MEMORANDUM FOR STUDENTS ENROLLED IN CHEN 4350 – Section 01

SUBJECT: CHEN 4350 – Chemical Plant Design II- Administrative Instructions

Lecture times: MWF, 10:10 am – 1:15 pm, RBN 1034 / RBS 2019

Office Hours: Tu Th, 8:30 am – 10:00 am

Instructor: Fernando Resende

E-mail: fresende@uttyler.edu

Welcome to CHEN 4350 – Chemical Plant Design II. This course is a direct continuation of CHEN 4370 (Chemical Plant Design I), and ***will be administered in conjunction with CENG 4315 (Civil Engineering Senior Design II).*** The Chemical Engineering component will take place in RBN 1034, and the Civil Engineering component (when applicable) will take place at the same time in RBS 2019.

In this capstone course, students will apply concepts learned in previous courses to design a plant for a chemical process assigned by the instructor. The process designed must be in accordance with industrial, federal, and local regulations. The design will involve an integrated approach that will include specific information about components of a chemical plant, and will account for factors such as installation, maintenance, economics, the environment, and ethics. The modelling and optimization of the process will be assisted by softwares like ASPEN Plus, Microsoft Excel, and MATLAB.

CHEN 4350 Plant Design Course Objectives:

1. Develop an integrated approach to employ concepts learned in previous courses to design the components of a chemical plant;
2. Complete the design of the components of the process, including selection of equipment and materials of construction;
3. Work effectively in teams;
4. Employ process design softwares to aid in calculations;
5. Optimize the plant design considering economics considering performance and profits according to industry standards;
6. Evaluate environmental impacts of the proposed process;
7. Develop communication skills via written and oral reports;

1. The course has two prerequisites which must be completed successfully prior to taking this course:
   - ✓ CHEN 4310 (Separation Processes)
   - ✓ CHEN 4330 (Process Control and Safety)

It also has one co-requisite that must be taken simultaneously:

- ✓ CHEN 4340 (Chemical Reaction Engineering)

2. The goal of our faculty is to be commonly available to you for assistance, so you are encouraged and expected to seek **additional instruction (AI)**. Take advantage of AI, it's FREE and really will help! There are several ways you can seek AI:
   - ✓ You are welcome to stop by the instructor's office at any time. However, for your own satisfaction, you can ensure the instructor is available at the office by using the following options:
   - ✓ Come to Office hours (Monday and Thursday from 3:00 pm to 4:00 pm). This is the time the instructor has set aside to answer your questions;
   - ✓ E-mail or call the instructor to set up a mutually agreeable time to meet with the instructor,
   - ✓ E-mail your questions to the instructor (this is the least preferred option because of the limited effectiveness of e-mail communication), but it is acceptable if other options are not possible.

3. Class Room Procedures:

a. Bring study notes, **textbooks**, note-taking material, and calculator to every class. You may not borrow or exchange calculators during graded events. If your calculator fails during a graded exercise, I am not responsible to furnish a substitute. Class preparation is your individual responsibility.

b. Textbooks:

Required:
Analysis, Synthesis, and Design of Chemical Processes; Turton, Whiting, Shaeiwitz, 5th Edition.

Optional:

Welty, J.R.; Rorrer, G.; Foster, D.G.; "Fundamentals of Momentum, Heat, and Mass Transfer", John Wiley & Sons, New York, 2014, 6th Edition (WRF).

Theodore L. Bergman, Adrienne S. Lavine, Frank P. Incropera, David P. Dewitt, Fundamentals of Heat and Mass Transfer, 7thEd., John Wiley & Sons, 2011 (BLID).

McCabe, Smith, and Harriott: "Unit Operations of Chemical Engineering", 7th edition. McGraw-Hill Inc. (2005) (MS)
Transport Processes and Separation Process Principles", 4th ed., Geankoplis, Prentice Hall, 2003. (G)

c. *Process Simulation Tool:* Students can use software packages to assist with the modelling and optimization of the design. Promax is the recommended package for this purpose.

d. Weekly Job Sheets and Billable Hours:

