

Syllabus XXXXXXXXXX CHEM 8833

1. Structure and Models of Bonding

- Atomic structure
- Quantum numbers and atomic orbitals
- Lewis structures
- Valence-shell electron pair repulsion rules
- Hybridization
- Combined valence bond/molecular orbital model
- Molecular orbital theory and concepts in electronic structure theory
- Larger molecules: Qualitative molecular orbital theory (QMOT)

First Exam

2. Strain and Stability

- Thermochemistry: stable molecules and reactive intermediates
- Structure and energetics
- Electronic Effects
- Strained molecules

3. Acid-Base Chemistry

- Aqueous Solution
- Nonaqueous systems
- Predicting acid strength in solution
- Lewis acid and bases

Second Exam

3. Stereochemistry

- Stereogenicity and stereoisomerism
- Symmetry and stereochemistry
- Topicity relationships
- Reaction stereochemistry

5. Organic Reaction Mechanisms I

- Reaction types and mechanistic classes
- Basic concepts on writing reaction mechanisms

Third Exam

6. Organic Reaction Mechanisms II

- Polar mechanisms under basic conditions
- Polar mechanisms under acidic conditions

Fourth Exam

Comprehensive Final Exam (Topic 1-6)