



# CHEMISTRY 623: Surface Chemistry\*

## Spring 2022

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**Required Textbook:** *Surface Science: Foundations of Catalysis and Nanoscience*, 4<sup>th</sup> edition, 2020.

**Other recommended texts:** *Introduction to Surface Chemistry and Catalysis*, 2<sup>nd</sup> edition, 2010.

*Intermolecular and Surface Forces*, 3<sup>rd</sup> edition, 2011.

**Lecture:** TTh 9:35 – 10:50 AM CHEM 2121 and ONLINE

**Office hours:** By appointment: CHEM 254 or by Zoom

**Class Website:** <http://canvas.tamu.edu>

*\*This course is dedicated to Dr. Wayne Goodman, Robert A. Welch Chair and Distinguished Professor of Chemistry, Texas A&M University (1945 – 2012).*

### General Course Outline:

Week	Subject	Reading
1 – January 18, 20	Introduction to the properties of surfaces (1/20 -Mechanochem seminar)	Ch. Intro & Ch. 1
2 – January 25, 27	continued...	<i>HW #1 due on 1/27</i>
3 – February 1, 3	Methods of surface chemical and structural analysis	Ch. 2
4 – February 8, 10	continued... instrument demos	<i>Hw#2 due on 2/10</i>
5 – February 15, 17 <i>Quiz #1 on 2/15</i>	Interactions of atoms and molecules with surfaces (2/17-Mechanochem seminar)	Ch. 3
6 – February 22, 24	continued...	<i>HW #3 due on 2/24</i>
7 – March 1, 3	Thermodynamics of surfaces	Ch. 4
8 – March 8,10	continued...	
9 – March 15, 17	<b>SPRING BREAK</b>	
10 – March 22,24 <i>Quiz #2 on 3/22</i>	Introduction to heterogeneous catalysis (3/24 lecture will be by Zoom)	Ch. 6 <i>HW# 4 due on 3/22</i>
10 – March 29, 31	continued...	
11 – April 5,7	Solid-Liquid and Organic Surfaces	Ch. 5 and Handouts
12 – April 12, 14	Properties of Nanomaterials ( <i>by Zoom</i> )	Handouts
13 – April 19, 21 <i>Quiz #3 on 4/19</i>	April 21 – prep for class presentations and mechanochem seminar	<i>HW# 5 due on 4/19</i>
14 – April 26, 28	Student in class presentations	
May 5	<b>Term Paper due by 2:30 PM</b>	

**Learning objectives for this course:** Students in this course will learn about the fundamentals of surface chemistry and the basic underlying chemistry and physics interfaces.

This will include applications in areas such as heterogeneous catalysis, organic surfaces, and nanomaterials. Students will also gain an understanding of the principles behind typical modern instrumentation used for chemical and structural analysis of surfaces and interfaces. This will include developing an understanding of how the instrumentation works, their specific applications and the information that can be obtained from various of surfaces related measurements. This will include electrical and optical spectroscopic measurements as well as methods of surface structure determination. Case studies will be used to explore many of these topics.

In the final week of the term, students will also give presentations on selected topics (usually related to their own research) to expand on these subjects. These presentations will be 15 minutes in length including a 3 min question/answer session. These presentations will be accompanied by a final paper describing the student's selected topic.

### Grading Policy:

Quizzes	30%
HW	30%
Student paper	20%
Presentations	20%

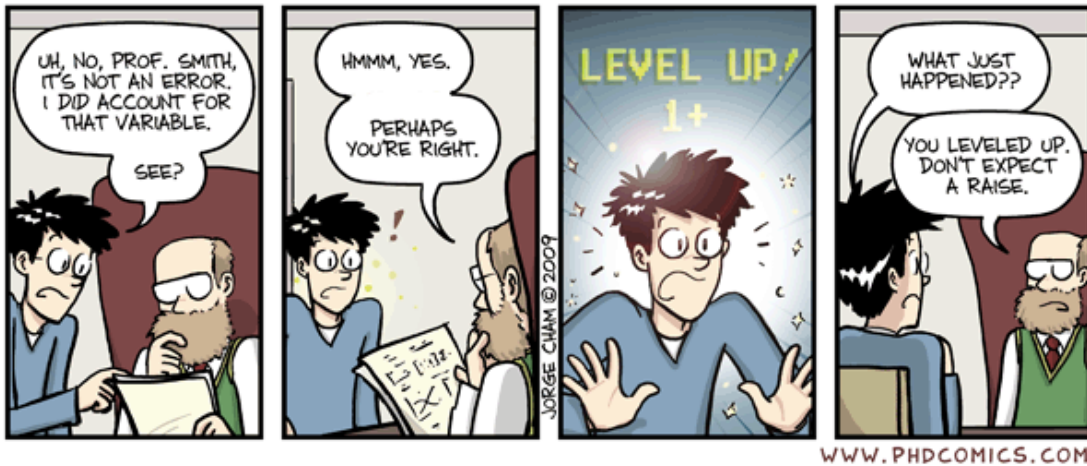
Grade	Percentage
A	85 – 100
B	75-84
C	65-74
D	50 – 64
F	< 50

