The University Of Western Ontario  
Faculty of Engineering  

DEPARTMENT OF CHEMICAL AND BIOCHEMICAL ENGINEERING  

CBE 2206 – INDUSTRIAL ORGANIC CHEMISTRY I  
Course Outline Fall 2015  

Description  
This course deals with the fundamental principles governing the structure and reactivity of organic molecules. Organic molecules form the basis of industrial chemical and environmental processes. The laboratory section focuses on bench scale processing of organic chemical products, and the use of modern instruments for analysis of organic materials and monitoring of chemical processes.  

Objectives  
- understand the molecular orbital theory of bonding and apply it to organic compounds  
- be familiar with the classification of organic compounds and functional groups  
- understand and apply the IUPAC nomenclature of organic compounds  
- understand the 3-D structure and types of isomers of organic compounds  
- be familiar with the source/preparation and fundamental reactions of organic compounds  
- get acquainted with the theory and practice of the most important instrumental techniques used to characterize organic compounds  
- apply the knowledge of organic chemistry to industrial processes  
- acquire basic skills in bench-scale laboratory techniques  

Prerequisites  
Chemistry 1024A/B, Chemistry 1050 or the former Chemistry 1020 or 023. Open only to students registered in the Faculty of Engineering.  

Unless you have either the prerequisites for this course or written special permission from your Dean to enroll in it, you will be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites.  

Corequisites  
None  

Antirequisites  
Chemistry 2213A/B or the former CBE 2216. CBE 2206A and GPE 2213A are antirequisites of each other.
**Contact Hours**
3 lecture hours, 3 laboratory hours, 0.5 course.

**Instructor**
Dr. John F. Trant (MSA 3240) Telephone 519-661-2111 ext: 80240 email: jtrant@uwo.ca

**Undergraduate Assistant**
Ingrid Timusk (TEB 477) Telephone: 519-661-2111 ext: 82131 email: ingrid.timusk@uwo.ca

**Lab Technician**
Brian Dennis (SEB1083) Telephone: 519-661-2111 ext: 80536 email: bdennis4@uwo.ca

**Required Text**

**Course Notes**
Lecture outlines and some lecture notes in the form of powerpoint slides will be available on OWL. The majority of the notes will only be provided in class.

**Laboratory Notes**
Laboratory manual will be available on OWL.

**Laboratory**
The laboratory section of this course consists of 6 experiments. Bench-scale experimentation will start in mid-September. Consult the lab schedule on OWL for the dates of particular experiments. Students will form groups of 2-3 to perform the experiments. Some lab reports will be written up individually and some will be written up in groups. After completion of the bench scale experiments, the students will be familiar with basic laboratory equipment and instrumentation and gain experience with basic laboratory techniques such as distillation and chromatography. Chemical engineers must be familiar with these basic techniques and instruments, as they are routinely used in the chemical industry and form the basis of more involved large-scale chemical unit operations.

You **must** acquire safety goggles and a laboratory coat for this course. Students without safety goggles and a laboratory coat cannot, and will not, be allowed into the laboratory and will **receive a mark of zero** for that particular lab. Students are expected to abide by the safety rules and procedures described in the lab manual.

Students must read the lab manual and complete the pre-lab questions prior to attending the lab. Three “pop” quizzes will be given at the beginning of certain laboratory sessions. The quiz will be based on the material described in the lab manual. **STUDENTS WHO ARRIVE LATE WILL NOT BE GIVEN EXTRA TIME.** When a “pop” quiz is given, this will account for 25% of the mark.
of that particular lab session (25% quiz, 75% lab report).

**Units:**
SI units will be used.

**General Learning Objectives**

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**Specific Learning Objectives**
Organic chemistry is at the basis of numerous industrial and biological processes. Chemical Engineers must know the basics not only to be able to understand, control and optimize processes involving organic compounds, but also for safety and environmental reasons. Safe handling of chemicals requires organic chemistry knowledge, and the same is true for designing new, environmentally friendly processes.

**Evaluation**
Evaluations will focus on testing the understanding of fundamental concepts of organic chemistry and on applying this knowledge to solving problems. The laboratory component also includes the evaluation of basic practical skills. Students must be prepared in advance for both the lectures and the laboratory. Some notes will be updated on the web site, but students should make their own notes during class. Laboratory reports are due one week after the completion of the lab. Late submission carries a penalty of 10% per day for 7 days, after which the particular lab will be marked zero. Attendance is required for all labs, exceptions being made only for justifiable absences (proper documentation from the Department or Undergraduate Services Office is required- otherwise absence notes will not be accepted by the professor). Failure to do so will result in a mark of zero, and may result in failure of the course as a whole: at a minimum, five of the six experiments must be attended and the reports submitted in order to pass the course.

