



TEXAS A&M UNIVERSITY

COMMERCE

CHEM 536 – Organometallic Chemistry

COURSE SYLLABUS: Fall 2023

Instructor: Dr. Bukuo Ni
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Office Hours: Monday and Thursday: 9:00am-11:30am or by appointment.

Course Information:

Lectures: Meets 8/28/2023 through 12/15/2023

Text Book: “Organotransition Metal Chemistry” by John Hartwig, University Science Books, 2010.

Reference books for your study of this course:

- (1) "Strategic Applications of Named Reactions in Organic Synthesis" by Laszlo Kuiti and Barbara Czako, Elsevier, Inc., 2005
- (2) "Organometallic Chemistry and Catalysis ", by Didier Astruc, Springer, 2007.
“Handbook of Palladium-Catalyzed Organic Reactions” J. C. Fiaud, Jean-Luc Malleron, J. Y. Legros.
- (3) "The Organometallic Chemistry of the Transition Metals", 4th Ed., Robert H. Crabtree
- (4) “Palladium-Catalyzed Crossing-Coupling Reactions in Total Synthesis” *Angew. Chem. Int. Ed.* **2005**, *44*, 4442-4489. By K. C. Nicolaou, Paul G. Bulger, and David Sarlah

Course description: The course is for graduate students majoring in chemistry. The course highlights the synthesis, structure, mechanism of transition metal complexes, which are used as catalysts for the coupling reactions, metathesis reaction, and industrial processes. As the subject changes, the course may be taken twice, with department head's approval.

Learning Outcome:

After taking this course, you will be able to know the transition-metal-catalyzed organic reactions and their applications to the total synthesis of a variety of complex products. You will be able to master a series of metal-catalyzed reactions and their mechanisms. You will be able to design the new transition metal-catalyzed reactions.

Structure

Three topics will be covered:

1. Introduction
2. Transition-metal complexes (structures and reactions)
3. Tactics of alkene/alkyne synthesis and metathesis
4. Transition metal catalyzed coupling reactions

There will be one midterm examination (100 points, 20% of your final grade), one final examination (100 point, 30% of your final grade), one review paper writing and presentation (100 point, 30% of your final grade), quiz and assignments (20% of your final grade). You can choose the topics about one type of the reaction you learned in the

class and review its current progress (within 10 years references). You are encouraged to discuss with me (Dr. Ni) about choosing topics and writing your paper. Your paper will consist of:

- (1) Introduction
- (2) Results and Discussion
- (3) Summary and Outlook
- (4) References and Notes

Final grade	Midterm examination:	20 points
	Final examination	30 points
	Final review paper	20 points
	Oral presentation	10 points
	<u>Assignment</u>	<u>20 points</u>
	TOTAL	100 points

The final letter grade will be based on a standard scale 90-100% A, 80-89% B, 70-79% C, 60-69% D, and below 60% F. The grades may be curved, if warranted.

There will be absolutely no make-ups for exams. If you miss an examination, you will be assigned a zero for that assignment. Problem assignment not submitted on time may receive a grade of zero.

Approximate Lecture Schedule

Weeks	Lecture Topics
Week 1	Introduction and Ligands
Week 2	Structures and elemental reactions of transition-metal complexes
Week 3	Tactics of alkene/alkyne synthesis and metathesis
Week 4	Tactics of alkene/alkyne synthesis and metathesis
Week 5	Transition metal catalyzed coupling reactions
Week 6	Transition metal catalyzed coupling reactions
Week 7	Transition metal catalyzed coupling reactions
Week 8	Midterm examination
Week 9	Pd-catalyzed inter- and intramolecular Heck reactions
Week 10	Pd-catalyzed inter- and intramolecular Heck reactions
Week 11	Tsuji-Trost reaction/allylation
Week 12	Carbon-Hydrogen activation
Week 13	Seminar: How to design new reactions from learned reactions
Week 14	Prepare the review paper and Oral presentation
Week 15	Review paper due and Oral presentation due
Dec. 11	Final comprehensive examination

* Please note that this schedule and topics are subject to change

TECHNOLOGY REQUIREMENTS

LMS – myLeo Online – D2L Brightspace

All course sections offered by Texas A&M University-Commerce have a corresponding course shell in the myLeo Online Learning Management System (LMS). Below are technical requirements.

LMS Requirements:

<https://community.brightspace.com/s/article/Brightspace-Platform-Requirements>

LMS Browser Support:

https://documentation.brightspace.com/EN/brightspace/requirements/all/browser_support.htm

YouSeeU Virtual Classroom Requirements:

<https://support.youseeu.com/hc/en-us/articles/115007031107-Basic-System-Requirements>

ACCESS AND NAVIGATION

You will need your campus-wide ID (CWID) and password to log into the course. If you do not know your CWID or have forgotten your password, contact the Center for IT Excellence (CITE) at 903.468.6000 or helpdesk@tamuc.edu.

Note: Personal computer and internet connection problems do not excuse the requirement to complete all course work in a timely and satisfactory manner. Each student needs to have a backup method to deal with these inevitable problems. These methods might include the availability of a backup PC at home or work, the temporary use of a computer at a friend's home, the local library, office service companies, Starbucks, a TAMUC campus open computer lab, etc.

