

Course Outline

1. COURSE INFORMATION

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| Session Offered | Fall 2023 | | |
| Course Name | Organic Chemistry | | |
| Course Code | BIOTECH 2OC3 | | |
| Date(s) and Time(s) of lectures | Monday Wednesday | (2:30-4:20 pm) (1:30-2:20 pm) | ABB 163 ETB 238 |
| Program Name | Biotechnology | | |
| Calendar Description | 3 Unit(s) This course covers a working knowledge of the major classes of organic compounds including their physical and chemical properties. The laboratory introduces the techniques of organic synthesis and identification. Three lecture, One lab (Three hours) | | |
| Instructor(s) | Jamshed Nisar | E-Mail: Office Location: Office Hours: Phone: | nishaar@mcmaster.ca ETB 209 Monday 1:15-2:15 pm 905-525-9140 Ext. 20292 |

2. COURSE SPECIFICS

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| Course Description | In this course, students will study the chemistry of organic, i.e., carbon-based compounds. They will learn general properties of the major classes of organic compounds, read and write both structures and names of compounds, learn the details and understand the mechanisms of chemical reactions that different compounds undergo, and identify, characterize, and synthesize such compounds in the lab. | | |
| Instruction Type | Code | Type | Hours per term |
| | C | Classroom instruction | 39 |
| | L | Laboratory, workshop or fieldwork | 36 |
| | T | Tutorial | |
| | DE | Distance education | |
| | Total Hours | | 75 |
| Resources | ISBN | Textbook Title & Edition | Author & Publisher |
| | 9781119453826 | Organic Chemistry with solution manual & Wiley Plus Lab Manual Fall 2018 Available on Avenue http://avenue.mcmaster.ca | David R. Klein |
| | Courseware | | Revised by Jamshed Nisar |
| | Other Supplies | Source | |
| | Lab goggles or Safety Glasses Lab Coat Lab Notebook | Titles Bookstore Titles Bookstore Titles Bookstore | |
| Prerequisite(s) | ENGTECH 1CH3 and registration in level II or above of Automation Engineering Technology | | |

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| Corequisite(s) | N/A |
| Antirequisite(s) | N/A |
| Course Specific Policies | <p>Electronic Resources This course will be using a range of software. Students should be aware that, when they access the electronic components of this course, private information such as first and last names, usernames for the McMaster e-mail accounts, and program affiliation may become apparent to all other students in the same course. The available information is dependent on the technology used. Continuation in this course will be deemed consent to this disclosure. If you have any questions or concerns about such disclosure, please discuss this with the course instructor. The instructor may also use other software including e-mail, Avenue, Learn Link, web pages, capa, Moodle, Thinking Cap, etc.</p> <p>Attendance Lectures are integral part of this course, regular attendance at lectures is expected throughout the semester.</p> <p>Assignments All assignments must be submitted to the instructor, online or in person depending on the assignment and as outlined in the assignment instructions, on the stated deadline dates at the stated deadline times. Late assignments will be penalized 15% by calendar day.</p> <p>Quizzes Unannounced quizzes will be given periodically throughout the term during the lecture period on all recently covered course material, including lectures, assignments, online postings, readings, labs, fellow student presentations, etc. No make-up quizzes will be allowed. Unexcused absences will result in a mark of zero for that quiz. Quizzes may involve written evaluations but may also take other formats.</p> <p>Class activity participation All the students are expected to participate in class discussions and any activity designed by the instructor. The marks for such activities will only be granted to a student if he/she actively participate and follow all the instructions.</p> <p>Tests There will be two tests administered in the lecture period during the term. The majority of each test will be based on course material either from the beginning of the term (for test 1) or from after the previous test (for test 2) up until the current test but may also be partly based on earlier material. The content of the tests will be based on all course material, including lectures, assignments, online postings, readings, labs, etc. All tests must be written at the times announced unless alternative arrangements have been made previously between the student and the professor to cover exceptional circumstances. Students with special needs must inform the professor through Student Accessibility Services (SAS) of their requirements five days prior to the test date so that alternative arrangements can be made. If you miss a test because</p> |