The final course mark will be determined as follows:

- Laboratory (including “pop” quizzes) (6 labs equally weighted) 20 %
- Mid-term exams (2 equally weighted) 35 %
Both mid-terms will be two hours in length covering different sections of the course. The dates for these tests will be announced in class and on OWL. The final examination will take place during the December examination period. It will be 3 hours in length and will cover content from the entire course. No calculators of any kind will be permitted, or required, during examinations.

**Note:**
1) **Students must pass the final examination to pass this course.** Students who fail the final examination will be assigned 48% if the aggregate mark is higher than 50% or the aggregate mark.
2) **Students must attend at minimum five labs, and turn in the laboratory reports, and achieve a passing grade in the laboratory component to pass this course.** If you miss more than one lab for medical, compassionate or other reasons, you cannot pass the course. In exceptional cases some accommodation may be possible. Failure to provide the adequate documentation for any missed lab will result in a mark of 0.
3) **Assignments are to be handed in to the CBE 2206A locker (#465) outside TEB 434 on the specified due date provided by the Instructor.**
4) **There will be no make-up tests.** If you are unable to write a test for medical or compassionate reasons, you must provide the appropriate documentation from the department or the Undergraduate Student Services Office and the weighting of the final exam will be adjusted accordingly. Failure to provide the adequate documentation will result in a mark of 0.

**Repeating All Components of the Course**
In accordance with Senate and Faculty Policy, students who have failed an Engineering course (ie. <50%) must repeat all components of the course. No special permissions will be granted enabling a student to retain laboratory, assignment or test marks from previous years. Previously completed assignments and laboratories cannot be resubmitted for grading by the student in subsequent years.

**Use of English**
In accordance with Senate and Faculty Policy, students may be penalized up to 10% of the marks on all assignments, tests, and examinations for the improper use of English. Additionally, poorly written work with the exception of the final examination may be returned without grading. If resubmission of the work is permitted, it may be graded with marks deducted for poor English and/or late submission.

**Attendance**
Attendance in all lectures, labs and tutorials is mandatory. Any student who, in the opinion of the instructor, is absent too frequently from class or laboratory periods in any course, will be reported to the Dean (after due warning has been given). On the recommendation of the
Department concerned, and with the permission of the Dean, the student will be excluded from taking the regular examination in the course.

**Cheating**
University policy states that cheating is a scholastic offence. The commission of a scholastic offence is attended by academic penalties, which might include expulsion from the program. If you are caught cheating, there will be no second warning (see Scholastic Offence Policy in the Western Academic Calendar).

**Plagiarism**
Students must write their essays and assignments in their own words. Whenever students take an idea or a passage of text from another author, they must acknowledge their debt both by using quotation marks where appropriate and by proper referencing such as footnotes or citations. Plagiarism is a major academic offence (see Scholastic Offence Policy in the Western Academic Calendar).

The University of Western Ontario has software for plagiarism checking. Students may be required to submit their work in electronic form for plagiarism checking.

**Conduct**
Students are expected to arrive at lectures on time, and to conduct themselves during class in a professional and respectful manner that is not disruptive to others. The instructors of both the course and laboratory components reserve the right to expel students from a lecture or laboratory at their discretion. Being expelled from a laboratory will result in a mark of zero for the lab, although it will not count as a missed lab.

**Sickness and Other Problems**
Students should immediately consult with the instructor or Department Chair if they have any problems that could affect their performance in the course. Where appropriate, the problems should be documented. The student should seek advice from the Instructor or Department Chair regarding how best to deal with the problem. Failure to notify the Instructor or Department Chair immediately (or as soon as possible thereafter) will have a negative effect on any appeal.

Please contact the course instructor if you require material in an alternate format or if any other arrangements can make this course more accessible to you. You may also wish to contact Services for Students with Disabilities (SSD) at 661-2111 x 82147 for any specific question regarding an accommodation.

**Notices**
Students are responsible for regularly checking their uwo email address and notices posted on OWL.

**Consultation**
Students are encouraged to discuss problems with their teaching assistant and/or instructor in tutorial sessions. Office hours will be arranged for the students to see the instructor and teaching assistants. Other individual consultation can be arranged by appointment with the appropriate instructor.

