

CBE 476/576 (1 Cr.) – Organosilicon Polymer Chemistry and Technology

Spring Semester 2018

Department of Chemical and Biological Engineering

South Dakota School of Mines and Technology

2018.02.20

COURSE SYLLABUS**Instructor:** Evan Waddell

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Co-Instructor: Travis Walker

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Dates: 2018.04.09-13**Lectures:** M-F 1600-1800**Laboratories:** TR 1800-2100**Classroom:** CBEC 212**Course Description:** CBE 476/576 Organosilicon Polymer Chemistry and Technology

Credits: (1-0) 1

An introduction to the engineering and science aspects of silicone-organic polymer chemistry from an industrial viewpoint. The course covers basic silicone nomenclature, monomer and polymerization reactions, curing, reinforcement, general applications, and hands-on laboratory exercises, which include making things like elastomeric (bouncy) putty and high-bouncing balls. The course is held during a one-week period.

Course Website:https://webpages.sdsmt.edu/~twalker/secure/teaching/2018/2018_01/cbe476_576.html**Course Outcomes:** By the end of the course, a student will be able to do the following:

- develop a basic understanding of the nomenclature of silicone chemicals;
- demonstrate an understanding of basic organosilicone reactions;
- be able to show how organosilicone polymers are formed;
- demonstrate a basic knowledge of organosilicone polymer properties and uses; and
- be able to demonstrate a basic knowledge of silicone chemistry by successfully completing various practical laboratory exercises.

Tentative Course Outline (2018.02.20): This tentative list is subject to change depending on class needs. All topics may not be covered, and some topics may be covered to a greater depth than others.

1. History and Nomenclature of Si
2. Bonding and Stereochemistry of Si
3. Chemicals and Monomers – Part I
 - Direct Process
 - Organometallics
4. Chemicals and Monomers – Part II
 - Redistribution
 - Addition of SiH to Multiple Bonds
 - Miscellaneous Applications
5. Polymers – Part I
 - Routes to Polymerization
6. Polymers – Part II
 - Fluids and Chemicals
 - Resins
7. Polymers – Part III
 - Elastomers (Low and High Consistency)
8. Polymers – Part IV
 - Cure Mechanisms
 - Reinforcement
9. Medical and Personal Care Applications
 - Emulsion and Formulation Science
10. Laboratory Exercises

Class and Lab Sessions will be held evening during the week of 2018.04.09-13. Tentatively, lectures will run from 1600-1800 with labs on Tuesday and Thursday evenings after lecture. Let Dr. Walker or Mr. Waddell know if you have questions, conflicts, or concerns.

Academic Integrity: Students are expected to abide by the SDSM&T policies of academic integrity (with regard to cheating, plagiarism, etc.), as outlined in the Course Catalog.

ADA Statement: *Students with special needs or requiring special accommodations should contact the instructor, (Travis Walker, at travis.walker@sdsmt.edu or 605.394.2543) and/or the Director of Counseling and Disability Services, Ms. Megan Reder-Schopp, at megan.reder-schopp@sdsmt.edu or 394-6988 at the earliest opportunity.*

Freedom in Learning Statement: *Under Board of Regents and University policy student academic performance may be evaluated solely on an academic basis, not on opinions or conduct in matters unrelated to academic standards. Students should be free to take reasoned exception to the data or views offered in any course of study and to reserve judgment about matters of opinion, but they are responsible for learning the content of any course of study for which they are enrolled. Students who believe that an academic evaluation reflects prejudiced or capricious consideration of student opinions or conduct unrelated to academic standards should contact the Provost and Vice President for Academic Affairs to initiate a review of the evaluation.*

Additional Support

- The Student Success Center is a hub for learning support, resources, and help in identifying sources of assistance or support on campus. Go to <http://www.sdsmt.edu/Academics/Student-Success-Center/> for more information or stop by the office in the Surbeck Center (across from the Dean of Students office) to visit with Lisa.Carlson@sdsmt.edu or Tyg.Long@sdsmt.edu. The phone number is 605.394.5261.
- Student Resource List:
<http://www.sdsmt.edu/Campus-Life/Student-Resources/Student-Resources-List/>
- Information about how to use or access ITS resources (e.g., computer, Internet, email):
<http://www.sdsmt.edu/Campus-Services/ITS/How-Do-I/>
- Title IX of the Educational Amendments Act of 1972 is the federal law prohibiting discrimination based on sex under any education program and/or activity operated by an institution receiving and/or benefiting from federal financial assistance. Behaviors that can be considered “sexual discrimination” include sexual assault, sexual harassment, stalking, relationship abuse (dating violence and domestic violence), sexual misconduct, and gender discrimination. You are encouraged to report these behaviors. Reporting: SD Mines can better support students in trouble if we know about what is happening. Reporting also helps us to identify patterns that might arise – for example, if more than one complainant reports having been assaulted or harassed by the same individual.

SDSM&T is committed to providing a safe and positive learning experience. To report a violation of sexual misconduct or gender discrimination, please contact the Title IX Coordinator at 605-394-1203. Please note that as your professor, I am required to report any incidences to the Title IX Coordinator. Confidential support for students is available by contacting the Student Counseling Center at 605.394.1924.