CHEM2224 - Organic Chemistry I

Credits:	5 (4/1/0)
Description:	Meets MnTC Goal Areas 2 and 3. This course is the first course of a two-course series (CHEM2224 and CHEM2225). Students will learn organic chemistry principles including introduction to the classification, structure, nomenclature, reactions and reaction mechanisms of carbon compounds. The following topics will be included: structure and properties of organic compounds, nomenclature, structural representation and interpretation, isomerism, acid base properties of organic molecules, reaction representation and interpretation, reactions of organic molecules (mechanistic representations, proton transfer, nucleophilic substitution, elimination, electrophilic addition and free radical), reaction considerations and basic principles of spectroscopy. The course includes a lab, which will include techniques for the purification, synthesis and characterization of organic compounds and the study of organic reactions. Green chemistry techniques will be practiced whenever possible.
Prerequisites:	• CHEM1112
Corequisites:	
Pre/Corequisites*:	

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Competencies:	1. Predict properties and reactivity of organic molecules using concepts of molecular structure, formal charge and resonance. 2. Translate between compound names and representations of structure. 3. Analyze the relative energies of molecular structures. 4. Create and employ three-dimensional structures to determine the constitutional and stereochemical isomeric relationships between molecules. 5. Identify various functional groups within complex molecules, correlate physical properties with functional group structure and predict relevant reactions each functional group will undergo. 6. Predict the products of acid-base, substitution, elimination and addition reactions through the application of thermodynamic and kinetic principles. 7. Create logical synthetic strategies by combining reactions into practical multi-step sequences. 8. Propose reaction mechanisms using the curved-arrow formalism. 9. Employ data from IR and NMR spectroscopy to identify organic compounds and develop an understanding of how each of these analytical techniques works. 10. Plan organic chemical reactions using proper reaction stoichiometry calculations. 11. Perform successful organic chemical reactions with hands-on use of reaction glassware and equipment, practicing proper laboratory technique to maximize product yield and purity. 12. Separate and purify chemical compounds. 13. Determine the identity of organic samples through physical and spectroscopic methods. 14. Determine the qualitative and quantitative purity of organic samples through physical and spectroscopic methods. 15. Model the scientific method by performing inquiry- or research-based laboratory experiments or projects in which the student makes decisions regarding experimental design and execution. 16. Demonstrate responsible laboratory safety and waste handling practices including the use of proper fume hoods or fume extraction for chemicals that emit hazardous vapors. 17. Communicate the procedure, results and relative success of an experiment with respect to the experimental objectives in the form of a laboratory notebook, written reports or verbal presentation.
MnTC goal areas:	2. Critical Thinking 3. Natural Sciences

[*] *Can be taking as a Prerequisite or Corequisite.*

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