### The Rules:

1) Upon accepting admission to Texas A&M University, a student immediately assumes a commitment to uphold the Honor Code, to accept responsibility for learning, and to follow the philosophy and rules of the Honor System. Students will be required to state their commitment on examinations, research papers, and other academic work. Ignorance of the rules does not exclude any member of the TAMU community from the requirements or the processes of the Honor System. ([aggiehonor.tamu.edu](http://aggiehonor.tamu.edu))

*“An Aggie does not lie, cheat, or steal or tolerate those who do.”*

2) **Homework and Quizzes:** Homework will be assigned, collected and checked based on **completion**. You are responsible for checking the answers with the solutions. You will receive a grade of **0 to 100%** based on the percentage completed. Doing the homework will help you be successful in this course and learn the materials. Quiz questions will be related to the various topics addressed in the class, HW questions, and seminars.



3) *Excused Absences*: Makeup examinations for major exams or other graded work (other than un-announced "pop" quizzes) will be given only for University-excused absences provided the appropriate documentation is provided within the time frame specified in the 2014 TAMU Rules and Regulations. Please note that Student Rule 7 (<http://student-rules.tamu.edu/rule07/>) regarding Attendance and Excused Absences has been modified this year. Absences of less than three days due to injury or illness will require that you provide either a physician's note affirming the date and time of visit related to the absence or the TAMU Explanatory Statement for Absence from Class form.

**You may use this to document excused absences of less than three days if you do not have a physician's note but please keep in mind that the information will be verified. Any misinformation included on the form or an inability to verify the information will lead to sanctions under the Aggie Code of Honor (<http://student-rules.tamu.edu/>).** Absences of three or more days due to illness or injury will definitely require a physician's or other acceptable documentation. Appropriate documentation will be required for other excused absences. The university policy has an absolute deadline (by the end of the second working day after the absence) by which you must notify the professor of any excused absence. I expect you to contact me the day of the examination or before the examination if you must miss an exam for any reason. Rarely would it be impossible for you, your roommate, a friend, or parent to contact me during this time frame. Delays in notification usually raise some doubts about the validity of the excuse. Do not take this admonition lightly since some people receive zeros on exams each semester for failure to follow this University regulation.

My phone (979-458-2965) has a 24-hour message recoding so you may leave a message (always leave a phone number where you may be reached) or talk directly to my office associate, Ms. Jennifer Belcik (979-458-2958), or me. I will tell you in advance that the excuse "I couldn't get in touch with you since I was out of town" is not acceptable. If you are unable to call us then have your roommate, parents, etc. make the contact for you. You are adults and it is your responsibility to notify me within the specified time frame if you have a legitimate University-excuse for missing an exam or quiz. One day can be the difference between the opportunity to take a makeup exam and a zero! Remember, it is **YOUR** responsibility to contact me and to arrange for a makeup. **It is not my responsibility to contact you, so simply e-mailing me asking me to contact you is not acceptable. You must keep trying to contact me to talk with me either in person or on the phone until you are successful.**

**Support Services:** 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 believe you have a disability requiring an accommodation, please contact the Department of Student Life, Services for Students with Disabilities (<http://disability.tamu.edu>) or call 979-845-1637.

**To help protect Aggieland and stop the spread of COVID-19, Texas A&M University urges students to be vaccinated and to wear masks in classrooms and all other academic facilities on campus, including labs. Doing so exemplifies the Aggie Core Values of respect, leadership, integrity, and selfless service by putting community concerns above individual preferences. COVID-19 vaccines and masking — regardless of vaccination status — have been shown to be safe and effective at reducing spread to others, infection, hospitalization, and death.**

**If you are exposed or test positive for COVID-19, you must follow the TAMU Quarantine Protocols: <https://covid.tamu.edu/guidance/covid-protocol.html>**