Because this course is formulated to simulate design as performed in a professional company, we will track our time and work load through the use of tools common to the business world: Billable Hours Work Sheets and Weekly Job Sheets. The billable hours sheet will be due each Monday in class and should reflect the time on task for each member in the design team. The Weekly Job sheet reflects the planned work for the upcoming week and will also be turned in on Monday. Each of these tools requires the initials of the engineer assigned and/or working on a particular task as well as the initials of at least one other engineer in the group. Examples of these two tools are found in the enclosures to this memo.

e. Engineering Design Problem:

This course includes a semester long design problem with 2 written submissions. When submissions are complete you will have executed a portion of a complex design. The submission will document critical stages of the design process, namely a 65% submission and a 100% submission. You will also be responsible for 2 oral presentations of your work: a presentation of the 35% submission completed last semester and a presentation of your completed design. The presentation will be made to prospective clients (me and others).

4. Evaluations:

a. *ACADEMIC DISHONESTY:* Representation of other's work as your own will not be tolerated. Cheating on examinations, quizzes, reports, and homework and the false representation of work will be interpreted as academic dishonesty. Academic dishonesty will be subject to disciplinary action as outlined by the UT Tyler Student Guide on Conduct and Discipline.

b. *Homeworks:* A set of homework problems will be assigned as part of the Chemical Engineering specific component. All homework is mandatory and becomes part of your grade. As an engineer your goal is to make a clear, logical, and professional presentation of your work, which is both accurate and correct. As such, both the presentation and the accuracy of your work is important, and both will be graded. It is critical that you show all of your work and leave "foot prints" so that it can be easily followed. No guess work should be required to see what you did. For each homework problem, the corresponding topic and numerical answers will be provided. You are encouraged to work in groups, but the work that you turn in should be your own. Homeworks are ***due*** at the beginning of class.

c. Late Submissions. It is a basic principle of professionalism that **"Professionals are not Late."** A "COORDINATED LATE" submission occurs when you will miss the due date for a graded assignment and you contact me in advance. Notification immediately before the submission will not suffice. Point cuts up to the amounts below **<u>may</u>** be assessed for a "COORDINATED LATE" submission:

1. 0-24 hours late — a deduction of 25% of the earned grade
2. 24-48 hours late — a deduction of 50% of the earned grade
3. More than 48 hours late — No credit.

Obviously there are circumstances that will occur and make a timely submission impossible and I will work with you when and if they occur.

1) All homework and reports in this course must be properly documented. As you are having your work reviewed, it is likely that you might receive help from your classmates, just simply document it. Information from the course textbooks (equations and outlines of procedures), class notes, or me is considered immediately available to all students and need not be acknowledged or documented with one exception. **YOU ARE REQUIRED TO ACKNOWLEDGE AND DOCUMENT ALL OTHER ASSISTANCE AND REFERENCES USED.** Documentation will be accomplished in accordance with any manual for writing, footnote or endnote, for papers, but for written homework, just place the documentation right at the point you received help using "Who and what" assistance.

d. *Quizzes:* There will be two quizzes on scheduled dates during the semester. ***Quizzes will only include problems from previous homework assignments*** (numerical values may be modified).

e. *Participation grade:* Students are expected to be engaged in class and outside of the class. The instructor will assign a participation grade to each student based on the following observations:

1) Peer-evaluations to be carried out during the semester;
2) Attendance in class and punctuality;
3) Level of participation in class, asking questions about the material and answering questions from the instructor;
4) Engagement, demonstrating initiative to work on problems, and actively participating in the discussions;
5) Asking questions outside class: after class, during office hours, and by e-mail;

Attendance in class is the component with more weight on participation. A student that attends every class, but otherwise is not active will receive a 2.5/5.0 as participation grade.

5. Grading:

The grading for this course will be based on two components: (1) the Chemical Engineering specific component, led by Dr. Resende and Mr. Thomas, and (2) the Engineering Design Problem, assigned by Dr. McGinnis in conjunction with the Civil Engineering students. Grades will be based entirely on the student's demonstrated ability to develop detailed, neat, organized, and correct solutions to the problems presented. Correct answers accompanied by incorrect, incomplete, or untidy solutions may receive no credit.

