Mathematical Introduction to General Chemistry (CHEM 1980)

Spring 2026

Instructor: Dr. Sophie Kinyanjui (sophia.kinyanjui@unt.edu)

Session	Days	Time	Location
CHEM 1980.001 (in-person)	MoWeFr	12:00 pm – 12:50 pm	CHEM 352
Office Hour	M	10:30 am – 11:30 am	CHEM 164
(other time by appointment)	F	9:30 am – 10:30 am	CHEM 164

Pre-requisite: TSI math compliant

Course Description: This is a one semester preparation course for General Chemistry. This course not only delivers chemical principles but also focuses on the application of mathematical skills in solving chemistry problems. It is designed for students with little or no chemistry training, or who need extra help with mathematics in the level of College Algebra and thus increases the likelihood of success in General Chemistry. We take a 'chemistry-first' approach, by introducing chemical concepts first and then apply specific mathematics skills to chemical concepts to facilitate deeper understanding, build student self-confidence, and get students engaged in the course.

Course Outcomes: At the end of the course, students will demonstrate the ability to:

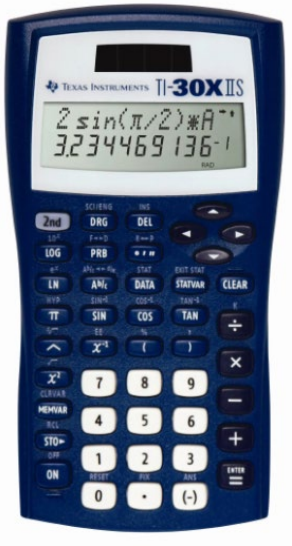
1. Solve mathematical calculations with moving decimals, using exponential notation and prefixes.
2. Solving chemical calculations with correct significant figures and conversion factors.
3. Understand and explain atomic structure, and its influence on the periodic properties.
4. Name binary molecular compounds and ionic compounds.
5. Understand moles, mass and molar mass, and know how to balance chemical equations.
6. Perform stoichiometric calculation and identify limiting reactants and theoretical yield.
7. Define molarity and perform molarity calculation.
8. Set up and solve problems in unit dimensional analysis.
9. relate a theory on molecular behavior in the gas phase to the Ideal Gas Law.
10. Define temperature, pressure, volume, and mole in Ideal Gas Law, and perform calculations using Ideal Gas Law.
11. Comprehend that chemistry topics are cross-linked.

Course Materials

1. Textbook: Calculations in Chemistry: An Introduction, ISBN: 9780393614367
2. Access to *Smartwork5* online Homework platform
3. A scientific calculator
4. Canvas is your single log-on to link to your assignments, to check your grade on every assignment/exam, or to contact me at any time.
    - UNT Help Desk http://www.unt.edu/helpdesk/index.htm Email: helpdesk@unt.edu
5. An electronic device (phone, iPad, computer, etc.) that can logon to Canvas for classroom attendance quizzes.

YOU NEED A SCIENTIFIC CALCULATOR FOR THIS COURSE!

- **Technically ANY SCIENTIFIC CALCULATOR will work for this class. So, if you already own any graphing calculator, you're good to go. BUT if you don't have a calculator and you're looking to acquire a cheap one for this class, this TI-30X-IIS (shown here) will be sufficient for this class. It costs approximately $10.00 at Walmart, BestBuy, or Office Depot. It's actually cheaper on Amazon!**



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Caution!!!!

- ***Cell phones, laptops, tablets, smartwatches, or anything else that can connect to the internet are not allowed on Exams. If you are caught using any item that connects to the internet during any mid-term Exam or the Final Exam, you will be asked to leave the Testing Center, and you will receive zero points for that Exam and that Exam will not be eligible for the Drop Exam policy.***

Getting Help

Technical Assistance

Part of working with course materials that rely heavily on online connectivity involves dealing with the inconveniences and frustration that can arise when technology breaks down or does not perform as expected. Here at UNT we have a Student Help Desk that you can contact for help with Canvas or other technology issues.