**Accreditation (AU) Breakdown**

Basic Science = 70 %

Engineering Science = 30 %
INSTRUCTIONS FOR STUDENTS UNABLE TO WRITE TESTS OR EXAMINATIONS OR SUBMIT ASSIGNMENTS AS SCHEDULED

IF, ON MEDICAL OR COMPASSIONATE GROUNDS, YOU ARE UNABLE TO WRITE TERM TESTS OR FINAL EXAMINATIONS OR COMPLETE COURSE WORK BY THE DUE DATE, YOU SHOULD FOLLOW THE INSTRUCTIONS LISTED BELOW. YOU SHOULD UNDERSTAND THAT ACADEMIC ACCOMMODATION WILL NOT BE GRANTED AUTOMATICALLY ON REQUEST. YOU MUST DEMONSTRATE TO YOUR DEPARTMENT (OR THE UNDERGRADUATE SERVICES OFFICE) THAT THERE ARE COMPPELLING MEDICAL OR COMPASSIONATE GROUNDS THAT CAN BE DOCUMENTED BEFORE ACADEMIC ACCOMMODATION WILL BE CONSIDERED. DIFFERENT REGULATIONS APPLY TO TERM TESTS, FINAL EXAMINATIONS AND LATE ASSIGNMENTS. READ THE INSTRUCTIONS CAREFULLY. (SEE THE 2015 UWO ACADEMIC CALENDAR).

A. GENERAL REGULATIONS & PROCEDURES

1. All first year students will report to the Undergraduate Services Office, SEB 2097, for all instances.

2. If you are an upper year student and you are missing a test/assignment/lab or exam that is worth MORE THAN 10% of your final grade, you will report to the Undergraduate Services Office, SEB 2097. Otherwise, you will report to your department office to request accommodation.

3. Check the course outline to see if the instructor has a policy for missed tests, examinations, late assignments or attendance.

4. Documentation must be provided as soon as possible. If no one is available in your Department office or the Undergraduate Services Office, leave a message clearly stating your name & student number and reason for your call. The department telephone numbers are given at the end of these instructions.

5. If you decide to write a test or an examination you should be prepared to accept the mark you earn. Rewriting tests or examinations or having the value of a test or examination reweighted on a retroactive basis is not permitted.

B. TERM TESTS

1. If you are in first year and you are unable to write a term test, contact the Undergraduate Services Office, SEB 2097 PRIOR to the scheduled date of the test.

2. If you are an upper year student and you are unable to write a term test, inform your instructor PRIOR to the scheduled date of the test. If the instructor is not available, leave a message for him/her at the department office. If the test is worth MORE THAN 10% of your final grade you will report to the Undergraduate Services Office, SEB 2097 to request accommodation. Otherwise, you will report to your department office to request accommodation.

3. Be prepared to provide supporting documentation to the Department Chair and/or the Undergraduate Services Office (see next page for information on documentation).

4. Discuss with the instructor if and when the test can be rescheduled. N.B. The approval of the Chair or the Undergraduate Services Office is required when rescheduling term tests.

C. FINAL EXAMINATIONS

1. If you are unable to write a final examination, contact the Undergraduate Services Office PRIOR TO THE SCHEDULED EXAMINATION TIME to request permission to write a Special Final Examination. If no one is available in the Undergraduate Services Office, leave a message clearly stating your name & student number.

2. Be prepared to provide the Undergraduate Services Office with supporting documentation (see next page for information on documentation) the next day, or as soon as possible (in cases where students are hospitalized). The following circumstances are not considered grounds for missing a final examination or requesting special examinations: common cold, sleeping in, misreading timetable and travel arrangements.

3. In order to receive permission to write a special examination, you must obtain the approval of the Chair of the Department and the Associate Dean and in order to apply you must sign a "Recommendation for a Special Examination Form" available in the Undergraduate Services Office. The Undergraduate Services Office will then notify the course instructor(s) and reschedule the examination on your behalf.

N.B. It is the student's responsibility to check the date, time and location of the special examination.

D. LATE ASSIGNMENTS

1. Advise the instructor if you are having problems completing the assignment on time (prior to the due date of the assignment).

2. Be prepared to provide documentation if requested by the instructor (see reverse side for information on documentation).

3. If you are granted an extension, establish a due date. The approval of the Chair of your Department (or the Associate Dean if you are in first year) is not required if assignments will be completed prior to the last day of classes.

4. i) Extensions beyond the end of classes must have the consent of the instructor, the department Chair and the Associate Dean. Documentation is mandatory.

ii) A Recommendation of Incomplete Form must be filled out indicating the work to be completed and the date by which it is due. This form must be signed by the student, the instructor, the department Chair and the Associate Dean.
E. **SHORT ABSENCES**

If you miss a class due to a minor illness or other problems, check your course outlines for information regarding attendance requirements and make sure you are not missing a test or assignment. Cover any readings and arrange to borrow notes from a classmate.