Points – Chemical Engineering Specific Component

Homeworks (5 at 2.0 points each)	10 (10 %)
Quizzes (2 at 5.0 points each)	10 (10 %)
Participation (5.0 points)	5 (5 %)

Total 25 (25%)

Points – Engineering Design Problem

35 % Oral Presentation	10 (10 %)
65 % Design Review	10 (10 %)
100 % Design Report	30 (30 %)
100 % Oral Presentation	15 (15 %)
Design Evaluation	10 (10 %)

Total 75 (75%)

Total points = Chem. Eng. Spec. Component + Engineering Design Problem - 100 (100 %)

The Team Project is an essential component of the Design course. Therefore, ***students who fail to turn in the Final Report will automatically receive an F grade for the course***.

Grade Scale based on points

Higher than 85 points	A
Between 70 and 85 points	B
Between 50 and 70 points	***C***
Between 30 and 50 points	D
Less than 30 points	F

You need at least 50 points total to pass the course with a C grade. Since this is a capstone project, submission of the Engineering Design Project is a requirement for passing the course.

6. Collection of Student Work:

Throughout the semester I will collect student work (best, average, and worst) for the ABET course and outcomes notebooks. This will require me to make a copy of your work, keep your original and return a copy of the graded work to you. I will not draw attention as to what level of work you accomplished.

7. Assigned readings:

The class schedule will include assigned reading for every lecture. Students who read the corresponding sections of the book *before each class* will certainly make the most of the lectures, so this is highly recommended. In addition, the instructor will periodically post the lecture notes

on the course website. Doing the assigned reading prior to class will help you to understand the material presented during the instruction and will fill in gaps for things we do not cover (***I will not cover everything***). It will also make you more familiar with terms and concepts to be covered.

8. **UT Tyler Honor Code** - Every member of the UT Tyler community joins together to embrace: Honor and integrity that will not allow me to lie, cheat, or steal, nor to accept the actions of those who do.

9. **Students Rights and Responsibilities:** to know and understand the policies that affect your rights and responsibilities as a student at UT Tyler, please follow this link: http://www.uttyler.edu/wellness/rightsresponsibilities.php.

10. **Campus Carry** - We respect the right and privacy of students 21 and over who are duly licensed to carry concealed weapons in this class. License holders are expected to behave responsibly and keep a handgun secure and concealed. More information is available at http://www.uttyler.edu/about/campus-carry/index.php.

11. **UT Tyler a Tobacco-Free University** - All forms of tobacco will not be permitted on the UT Tyler main campus, branch campuses, and any property owned by UT Tyler. This applies to all members of the University community, including students, faculty, staff, University affiliates, contractors, and visitors. Forms of tobacco not permitted include cigarettes, cigars, pipes, water pipes (hookah), bidis, kreteks, electronic cigarettes, smokeless tobacco, snuff, chewing tobacco, and all other tobacco products. There are several cessation programs available to students looking to quit smoking, including counseling, quitlines, and group support. For more information on cessation programs please visit www.uttyler.edu/tobacco-free.

12. **Grade Replacement/Forgiveness and Census Date Policies** - Students repeating a course for grade forgiveness (grade replacement) must file a Grade Replacement Contract with the Enrollment Services Center (ADM 230) on or before the Census Date of the semester in which the course will be repeated. Grade Replacement Contracts are available in the Enrollment Services Center or at http://www.uttyler.edu/registrar. Each semester's Census Date can be found on the Contract itself, on the Academic Calendar, or in the information pamphlets published each semester by the Office of the Registrar. Failure to file a Grade Replacement Contract will result in both the original and repeated grade being used to calculate your overall grade point average. Undergraduates are eligible to exercise grade replacement for only three course repeats during their career at UT Tyler; graduates are eligible for two grade replacements. Full policy details are printed on each Grade Replacement Contract. The Census Date is the deadline for many forms and enrollment actions of which students need to be aware. These include:
    - Submitting Grade Replacement Contracts, Transient Forms, requests to withhold directory information, approvals for taking courses as Audit, Pass/Fail or Credit/No Credit.
    - Receiving 100% refunds for partial withdrawals. (There is no refund for these after the Census Date)
    - Schedule adjustments (section changes, adding a new class, dropping without a "W" grade)
    - Being reinstated or re-enrolled in classes after being dropped for non-payment
    - Completing the process for tuition exemptions or waivers through Financial Aid

13. **State-Mandated Course Drop Policy** - Texas law prohibits a student who began college for the first time in Fall 2007 or thereafter from dropping more than six courses during their entire undergraduate career. This includes courses dropped at another 2-year or 4-year Texas public college or university. For purposes of this rule, a dropped course is any course that is dropped after the census date (See Academic Calendar for the specific date). Exceptions to the 6-drop rule may be found in the catalog. Petitions for exemptions must be submitted to the Enrollment Services Center and must be accompanied by documentation of the extenuating circumstance. Please contact the Enrollment Services Center if you have any questions.