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| | <p>of an emergency, you must follow university policy with respect to reporting absences on the online McMaster Student Absence Form (see below). In the event of an allowable absence, it is the student's responsibility to plan with the instructor with respect to scheduling a make-up test or redistributing the weighting of evaluations over the term.</p> <p>All make-up tests are to be written at a pre-arranged date, time, and place. Test questions and the method of grading may be changed, but the weight of the test will be identical to the original test.</p> <p>Final Exam</p> <p>The final exam will be cumulative and will cover all course material, including the lectures, reading, assignments, material posted online, laboratory theory and student presentations. The exam will be two and a half hours in length.</p> <p>Labs</p> <p>Students are expected to attend all labs and to submit a lab report for all labs. If you miss a lab because of an emergency or sickness, you must contact the instructor no later than the next business day; you must submit a MSAF and make alternate arrangements to do the lab. Failure to do so will automatically result in a grade of 0 for the missed lab.</p> <p>Reports are due one week after completion of the laboratory work. Reports submitted late without a suitable explanation will incur a penalty of 15% per day, including weekends and statutory holidays. Students are expected to have prelab exercises completed prior to attending the lab. Students need to do an online quiz one day before the lab.</p> <p>Refer to lab manual for additional details regarding lab requirements.</p> |
| <p>Departmental Policies</p> | <p>Students must maintain a GPA of 3.5/12 to continue in the program.</p> <p>In order to achieve the required learning objectives, on average, B.Tech. students can expect to do at least 3 hours of “out-of-class” work for every scheduled hour in class. “Out-of-class” work includes reading, research, assignments and preparation for tests and examinations.</p> <p>Where group work is indicated in the course outline, such collaborative work is mandatory.</p> <p>The use of cell phones, iPods, laptops and other personal electronic devices are prohibited from the classroom during the class time, unless the instructor makes an explicit exception.</p> <p>Announcements made in class or placed on Avenue are considered to have been communicated to all students including those individuals that are not in class.</p> <p>Instructor has the right to submit work to software to identify plagiarism.</p> |

| Days | Subtopics | Weeks |
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| Wednesday (Sep 06) | Chapter 1 (A Review of General Chemistry) | Week 1 |
| Monday (Sep 11) Wednesday (Sep 13) | Chapter 1 (A Review of General Chemistry) Chapter 1 (A Review of General Chemistry) | Week 2 |
| Monday (Sep 18) Wednesday (Sep 20) | Chapter 2 (Molecular Representations) Review of Nomenclature Quiz/Assignment # 1 | Week 3 |
| Monday (Sep 25) Wednesday (Sep 27) | Review of Nomenclature Review of Nomenclature Quiz Nomenclature 1 | Week 4 |
| Monday (Oct 02) Wednesday (Oct 04) | Reaction Types (Chapter 4, 7, 8, 9, 10 & 12) Reaction Types (Chapter 4, 7, 8, 9, 10 & 12) Quiz Nomenclature 2 | Week 5 |
| Mid-term Recess: Monday, October 9 to Sunday, October 15 | | Week 6 |
| Monday (Oct 16) Wednesday (Oct 18) | Chapter 5 (Stereoisomerism) Chapter 7 (Stereoisomerism) Midterm 1 | Week 7 |
| Monday (Oct 23) Wednesday (Oct 25) | Chapter 14 (Infrared spectroscopy & mass spectrometry) Chapter 14 (Infrared spectroscopy & mass spectrometry) Assignment/Quiz 3 | Week 8 |
| Monday (Oct 30) Wednesday (Nov 01) | Chapter 14 (Infrared spectroscopy & mass spectrometry) Chapter 14 (Infrared spectroscopy & mass spectrometry) Assignment/Quiz 4 | Week 9 |
| Monday (Nov 06) Wednesday (Nov 08) | Chapter 15 (Nuclear Magnetic Resonance Spectroscopy) Chapter 15 (Nuclear Magnetic Resonance Spectroscopy) In class Assignment 5 | Week 10 |
| Monday (Nov 13) Wednesday (Nov 15) | Chapter 15 (Nuclear Magnetic Resonance Spectroscopy) Chapter 15 (Nuclear Magnetic Resonance Spectroscopy) In Class Assignment 6 | Week 11 |

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| Monday (Nov 20) Wednesday (Nov 22) | Spectroscopy practice problems Spectroscopy practice problems Midterm 2 | Week 12 |
| Monday (Nov 27) Wednesday (Nov 29) | In Class spectroscopy Assignment In Class spectroscopy Assignment | Week 13 |
| Monday (Dec 04) Wednesday (Dec 06) | Exam Review Exam Review | Week 14 |

Classes end: Wednesday, December 06, 2023
Final Examination Period: Friday, December 08 to Thursday, December 21
All examinations MUST be written during the scheduled examination period.