F. **EXTENDED ABSENCES**

If you are absent more than one week or if you get too far behind to catch up, you should consider reducing your workload by dropping one or more courses. (Note drop deadlines listed below). You may want to seek advice from the academic counsellor in your Department or Ms. Karen Murray in the Undergraduate Services Office, if you are in first year.

G. **DOCUMENTATION**

If you consulted an off-campus doctor or Student Health Services regarding your illness or personal problem, **you must provide the doctor with a Student Medical Certificate** to complete at the time of your visit and then bring it to the Department (or the Undergraduate Services Office). This note must contain the following information: severity of illness, effect on academic studies and duration of absence. Regular doctors notes will not be accepted; only the Student Medical Certificate will be accepted.

**In Case of Serious Illness of a Family Member:** Provide a Student Medical Certificate to your family member's physician to complete and bring it to the Department (or the Undergraduate Services Office if you are in first year).

**In Case of a Death:** Obtain a copy of the death certificate or the notice provided by the funeral director's office. You must include your relationship to the deceased and bring it to the Department (or the Undergraduate Services Office if you are in first year).

**For Other Extemuating Circumstances:** If you are not sure what documentation to provide, ask the Departmental Office (or the Undergraduate Services Office if you are in first year) for direction.

**Note:** Forged notes and certificates will be dealt with severely. To submit a forged document is a scholastic offence (see below).

H. **ACADEMIC CONCERNS**

1. You need to know if your instructors have a policy on late penalties, missed tests, etc. This information may be included on the course outlines. If not, ask your instructor(s).

2. **You should also be aware of attendance requirements in some courses. You can be debarred from writing the final examination if your attendance is not satisfactory.**

3. If you are in academic difficulty, check out the minimum requirements for progression in the calendar. If in doubt, see your academic counsellor.

**Calendar References:** Check these regulations in your 2015 Western Academic Calendar available at www.westerncalendar.uwo.ca.

Absences Due to Illness: [http://www.westerncalendar.uwo.ca/2015/pg117.html](http://www.westerncalendar.uwo.ca/2015/pg117.html)

Academic Accommodations for Students with Disabilities: [http://www.westerncalendar.uwo.ca/2015/pg118.html](http://www.westerncalendar.uwo.ca/2015/pg118.html)


Course Withdrawals: [http://www.westerncalendar.uwo.ca/2015/pg129.html](http://www.westerncalendar.uwo.ca/2015/pg129.html)

Examinations: [http://www.westerncalendar.uwo.ca/2015/pg129.html](http://www.westerncalendar.uwo.ca/2015/pg129.html)

Scheduling of Term Assignments: [http://www.westerncalendar.uwo.ca/2015/pg97.html](http://www.westerncalendar.uwo.ca/2015/pg97.html)

Scholastic Offences: [http://www.westerncalendar.uwo.ca/2015/pg113.html](http://www.westerncalendar.uwo.ca/2015/pg113.html)

Student Medical Certificate: [http://www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform.pdf](http://www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform.pdf)

Engineering Academic Regulations: [http://www.westerncalendar.uwo.ca/2015/pg1442.html](http://www.westerncalendar.uwo.ca/2015/pg1442.html)

**Note:** These instructions apply to all students registered in the Faculty of Engineering regardless of whether the courses are offered by the Faculty of Engineering or other faculties in the University.

**Drop Deadlines:**

- First term half course (i.e. “A” or “F”): November 5, 2015
- Full courses and full-year half courses (i.e. “E”, “Y” or no suffix): November 30, 2015
- Second term half or second term full course (i.e. “B” or “G”): March 7, 2016

**Contact Information:**

- Undergraduate Services Office: SEB 2097 Telephone: (519) 661-2130 Fax: (519) 661-3757
- Dept. of Chemical and Biochemical Engineering & Green Process Engineering: TEB 477 Telephone: (519) 661-2131 Fax: (519) 661-3498
- Dept. of Civil and Environmental Engineering: SEB 3005 Telephone: (519) 661-2139 Fax: (519) 661-3779
- Dept. of Electrical and Computer Engineering, Software Engineering & Mechatronics Engineering: TEB 279 Telephone: (519) 661-3758 Fax: (519) 850-2436
- Dept. of Mechanical and Materials Engineering: SEB 3002 Telephone: (519) 661-4122 Fax: (519) 661-3020

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