14. **Disability/Accessibility Services** - In accordance with Section 504 of the Rehabilitation Act, Americans with Disabilities Act (ADA) and the ADA Amendments Act (ADAAA) the University of Texas at Tyler offers accommodations to students with learning, physical and/or psychological disabilities. If you have a disability, including a non-visible diagnosis such as a learning disorder, chronic illness, TBI, PTSD, ADHD, or you have a history of modifications or accommodations in a previous educational environment, you are encouraged to visit https://hood.accessiblelearning.com/UTTyler and fill out the New Student application. The Student Accessibility and Resources (SAR) office will contact you when your application has been submitted and an appointment with Cynthia Lowery, Assistant Director of Student Services/ADA Coordinator. For more information, including filling out an application for services, please visit the SAR webpage at http://www.uttyler.edu/disabilityservices, the SAR office located in the University Center, # 3150 or call 903.566.7079.

15. **Student Absence due to Religious Observance** - Students who anticipate being absent from class due to a religious observance are requested to inform the instructor of such absences by the second class meeting of the semester.

16. **Student Absence for University-Sponsored Events and Activities** - Revised 05/19 If you intend to be absent for a university-sponsored event or activity, you (or the event sponsor) must notify the instructor at least two weeks prior to the date of the planned absence. At that time the instructor will set a date and time when make-up assignments will be completed.

17. **Social Security and FERPA Statement** - It is the policy of The University of Texas at Tyler to protect the confidential nature of social security numbers. The University has changed its computer programming so that all students have an identification number. The electronic transmission of grades (e.g., via e-mail) risks violation of the Family Educational Rights and Privacy Act; grades will not be transmitted electronically.

18. **Emergency Exits and Evacuation** - Everyone is required to exit the building when a fire alarm goes off. Follow your instructor's directions regarding the appropriate exit. If you require assistance during an evacuation, inform your instructor in the first week of class. Do not re-enter the building unless given permission by University Police, Fire department, or Fire Prevention Services.

19. **Student Standards of Academic Conduct** - Disciplinary proceedings may be initiated against any student who engages in scholastic dishonesty, including, but not limited to, cheating,

plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts.

i. "Cheating" includes, but is not limited to:

- copying from another student's test paper;
- using, during a test, materials not authorized by the person giving the test;
- failure to comply with instructions given by the person administering the test;
- possession during a test of materials which are not authorized by the person giving the test, such as class notes or specifically designed "crib notes". The presence of textbooks constitutes a violation if they have been specifically prohibited by the person administering the test;
- using, buying, stealing, transporting, or soliciting in whole or part the contents of an unadministered test, test key, homework solution, or computer program;
- collaborating with or seeking aid from another student during a test or other assignment without authority;
- discussing the contents of an examination with another student who will take the examination;
- divulging the contents of an examination, for the purpose of preserving questions for use by another, when the instructors has designated that the examination is not to be removed from the examination room or not to be returned or to be kept by the student;
- substituting for another person, or permitting another person to substitute for oneself to take a course, a test, or any course-related assignment;
- paying or offering money or other valuable thing to, or coercing another person to obtain an unadministered test, test key, homework solution, or computer program or information about an unadministered test, test key, home solution or computer program;
- falsifying research data, laboratory reports, and/or other academic work offered for credit;
- taking, keeping, misplacing, or damaging the property of The University of Texas at Tyler, or of another, if the student knows or reasonably should know that an unfair academic advantage would be gained by such conduct; and
- misrepresenting facts, including providing false grades or resumes, for the purpose of obtaining an academic or financial benefit or injuring another student academically or financially.

ii. "Plagiarism" includes, but is not limited to, the appropriation, buying, receiving as a gift, or obtaining by any means another's work and the submission of it as one's own academic work offered for credit.

iii. "Collusion" includes, but is not limited to, the unauthorized collaboration with another person in preparing academic assignments offered for credit or collaboration with another person to commit a violation of any section of the rules on scholastic dishonesty.

iv. All written work that is submitted will be subject to review by plagiarism software.

