 6:00 - 9:00 PM**
**SMITH 240**

**Instructors:** Prof. Tomokazu Iyoda TIYODA@MAIL.DOSHISHA.AC.JP
Prof. Georgiy Akopov GEORGIY.AKOPOV@NEWARK.RUTGERS.EDU

This materials chemistry course is divided into two parts: 1) Templated Materials Science on the Nano and Microscale; and 2) Solid-State Chemistry: Synthesis, Properties and Characterization of Materials. The first part of the course will introduce several topics of templated materials science, in which unique shapes of nano/micro-structures occurring in nature are not only used as an inspiration but physically transferred onto various kinds of laboratory-made materials and their specific functions are developed. The goal of this part is to develop the understanding of the field of templated materials science and the techniques commonly used in this area of research. The second part of the course will introduce a variety of solid-state chemistry methods of bulk materials synthesis, crystal growth, properties (chemical, optical, transport, and magnetic), characterization (single and powder XRD, TGA, DSC) and applications. Emphasis will be placed on the crystal structure-property relationship in materials, and as such bonding and crystal defects will be explored. The overarching goal of this course is to familiarize the students with modern methods and techniques used in materials science as they pertain to solid-state materials with everyday uses and applications.

**Organic Reaction Mechanisms (26:160:564)**
**WEDNESDAYS 6:00 - 9:00 PM**
**SMITH 240**

**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 fundamental 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.