| Weeks | List of experiments | |
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| Week 1 | Lab 0 | Introduction, Safety, Lab tour |
| Week 2 | Lab 1 | Simple Distillation at atmospheric pressure |
| Week 3 | Lab 2 | Solvent Extraction by the Soxhlet Method |
| Week 4 | Lab 4 | Reactions and Properties of Hydrocarbons |
| Week 5 | Lab 5 | Identification of an unknown alcohol, Week 1 Chapter 12 (Alcohols and Phenols) |
| Week 6 | Mid-term Recess: Monday, October 9 to Sunday, October 15 | |
| Week 7 | Lab 5 | Identification of an unknown alcohol, Week 2 Chapter 12 (Alcohols and Phenols) |
| Week 8 | Lab 7 | Synthesis and purification of n-butyl acetate, Week 1 Chapter 20 (Carboxylic acids and their derivatives) |
| Week 9 | Lab 7 | Synthesis and purification of n-butyl acetate, Week 2 Chapter 20 (Carboxylic acids and their derivatives) |
| Week 10 | Lab 6 | Structure Determination of Organic Compounds using FTIR |
| Week 11 | Lab 8 | Identification of unknown organic acid, Week 1 |
| Week 12 | Lab 8 | Identification of unknown organic acid, Week 2 |
| Week 13 | Lab Make up Day | |
| Week 14 | No Labs | Lab Reports submission |

This lecture schedule is based upon current university and public health guidelines and may be subject to changes during the term. Any changes to the schedule or course delivery will be communicated on the course announcements section on Avenue to Learn. Please check the announcements prior to attending class.

Note that this structure represents a plan and is subject to adjustment term by term.

The instructor and the University reserve the right to modify elements of the course during the term. The University may change the dates and deadlines for any or all courses in extreme circumstances. If either type of modification becomes necessary, reasonable notice and communication with the students will be given with explanation and the opportunity to comment on changes.

| 3. ASSESSMENT OF LEARNING *including dates* | Weight |
|--|---------------|
| Quizzes/Assignments | 20% |
| Mid-term test 1 | 12.5% |
| Mid-term test 2 | 12.5% |
| Labs | 20% |
| Final examination (tests cumulative knowledge) | 35% |
| TOTAL | 100% |

Percentage grades will be converted to letter grades and grade points per the University calendar.

5. LEARNING OUTCOMES

1. Classify, name, and draw organic compounds comprised of the major functional groups and describe the general properties and reactions of these groups
2. Relate the concepts of electronegativity to the properties and reactions of organic compounds
3. Describe and contrast the different types of isomerism
4. Distinguish different general classes of organic reactions and explain specific mechanisms
5. Elucidate the structures of various organic compounds using different spectroscopic techniques
6. Perform one step and multi step conversions of organic compounds
7. Safely perform laboratory procedures to identify, synthesize, purify, and analyze organic compounds.

6. COURSE OUTLINE – APPROVED ADVISORY STATEMENTS

ANTI-DISCRIMINATION

The Faculty of Engineering is concerned with ensuring an environment that is free of all discrimination. If there is a problem, individuals are reminded that they should contact the Department Chair, the Sexual Harassment Officer or the Human Rights Consultant, as soon as possible.

http://www.mcmaster.ca/policy/General/HR/Discrimination_Harassment_Sexual_Harassment-Prevention&Response.pdf

ACADEMIC INTEGRITY

You are expected to exhibit honesty and use ethical behaviour in all aspects of the learning process. Academic credentials you earn are rooted in principles of honesty and academic integrity. It is your responsibility to understand what constitutes academic dishonesty.

Academic dishonesty is to knowingly act or fail to act in a way that results or could result in unearned academic credit or advantage. This behaviour can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: "Grade of F assigned for academic dishonesty"), and/or suspension or expulsion from the university. For information on the various types of academic dishonesty please refer to the Academic Integrity Policy, located at <https://secretariat.mcmaster.ca/university-policies-procedures-guidelines/>

The following illustrates only three forms of academic dishonesty: The following illustrates only three forms of academic dishonesty:

- plagiarism, e.g. the submission of work that is not one's own or for which other credit has been obtained.
- improper collaboration in group work.
- copying or using unauthorized aids in tests and examinations.

AUTHENTICITY / PLAGIARISM DETECTION

Some courses may use a web-based service (Turnitin.com) to reveal authenticity and ownership of student submitted work. For courses using such software, students will be expected to submit their work electronically either directly to Turnitin.com or via an online learning platform (e.g. A2L, etc.) using plagiarism detection (a service supported by Turnitin.com) so it can be checked for academic dishonesty.