COMMUNICATION AND SUPPORT

If you have any questions or are having difficulties with the course material, please contact your Instructor.

Technical Support

If you are having technical difficulty with any part of Brightspace, please contact Brightspace Technical Support at 1-877-325-7778. Other support options can be found here:

<https://community.brightspace.com/support/s/contactsupport>

Interaction with Instructor Statement

Communication: If the instructor needs to contact an individual student, it will be via the student's Texas A&M –Commerce email account.

COURSE AND UNIVERSITY PROCEDURES/POLICIES

Attendance Policy: All students are expected to attend classes on a regular basis. The Department of Chemistry adheres to the attendance policy set by the University as stated in the most current Undergraduate Catalog. The attendance record is taken from the **daily sign-in sheet**. A student who is late by more than 5 minutes or fails to sign the sign-in sheet will be counted as missing a class.

Excessive absence is defined as missing more than 10% of the class without excusable reasons. Excessive absence will be reported to the Dean of the College and the Dean of Students. In addition, **according to the TAMU-Commerce Procedure 13.99.99.R0.001, if a student has excessive absences, the instructor may drop the student from the course.** The instructor will only excuse an absence if the student provides, with appropriate document, an excusable reason allowed by the

TAMU-Commerce Procedure **13.99.99.R0.001**. Good class attendance will be necessary in order to pass this course.

Syllabus Change Policy

The syllabus is a guide. Circumstances and events, such as student progress, may make it necessary for the instructor to modify the syllabus during the semester. Any changes made to the syllabus will be announced in advance.

University Specific Procedures Student Conduct

All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment. The Code of Student Conduct is described in detail in the [Student Guidebook](#) .

<http://www.tamuc.edu/Admissions/oneStopShop/undergraduateAdmissions/studentGuidebook.aspx>

Students should also consult the Rules of Netiquette for more information regarding how to interact with students in an online forum: [Netiquette http://www.albion.com/netiquette/corerules.html](http://www.albion.com/netiquette/corerules.html)

TAMUC Attendance

For more information about the attendance policy please visit the [Attendance](#) webpage and [Procedure 13.99.99.R0.01](#).

<http://www.tamuc.edu/admissions/registrar/generalInformation/attendance.aspx>

<http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/academic/13.99.99.R0.01.pdf>

Academic Integrity

Students at Texas A&M University-Commerce are expected to maintain high standards of integrity and honesty in all of their scholastic work. For more details and the definition of academic dishonesty see the following procedures:

[Undergraduate Academic Dishonesty 13.99.99.R0.03](#)

<http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/undergraduates/13.99.99.R0.03UndergraduateAcademicDishonesty.pdf>

[Graduate Student Academic Dishonesty 13.99.99.R0.10](#)

<http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/graduate/13.99.99.R0.10GraduateStudentAcademicDishonesty.pdf>

ADA Statement Students with Disabilities

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you have a disability requiring an accommodation, please contact:

Office of Student Disability Resources and Services

Texas A&M University-Commerce

Gee Library- Room 162

Phone (903) 886-5150 or (903) 886-5835

Fax (903) 468-8148

Email: studentdisabilityservices@tamuc.edu

Website: [Office of Student Disability Resources and Services](http://www.tamuc.edu/campusLife/campusServices/studentDisabilityResourcesAndServices/)
<http://www.tamuc.edu/campusLife/campusServices/studentDisabilityResourcesAndServices/>

Nondiscrimination Notice

Texas A&M University-Commerce will comply in the classroom, and in online courses, with all federal and state laws prohibiting discrimination and related retaliation on the basis of race, color, religion, sex, national origin, disability, age, genetic information or veteran status. Further, an environment free from discrimination on the basis of sexual orientation, gender identity, or gender expression will be maintained.

Campus Concealed Carry Statement

Texas Senate Bill - 11 (Government Code 411.2031, et al.) authorizes the carrying of a concealed handgun in Texas A&M University-Commerce buildings only by persons who have been issued and are in possession of a Texas License to Carry a Handgun. Qualified law enforcement officers or those who are otherwise authorized to carry a concealed handgun in the State of Texas are also permitted to do so. Pursuant to Penal Code (PC) 46.035 and A&M-Commerce Rule 34.06.02.R1, license holders may not carry a concealed handgun in restricted locations.

For a list of locations, please refer to the [Carrying Concealed Handguns On Campus](#) document and/or consult your event organizer.

Web

url:

<http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/34SafetyOfEmployeesAndStudents/34.06.02.R1.pdf>

Pursuant to PC 46.035, the open carrying of handguns is prohibited on all A&M-Commerce campuses. Report violations to the University Police Department at 903-886-5868 or 9-1-1.

A&M-Commerce Supports Students' Mental Health

The Counseling Center at A&M-Commerce, located in the Halladay Building, Room 203, offers counseling services, educational programming, and connection to community resources for students. Students have 24/7 access to the Counseling Center's crisis assessment services by calling 903-886-5145. For more information regarding Counseling Center events and confidential services, please visit www.tamuc.edu/counsel