

**Course Subject, Number and Title**

CHEM/CBE505 Aspects of Industrial Chemistry and Business Fundamentals

Semester and Year

Spring 2020

Credits

3 credits

Canvas Course URL

<https://canvas.wisc.edu/courses/191918>

Course Designations and Attributes

Elective for Chemical and Biological Engineering and Chemistry Departments

Meeting Time and Location

Tuesday & Thursday 1:00-2:25 PM in CHEM B371

Instructional Mode

face-to-face

This class meets for two 75-minute class periods each week over the semester and carries the expectation that students will work on course learning activities (reading, writing, problem sets, studying, etc) for about 3 hours out of classroom for every class period. The syllabus includes more information about meeting times and expectations for student work.

INSTRUCTORS AND TEACHING ASSISTANTS

Prof. Dr. William Banholzer

Prof. Dr. Ive Hermans

Instructor Availability

By appointment

Instructor Email/Preferred Contact

- WBANHOLZER@WISC.EDU
- HERMANS@CHEM.WISC.EDU

Teaching Assistant

Michael Jindra

TA Office Hours

By appointment

TA Email/Preferred Contact

mikeajindra@gmail.com

COURSE DESCRIPTION

The objective of this course is to educate students in the chemistry and chemical engineering that defines societies' standard of living. Commercial chemical processes will be reviewed. Practical realities of how a discovery moves from research to commercial product will be taught through examples and case studies. Financial concepts that guide investment will be reviewed.

REQUISITES

Junior standing and Chem 345

LEARNING OUTCOMES

Provide students with an overview of the most important value-chains in the chemical industry and connect the fundamental chemistry and chemical engineering principles learned in other courses with real-world applications. Teach students how laboratory discoveries can be legally protected and successfully commercialized and how to assess alternative technologies against the state-of-the-art.

GRADING

Grading will be based upon the evaluation of research problems (30%), a midterm exam 25%, a cumulative final exam (35%), and homework- business simulations/class participation (10%).

Letter grades will be assigned, relative to the overall performance of the class using the following intended grading scale as a starting point:

A 90 to 100% B 80 to 89.9% C 70 to 79.9% D 60 to 69.9% F <60%

DISCUSSION SESSIONS

NA

LABORATORY SESSIONS

NA

REQUIRED TEXTBOOK, SOFTWARE & OTHER COURSE MATERIALS

All material will be provided

OTHER COURSE INFORMATION

Topics covered include the following:

1. Chemical industry integration, feedstock, product flow.
2. Industrial important inorganic chemistry (e.g., Chlor-alkali, nitric, sulfuric, and phosphoric acid)
3. Industrial important organic chemistry including:
 1. Organic Feedstocks (petroleum, natural gas, bio-derived)
 2. C1-chemistry (methane, syn-gas, methanol and formaldehyde)
 3. C2-chemistry (ethane, ethene, ethylene oxide, ethylene glycol and key derivatives)
 4. C3-chemistry (propane, propene, propylene oxide, propylene glycol)
 5. C4-chemistry (butane, butenes and butadiene)
 6. C6 – aliphatic (from cyclohexane to nylon)
 7. Aromatics (benzene, toluene and xylenes (BTX) and their key-derivatives like phenol, benzoic acid and therephtahlic acid)
 8. Long chain linear acids, alcohols and surfactants
 9. Plastics (overview of the most important crystalline and amorphous polymers and their applications)
3. Industrial Business fundamentals including:
4. Financial fundamentals (NPV, IRR, Cash Flow)
5. Source of Competitive Advantage (IP)
6. Large Corporations, Small Company, Start-up VC
7. business simulation, and a variety of case studies

RULES, RIGHTS & RESPONSIBILITIES

- See: <https://guide.wisc.edu/undergraduate/#rulesrightsandresponsibilitiestext>

ACADEMIC CALENDAR & RELIGIOUS OBSERVANCES

- See: <https://secfac.wisc.edu/academic-calendar/#religious-observances>

ACADEMIC INTEGRITY

Recommended syllabus statement: By virtue of enrollment, each student agrees to uphold the high academic standards of the University of Wisconsin-Madison; academic misconduct is behavior that negatively impacts the integrity of the institution. Cheating, fabrication, plagiarism, unauthorized collaboration, and helping others commit these previously listed acts are examples of misconduct which may result in disciplinary action. Examples of disciplinary action include, but is not limited to, failure on the assignment/course, written reprimand, disciplinary probation, suspension, or expulsion.

<https://conduct.students.wisc.edu/syllabus-statement/>

ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES

McBurney Disability Resource Center recommended syllabus statement: The University of Wisconsin-Madison supports the right of all enrolled students to a full and equal educational opportunity. The Americans with Disabilities Act (ADA), Wisconsin State Statute (36.12), and UW-Madison policy (Faculty Document 1071) require that students with disabilities be reasonably accommodated in instruction and campus life. Reasonable accommodations for students with disabilities is a shared faculty and student responsibility. Students are expected to inform faculty [me] of their need for instructional accommodations by the end of the third week of the semester, or as soon as possible after a disability has been incurred or recognized. Faculty [I], will work either directly with the student [you] or in coordination with the McBurney Center to identify and provide reasonable instructional accommodations. Disability information, including instructional accommodations as part of a student's educational record, is confidential and protected under FERPA. <https://mcburney.wisc.edu/instructor/>

DIVERSITY & INCLUSION

Institutional statement on diversity: Diversity is a source of strength, creativity, and innovation for UW-Madison. We value the contributions of each person and respect the profound ways their identity, culture, background, experience, status, abilities, and opinion enrich the university community. We commit ourselves to the pursuit of excellence in teaching, research, outreach, and diversity as inextricably linked goals.

The University of Wisconsin-Madison fulfills its public mission by creating a welcoming and inclusive community for people from every background – people who as students, faculty, and staff serve Wisconsin and the world. <https://diversity.wisc.edu/>