20. UT Tyler Resources for Students

- UT Tyler Writing Center (903.565.5995), writingcenter@uttyler.edu
- UT Tyler Tutoring Center (903.565.5964), tutoring@uttyler.edu

- The Mathematics Learning Center, RBN 4021, this is the open access computer lab for math students, with tutors on duty to assist students who are enrolled in early-career courses.
- UT Tyler Counseling Center (903.566.7254)

Billable Hours and Weekly Job Sheet

CENG 4315 Weekly Job Sheet
Spring 2009

Engineer	Initial	Tasks	Team Initial

Notes:

CENG 4315 Billable Hours
Spring 2009

Week of:	Date	Task	Engineer	Account Number	Team Initial

Accounting:

CE09-1 Structure	CE09-3 Transportation	CE09-5 Environmental	CE09-7 Surveying
CE09-2 Geotechnical	CE09-4 Const. Mngmnt	CE09-6 Water Res./Hydro.	CE09-8 Other

Schedule:
PLEASE NOTE – on the dates highlighted as green, we will meet on RBS 2019. Otherwise, we will meet on RBN 1034.

week		January	Material	Assigned Reading	Evaluation due
1	M	9	CENG 4315 - Feedback on 35 % report	-	-
	W	11	Syllabus, Introduction		-
	F	13	Storyboard due	-	-
2	M	16	No class - Martin Luther King	-	-
	W	18	Fluid Machinery: Pump Classifcation, Centrifugal Pumps, Pump performance	WRF 14	-
	F	20	Dry run for 35 % presentation	-	35 % presentation draft
3	M	23	Net Positive Suction Head	WRF 14	-
	W	25	Scaling Laws for Pumps and Fans	WRF 14	-
	F	27	Full 35 % presentations	-	35 % presentation
4	M	30	35 % presentation debrief		-
		February	**Material**	**Assigned Reading**	**Evaluation due**
4	W	1	Recitation 1	-	-
	F	3	Heat Exchanger Types, Overall Heat Transfer Coefficient , The Log Mean Temperature Difference	BLID 11.1-11.3	HW 1
5	M	6	Heat Exchangers - additional considerations	BLID 11.6	-
	W	8	Recitation 2	-	-
	F	10	Introduction to equilibrium stage processes, ideal stages	MS. 643-646, G. 625-630	-
6	M	13	Business Development 1	-	-
	W	15	Business Development 2	-	-
	F	17	Business Development 3	-	-
7	M	20	Business Development 4	-	-
	W	22	Business Development 5	-	-
	F	24	Business Development 6, meeting with mentors	-	-
8	M	27	Multiple stages for equilibrium processes	MS 646-651, G. 631-634	HW 2

		March	**Material**	**Assigned Reading**	**Evaluation due**
8	W	1	65 % review	-	65 % report
	F	3	Design of cascades, McCabe-Thiele method	MS. 651-653	-
9	M	6	Analytical method for cascades design - the Kremsher Equation	MS. 653-660, G. 634 – 636	Quiz 1
	W	8	Selected topics	TBA	-
	F	10	Selected topics	TBA	-
10	M	13	No class - Spring break		-
	W	15	No class - Spring break		-
	F	17	No class - Spring break		-
11	M	20	Mentor Presentation		-
	W	22	Selected topics	TBA	-
	F	24	Mentor Presentation		-
12	M	27	Selected topics	TBA	-
	W	29	Selected topics	TBA	HW 4
	F	31	Selected topics	TBA	-
		April	**Material**	**Assigned Reading**	**Evaluation due**
13	M	3	Selected topics	TBA	-
	W	5	Class cancelled	-	-
	F	7	Selected topics	TBA	HW 3
14	M	10	Dry run for 100 % presentation		-
	W	12	Full 100 % presentations	-	100 % presentations
	F	14	Rubric due	-	Quiz 2
15	M	17	Class cancelled - Ring Ceremony		HW 5
	W	19	Final Presentations		Final Presentations
	F	21	ChemE 100 % presentation		-