Students who do not wish their work to be submitted through the plagiarism detection software must inform the Instructor before the assignment is due. No penalty will be assigned to a student who does not submit work to the plagiarism detection software. All submitted work is subject to normal verification that standards of academic integrity have been upheld (e.g., on-line search, other software, etc.). For more details about McMaster's use of Turnitin.com, please go to www.mcmaster.ca/academicintegrity.

COURSES WITH AN ON-LINE ELEMENT

Some courses may use on-line elements (e.g., e-mail, Avenue to Learn (A2L), Learn Link, web pages, capa, Moodle, ThinkingCap, etc.). Students should be aware that, when they access the electronic components of a course using these elements, private information such as first and last names, user names for the McMaster e-mail accounts, and program affiliation may become apparent to all other students in the same course. The available information is dependent on the technology used. Continuation in a course that uses on-line elements will be deemed consent to this disclosure. If you have any questions or concerns about such disclosure, please discuss this with the course instructor.

ONLINE PROCTORING

Some courses may use online proctoring software for tests and exams. This software may require students to turn on their video camera, present identification, monitor and record their computer activities, and/or lock/restrict their browser or other applications/software during tests or exams. This software may be required to be installed before the test/exam begins.

COMMUNICATIONS

It is the student's responsibility to:

- Maintain current contact information with the University, including address, phone numbers, and emergency contact information.
- Use the University provided e-mail address or maintain a valid forwarding e-mail address.
- Regularly check the official University communications channels. Official University communications are considered received if sent by postal mail, by fax, or by e-mail to the student's designated primary e-mail account via their @mcmaster.ca alias.
- Accept that forwarded e-mails may be lost and that e-mail is considered received if sent via the student's @mcmaster.ca alias.
- Check the McMaster/Avenue email and course websites on a regular basis during the term.

CONDUCT EXPECTATIONS

As a McMaster student, you have the right to experience, and the responsibility to demonstrate, respectful and dignified interactions within all of our living, learning, and working communities. These expectations are described in the Code of Student Rights & Responsibilities (the “Code”). All students share the responsibility of maintaining a positive environment for the academic and personal growth of all McMaster community members, whether in person or online.

It is essential that students be mindful of their interactions online, as the Code remains in effect in virtual learning environments. The Code applies to any interactions that adversely affect, disrupt, or interfere with reasonable participation in University activities. Student disruptions or behaviours that interfere with university functions on online platforms (e.g. use of Avenue 2 Learn, WebEx or Zoom for delivery), will be taken very seriously and will be investigated. Outcomes may include restriction or removal of the involved students’ access to these platforms.

ACADEMIC ACCOMMODATION OF STUDENTS WITH DISABILITIES

Students with disabilities who require academic accommodation must contact Student Accessibility Services (SAS) at 905-525-9140 ext. 28652 or sas@mcmaster.ca to make arrangements with a Program Coordinator. For further information, consult McMaster University’s Academic Accommodation of Students with Disabilities policy.

REQUESTS FOR RELIEF FOR MISSED ACADEMIC TERM WORK

McMaster Student Absence Form (MSAF): In the event of an absence for medical or other reasons, students should review and follow the Academic Regulation in the Undergraduate Calendar “Requests for Relief for Missed Academic Term Work”.

ACADEMIC ACCOMMODATION FOR RELIGIOUS, INDIGENOUS OR SPIRITUAL OBSERVANCES (RISO)

Students requiring academic accommodation based on religious, indigenous, or spiritual observances should follow the procedures set out in the RISO policy. Students should submit their request to their Faculty Office normally within 10 working days of the beginning of term in which they anticipate a need for accommodation or to the Registrar's Office prior to their examinations. Students should also contact their instructors as soon as possible to make alternative arrangements for classes, assignments, and tests. <http://www.mcmaster.ca/policy/Students-AcademicStudies/Studentcode.pdf>

COPYRIGHT AND RECORDING

Students are advised that lectures, demonstrations, performances, and any other course material provided by an instructor include copyright protected works. The Copyright Act and copyright law protect every original literary, dramatic, musical and artistic work, including lectures by University instructors

The recording of lectures, tutorials, or other methods of instruction may occur during a course. Recording may be done by either the instructor for the purpose of authorized distribution, or by a student for the purpose of personal study. Students should be aware that their voice and/or image may be recorded by others during the class. Please speak with the instructor if this is a concern for you.

EXTREME CIRCUMSTANCES

The University reserves the right to change the dates and deadlines for any or all courses in extreme circumstances (e.g., severe weather, labour disruptions, etc.). Changes will be communicated through regular McMaster communication channels, such as McMaster Daily News, A2L and/or McMaster email.