

<b>Academic Year</b>	AY20/21	<b>Semester</b>	2
<b>Course Coordinators</b>	Loh Teck Peng / Tan Choon Hong		
<b>Course Code</b>	CM4032		
<b>Course Title</b>	Current Topics in Synthetic Organic Chemistry		
<b>Pre-requisites</b>	CM3031 or by permission		
<b>No of AUs</b>	3		
<b>Contact Hours</b>	Lectures: 39 hours		
<b>Proposal Date</b>	10 March 2020		

#### Course Aims

This course aims to deal with the frontiers in organic synthesis. As a result of this course, you will develop the necessary knowledge to prepare yourself for a career that involves organic chemistry for research and industry applications. The course will improve your communication skills by requiring you to deliver technical presentations to a broad audience.

#### Intended Learning Outcomes (ILO)

Upon successful completion of this course, you should be able to:

1. Explain the principles and scope of organic synthesis
2. Identify and derive basic reactions of organic chemistry
3. Describe and propose a synthetic route for molecules
4. Discuss green chemistry and other current topics in organic chemistry, and their applications
5. Communicate difficult chemistry concepts in written and oral forms to layman

#### Course Content

Topics included in this course are:

1. The importance of organic synthesis
2. Major discoveries by Nobel laureates
3. The importance of green chemistry
4. The development of new and practical synthetic methods
5. Asymmetric synthesis
6. Total synthesis of selected natural products
7. Chemical Biology
8. Other emerging topics in organic synthesis

**Assessment (includes both continuous and summative assessment)**

Component	Course ILO Tested	Related Programme LO or Graduate Attributes	Weighting	Team/ Individual	Assessment rubrics
Summary report of lectures	All	Competence and creativity	50%	Individual	Appendix 1
Mini-literature review	All	Competence and creativity	10%	Individual	Appendix 2
Presentation	All	Competence and creativity	40%	Individual	Appendix 3
Total			100%		

**Formative feedback**

You will be given feedback in three ways:

1. By response to postings on the course discussion board.
2. Through the marking of reports.
3. General feedback will be provided to the students following the course.

**Learning and Teaching approach**

<b>Lectures</b>	Face-to-face lectures will be employed to enable you to interact directly with the instructor.
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**Reading and References**

All Scientific journals of organic chemistry and synthesis.

**Course Policies and Student Responsibilities****(1) General**

You are expected to read the lecture materials prior to the lecture session in question. This will help you to learn much more efficiently as you will already have an impression on the topics to be covered. You should also read the textbook and to attempt the exercises provided in the problem sets.

**(2) Absenteeism**

If you miss a lecture, you are expected to make up for the lost learning activities. If you miss the mid-term test with approval, you will either be offered a make-up test or grading based upon the final exam score.

**Academic Integrity**

Good academic work depends on honesty and ethical behavior. The quality of your work as a student relies on adhering to the principles of academic integrity and to the NTU Honor Code, a set of values shared by the whole university community. Truth, Trust and Justice are at the core of NTU's shared values.

As a student, it is important that you recognize your responsibilities in understanding and applying the principles of academic integrity in all the work you do at NTU. Not knowing what is involved in maintaining academic integrity does not excuse academic dishonesty. You need to actively equip yourself with strategies to avoid all forms of academic dishonesty, including plagiarism, academic fraud, collusion and cheating. If you are uncertain of the definitions of any of these terms, you should go to the [academic integrity website](#) for more information. Consult your instructor(s) if you need any clarification about the requirements of academic integrity in the course.

