University of Alabama  
Department of Chemical & Biological Engineering  

CHE 255: Chemical Engineering Thermodynamics  
Spring 2016

Instructor:  Dr. Stephen Ritchie  
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Office Hours:  
F 8:00 – 9:50 AM  
or by appointment


Time and Place:  
MTWRF  8:00 – 8:50 AM, 1013 SERC (Section 001)  
MTWRF  9:00 – 9:50 AM, 1013 SERC (Section 002)  

Course Website:  http://www.bama.ua.edu/~sritchie/teaching.html (Notes only)  
See Blackboard for additional course materials/handouts

Course Pre/Co-Requisites:  
CHE 254 (Chemical Engineering Calculations) – Prerequisite  
MATH 126 (Calculus II) – Prerequisite

Course Description:  
Chemical calculations using the first and second laws of thermodynamics, including chemical and phase equilibria, multiphase reacting systems, steady- and non-steady-state material and energy balances. Computer proficiency is required for a passing grade in this course.

Topics:  
1. The First Law  
2. Volumetric Properties of Pure Fluids  
3. Heat Effects  
4. The Second Law  
5. Thermodynamic Properties of Fluids  
6. Applications in Flow Processes  
7. Power Production and Refrigeration  
8. Vapor/Liquid Equilibrium  
9. Solution Thermodynamics: Theory and Applications  
10. Chemical Reaction Equilibria

Expected Outcomes:  
Students will have the ability to explain/design/analyze:  
1. physical equilibria, and  
2. chemical equilibria.
Important Dates (regular exam dates subject to change):
January 13   First class session
January 18   MLK Jr Day (No class)
February 5   Exam I
March 4      Exam II
March 14 - 18 Spring Break
April 7      Exam III
May 3        Final Exam (Section 002, 8:00 AM – 10:30 AM)
May 4        Final Exam (Section 001, 11:30 AM – 2:00 PM)

Lectures and Reading:
Reading assignments will parallel the notes. Notes for each chapter are available on the course website (Blackboard). It is strongly encouraged that you read these before the lecture as they will greatly enhance your grasp of the material and make the lectures more useful. Please note that lectures are for clarification of the course material, and that tests may contain material from the reading that has not been explicitly covered in the lecture.

Homework Assignments:
Homework will be assigned regularly and will be due at the beginning of class. No late homework will be accepted. Homework assignments should be completed on your own. The use of spreadsheets and simulation software is encouraged where appropriate. Sample calculations should be included when not apparent from the output. Two homework scores will be dropped.

Design Project:
You will be required to complete a computer-related design project as part of this course. This will be accompanied by a report and hand calculations. More information will be dispensed during the semester.

Attendance and Make-up Policy:
On-time and regular attendance is expected. There are a number of in-class exercises, and exams during the semester besides normal interactions during lecture that make attendance important. Make-up opportunities for missed exams will be handled on a case-by-case basis. There are no opportunities for missed homework, but the two lowest homework scores will be dropped during the semester.

Grading:
At worst a straight grading scale will be used in this course. The grade of A+ will only be assigned for 100% or greater. There will be one extra credit assignment during the course.

Grade Composition:
- Homework 25%
- Design Project 10%
- Exams (3) 45%
- Final Exam 20%
Program Education Outcome Assessment:
The faculty of the ChBE department has chosen ChBE 255 to fulfill our program educational outcome, “A working knowledge of thermodynamics of physical and chemical equilibria.” This requires ChBE 255 to use “criterion-based assessment,” which is defined as, “an assessment tool that ‘measures the performance against an agreed set of criteria,’ in contrast to norm-referenced assessment, which compares each student’s performance with the student’s peers.” A value of 70% will be the criterion on exam material in two areas: physical and chemical equilibria.

Teaming is also assessed in this course. One lecture will be given on working in teams, and you will be asked to evaluate your team members during the Design Project. The evaluation is only for assessment of how the department is doing on teaching these skills. The evaluation will NOT affect your grade.

Severe Weather Guidelines:
The guiding principle at The University of Alabama is to promote the personal safety of our students, faculty and staff during severe weather events. It is impossible to develop policies which anticipate every weather-related emergency. These guidelines are intended to provide additional assistance for responding to severe weather on campus.

UA is a residential campus with many students living on or near campus. In general classes will remain in session until the National Weather Service issues safety warnings for the city of Tuscaloosa. Clearly, some students and faculty commute from adjacent counties. These counties may experience weather related problems not encountered in Tuscaloosa. Individuals should follow the advice of the National Weather Service for that area taking the necessary precautions to ensure personal safety. Whenever the National Weather Service and the Emergency Management Agency issue a warning, people in the path of the storm (tornado or severe thunderstorm) should take immediate life saving actions.

When West Alabama is under a severe weather advisory, conditions can change rapidly. It is imperative to get to where you can receive information from the National Weather Service and to follow the instructions provided. Personal safety should dictate the actions that faculty, staff and students take.

The Office of University Relations will disseminate the latest information regarding conditions on campus in the following ways:

- Weather advisory posted on the UA homepage
- Weather advisory sent out through UA Alerts to faculty, staff and students
- Weather advisory broadcast over WVUA at 90.7 FM
- Weather advisory broadcast over Alabama Public Radio (WUAL) at 91.5 FM
- Weather advisory broadcast over WVUA-TV/WUOA-TV, and on the website at http://wvuatv.com/content/weather. WVUA-TV Home Team Weather provides a free service you can subscribe to which allows you to receive weather warnings for Tuscaloosa via e-mail or cell phone. Check http://wvuatv.com/content/free-email-weather-alerts for more details and to sign up for weather alerts.
In the case of a tornado warning (tornado has been sighted or detected by radar; sirens activated), all university activities are automatically suspended, including all classes and laboratories. If you are in a building, please move immediately to the lowest level and toward the center of the building away from windows (interior classrooms, offices, or corridors) and remain there until the tornado warning has expired. Classes in session when the tornado warning is issued can resume immediately after the warning has expired at the discretion of the instructor. Classes that have not yet begun will resume 30 minutes after the tornado warning has expired provided at least half of the class period remains.

Policy on Academic Misconduct:
All students in attendance at The University of Alabama are expected to be honorable and to observe standards of conduct appropriate to a community of scholars. The University of Alabama expects from its students a higher standard of conduct than the minimum required to avoid discipline. At the beginning of each semester and on examinations and projects, the professor, department, or division may require that each student sign the following Academic Honor Pledge: “I promise or affirm that I will not at any time be involved with cheating, plagiarism, fabrication, or misrepresentation while enrolled as a student at The University of Alabama. I have read the Academic Honor Code, which explains disciplinary procedure resulting from the aforementioned. I understand that violation of this code will result in penalties as severe as indefinite suspension from the University.”

See the Code of Student Conduct for more information.

Disability Statement:
If you are registered with the Office of Disability Services, please make an appointment with me as soon as possible to discuss any course accommodations that may be necessary.

If you have a disability, but have not contacted the Office of Disability Services, please call (205) 348-4285 (Voice) or (205) 348-3081 (TTY) or visit 1000 Houser Hall to register for services. Students who may need course adaptations because of a disability are welcome to make an appointment to see me during office hours. Students with disabilities must be registered with the Office of Disability Services, 1000 Houser Hall, before receiving academic adjustments.

UAct: Ethical Community Statement
The University of Alabama is committed to an ethical, inclusive community defined by respect and civility. The UAct website (http://www.ua.edu/uact) provides a list of reporting channels that can be used to report incidences of illegal discrimination, harassment, sexual assault, sexual violence, retaliation, threat assessment or fraud.