COURSE SYLLABUS STEM Ed Abroad Program

Course Title: Organic Chemistry I (including laboratory component)

Course Semester: Fall

University and Country: Adam Mickiewicz University; Poznan, Poland

Number of ECTS: 6 (lecture) and 2 (laboratory)

Course Designations for Transfer Credit: CH221/222 (NCSU), CHEM331/331L (ISU)

Content: Organic Chemistry I is the first course in a two-semester sequence of university-level organic chemistry structure and synthesis courses.

Pre-requisites: General Chemistry I with a grade of C- or better. Credit cannot be received for similar level organic Chemistry courses taught specifically for Chemistry Majors.

Aims:

Lecture component: Upon completing of this course , the student will know: structures of basic hydrocarbon classes and will be able to relate their properties to electron structure and hybridization. Will know reactions of functional compounds as organic halides, alcohols, ethers. Student will adopt rules of nomenclature and will be able to give systematic names to given compounds of above classes. Will know concept of chirality, rules of assigning absolute configuration. Student will be acquainted with characteristics of different classes of reactions as: nucleophilic substitution, electrophilic addition to multiple bond and elimination. Student will have basic knowledge of main spectroscopic methods applied in organic chemistry namely IR and NMR spectroscopy, including ability to interpret and solve simple spectra. Within the scope of known classes of compounds and reactions, student will be able to plan syntheses of organic compounds.

Lab component: Upon successful completion of this course, the student will be able (on basic level) to:

1. Demonstrate awareness of and implement the safety procedures and regulations that must be observed when performing organic chemistry experiments in a laboratory.

2. Perform simple separations using Thin Layer Chromatography.

3. Determine melting points and boiling points and use them to characterize organic compounds.

4. Perform Infrared Spectroscopy and use the results obtained to identify organic compounds.

5. Accomplish the separation of predetermined chemical mixtures by using liquid-liquid extraction and microextraction.

6. Complete small-scale synthesis of simple organic materials and characterize the products obtained using a variety of techniques.

7. Use Gas Chromatography as a tool for separation and characterization of organic materials.

The Learning Objectives for each exam will be posted on each section's web site prior to the first lecture of the sequence leading up to that exam and will serve as both a study outline and a summary of items to review. The Learning Objectives also includes the topics listed below in Course Lecture and Laboratory Topics. A student must know and apply to demonstrate mastery of the material listed in these topics as presented in this course.

Recommended Books: *Organic Chemistry,* Francis A. Carey (all editions are acceptable)

Instructors: Dr. Hab. Jan Milecki (lecture) and Dr. Jakub Grajewski. (laboratory) with consultation by Dr. Kay Sandberg (NC State University).

Grading System and Percentage Contribution

A. Lecture assessment

Lecture participation	5%
Continuous assessment (preparation for class)	5%
Homework	12%
Problem Sessions	12%
Exam (3 @12% each)	36%
Final Exam, Cumulative	30%
Total	100%

B. Laboratory assessment

Preparation for laboratories	35%
Laboratory reports	65%
Total	100%

AMU Grading system and scale

The grading system used at Adam Mickiewicz University, whose name is abbreviated as AMU or UAM, is as follows:

Tests, exams, homework assignments grading scale

5 100%-91%
4+ 90%-86%
4 85%-76%
3+ 75%-71%
3 70%-60%
2 59% and less

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This translates into the following ECTS (European internationally recognized system) grading scale:

ECTS Grade	AMU grade	Definition
A	5.0	EXCELLENT – outstanding performance with only minor errors
B	4+ / 4.5	VERY GOOD – above the average standard but with some errors
C	4.0	GOOD – generally sound work with a number of notable errors
D	3+ / 3.5	SATISFACTORY – fair but with significant shortcomings
E	3.0	SUFFICIENT – performance meets the minimum criteria
FX	2.0	FAIL – some more work required before the credit can be awarded
F	2.0	FAIL – considerable further work is required

Hours: 3 Lecture hours and 1 Tutorial hour per week. The laboratory component consists of 5 topics listed below. Each laboratory has a duration of 2.5 hours.

Course Lecture and Laboratory Topics:

Organic Chemistry I Lecture

1 week 2	Organic structures and Alkanes
2 week 2	Alkane nomenclature
3 week 3	More alkane nomenclature and physical properties of alkanes
4 week 3	Combustion of alkanes, bicycloalkanes, conformations of alkanes
5 week 4	Cyclohexane chemistry
6 week 4	Acid base chemistry & Alkyl halide and alcohol introduction
7 week 5	SN1 mechanism & carbocation stability
8 week 5	Halogenation of alkanes
9 week 6	Spectroscopy: NMR
Exam 1 week 6	Lectures 1 – 8
10 week 7	Alkenes: nomenclature, physical properties, E1 rxn
11 week 7	Alkene Preparations: Dehydration & dehydrohalogenation
12 week 8	NMR with pi-systems and IR
13 week 8	Alkene addition rxns - electrophilic addition & free-radical addition
14 week 9	More alkene addition reactions
15 week 9	More alkene reactions: Polymerization & Ozonolysis; Chirality
16 week 11	Chirality: R/S configuration determination
Exam 2 week 11	Lectures 9 – 15
17 week 12	Chirality: reactions
18 week 12	The SN2 mechanism
19 week 13	Predicting which of the 4 mechanisms leading to the MOP
20 week 13	Ethers and sufides
21 week 14	Epoxide chemistry
22 week 14	Alcohol synthesis & carbonyl reduction

23 short week	Diol synthesis & alcohol oxidation
Exam 3 week 15	Lectures 16 – 22
24 week 15	Thiol chemistry & introduction to alkynes
25 week 16	Alkynes –preparations & reactions
26 week 16	Alkyne reactions

Organic Chemistry I Laboratory

Day	Experiment
Week2	Safety Briefing Introduction to the Lab
Week 3	Experiment 1: Thin Layer Chromatography
Week 4	Experiment 2: Infrared Spectroscopy
Week 5	Experiment 3: Extraction
Week 6	Experiment 4: Dehydration of an Alcohol/ Gas Chromatography
Week 7	Experiment 5: Nucleophilic Substitution: The S_N2 Reaction Final Written Quiz Laboratory Cleanup and Checkout