### Course Instructors

Instructor	Office Location	Phone	Email
Loh Teck Peng	CBC-05-20	65138203	teckpeng@ntu.edu.sg
Tan Choon Hong	CBC-04-18	63168761	choonhong@ntu.edu.sg

### Planned Weekly Schedule

Week	Topic	Course ILO	Readings/Activities
1	Introduction to current organic synthesis	1-4	Lecture
2	Natural product synthesis	1-4	Lecture
3	Radical reactions	1-4	Lecture
4	Green solvents	1-4	Lecture
5	Biomass and Ionic Liquids	1-4	Lecture
6	Diels-Alder reactions	1-4	Lecture
7	Literature reviews	5	Lecture
8	Modern topics in organic chemistry	5	Lecture
9	Literature Reviews	5	Lecture
10	Literature Reviews	5	Lecture
11	Modern Topics in organic chemistry	5	Lecture
12	Modern Topics in organic chemistry	5	Lecture
13	Modern Topics in organic chemistry	5	Lecture

### Appendix 1: Rubrics for Summary (50%)

Students have to summarize the highlights of the topic taught for that particular week briefly in two pages. Students will be analyzed by their writing skills, drawing the schemes and citing the literatures. Marks will be scaled to 50% of the course total.

0-20 marks	21-40 marks	41-50 marks
Shows little to no understanding of the theoretical and practical principles covered in the lectures	Shows moderate to good understanding of the theoretical and practical principles covered in the lectures	Shows a comprehensive or near comprehensive understanding of the theoretical and practical principles covered in the lectures

### Appendix 2: Rubrics for Literature Review (10%)

While writing the summary of the week's report, students have to include proper, related citations wherever necessary. Marks will be scaled to 10% of the course total.

0-3 marks	4-7 marks	8-10 marks
Showing no uniformity and not citing proper references	Showing uniformity but not citing all the relevant references	Showing uniformity and citing all the relevant references

### Appendix 3: Presentation Rubrics (40%)

Grading Criteria for Presentation

Performance Level	Criteria
Excellent	Demonstrates complete achievement of the learning outcomes 1-5. Able to connect to the topics covered and how it can be used to solve the problem. Able to organize the team to present the assigned topic and answer the comments/questions after the oral presentation. Show good communication ability to lead the learning team and peer tutor the team members.
Good	Demonstrates complete achievement of the learning outcomes 1-5. Able to connect to the topics covered and how it can be used to solve the problem at hand. Able to present the assigned topic and have good communication with the team members.
Satisfactory	Demonstrates partial achievement of the learning outcomes 1-5. Able to apply the technique or methodology taught in class only in direct way. Able to present the assigned topic but may not be precise or concise enough.
Unsatisfactory	Demonstrates minimal achievement of the learning outcomes 1-5. Not able to apply the knowledge to the problems or not able to present the assigned topic well or have difficulty to maintain good communication with the team member.
Poor	Do not possess sufficient understanding of problem and lack solution for it. Not able to complete presentation and join team study.

## CBC Programme Learning Outcome

The Division of Chemistry and Biological Chemistry (CBC) offers an undergraduate degree major in Chemistry that satisfies the American Chemical Society (ACS) curricular guidelines and equips students with knowledge relevant to the industry. Graduates of the Division of Chemistry and Biological Chemistry should have the following key attributes:

### **1. Competence**

Graduates should be well-versed in the foundational and advanced concepts of chemical science, be able to evaluate chemistry-related information critically and independently, and be able to use complex reasoning to solve emergent chemical problems.

### **2. Creativity**

Graduates should be able to synthesize and integrate multiple ideas across the curriculum, and propose innovative solutions to emergent chemistry-related problems based on their training in chemistry.

### **3. Communication**

Graduates should be able to demonstrate clarity of thought, independent thinking, and sound scientific analysis and reasoning through written and oral reports to audiences with varying technical backgrounds. They should also be able to effectively engage other professional chemists in collaborative endeavours.

### **4. Character**

Graduates should be able to act in responsible ways and uphold the high ethical standards that the society expects of professional chemists.

### **5. Civic-mindedness**

Graduates should be aware of the impact of chemistry on society, and how chemistry can be applied to benefit mankind. They should also be aware of and uphold the best chemical safety practices.