UIT Help Desk: UIT Student Help Desk site (http://www.unt.edu/helpdesk/index.htm)
Email: helpdesk@unt.edu
Phone: 940-565-2324
In Person: Sage Hall, Room 130
Walk-In Availability: 8am-9pm
Telephone Availability:

- Sunday: noon-midnight
- Monday-Thursday: 8am-midnight
- Friday: 8am-8pm
- Saturday: 9am-5pm

Laptop Checkout: 8am-7pm
For additional support, visit Canvas Technical Help (https://community.canvaslms.com/docs/DOC-10554-4212710328)

Chemistry Resources

- ***Chemistry Resource Center (CRC)***: Room # CHEM 231. It a dedicated Chemistry tutoring lab, staffed by chemistry graduate students.
- ***The Computational Chemistry Instructional Laboratory (CCIL)***: CCIL provides computer access to all undergraduate and graduate students enrolled in UNT chemistry courses. Computers are to be used only for chemistry related work and instruction. The CCIL is staffed by chemistry graduate students knowledgeable in the area of computational chemistry.

More information about CRC and CCIL can be found at this website (https://chemistry.unt.edu/undergraduate-program/instructional-resources).

My Teaching Philosophy – The importance of Goal setting

I believe that everyone can succeed in chemistry, regardless of what you may have heard before. I find chemistry endlessly interesting and my goal in this course is to introduce you to some of that fascination. I want you to learn the foundations of chemistry that you will carry with you through other chemistry courses, as well as into your everyday life. I have tried to ensure that the material on this course is presented in several different ways, from reading to videos to interactive simulations. I want you to *think* about the material and learn how to apply the knowledge you are gaining to solve chemical problems. I do not want you to simply memorize and regurgitate information on exams. You don't learn anything through simple memorization.

Goal setting is a very important step in ensuring your success in any undertaking. I would like you to pause here and think about the grade you want to make in this class. Many of my students want to get A grades in all their classes. Some want to make B grades and a few just want to survive and therefore consider a C grade sufficient for their purposes. I make no judgment about what you have chosen for yourself. My job is to support you in achieving the goal that you set for yourself. So, I would like you to be very honest with yourself and write down the grade you want to make in this class on a plain piece of paper.

Now, if you never get up and start walking towards your goal then you will never achieve it. So, you will need to set your second goal which is to work diligently towards achieving the first goal throughout this semester. In fact, go ahead and write your desired grade on more pieces of paper and stick them to the fridge, to the bathroom mirror, and on your desk. You may even make this letter grade the screen saver on your cell phone and on your computer. Let everything around you remind you of your goal, and purpose to walk towards this goal every moment of the semester. If you find yourself playing a computer game, or doing something random, simply ask yourself, "Is this taking me towards my goal?" If it is not, then just gently turn away from it and continue walking towards your goal. Practice this every day without fail.

So, what is the best strategy that has proven to ensure success in this class? I can tell you it is groupwork. I know that many of you do not like talking to anyone, let alone trying to study with them. Nevertheless, you will find that the material covered in this class is so much, and it can get quite confusing and overwhelming. Besides, there are concepts that you must recall exactly in order to help you solve problems involving new concepts. This is why teamwork is so important. Besides giving you a variety of perspectives on difficult concepts which will help you remember them more easily, you get an opportunity to explain the concepts that you have already internalized to your peers which helps to cement them in your mind. If you can articulate a concept so well that someone else understands it, that is clear evidence that you understand it. So, teamwork helps you practice what you already know by giving you an opportunity to teach it to others. And teaching is the best way to learn. I honestly cannot overemphasize the significance of groupwork and study groups in any science course. It is almost impossible to succeed in science courses without leaning on other classmates. So, please make it a priority to join a study group, or create one ASAP.

You see, I believe in you and in your ability to succeed. I believe that you are able to achieve any goal that you set your mind to as long as you keep walking towards it without getting overly distracted. I would like you now to believe in yourself and to focus on achieving your goals for this semester. Tell yourself that you can do it. Remind yourself every day that you can do it. Do not let anyone tell you that you cannot do it. If they do, just tell them, "Just watch me, and I will show you." Remember. All you have to do is to keep thinking about your goal every moment and simply keep walking towards it. You do not have to struggle. You just need to keep working on every assignment, keep up with the readings and every homework assignment and quiz on a daily basis. If you get distracted for a moment, that is ok. Just notice it, gently turn from it, and keep working on the course materials.

16 weeks is such a short time. Before you know it, the semester will be over. And….. You will have either achieved your goal….. or not. It entirely depends on you and the decisions you make. Most importantly, believe in yourself.

I suggest that you write yourself a weekly schedule for all your classes, including all the required face-to-face class times, study time, any upcoming assignments, and things of that nature. Do not forget to

schedule yourself time to eat, sleep, and to do whatever else you need to stay healthy!

Then set your intention to succeed. You can do it!

Course Schedule (Subject to Change)

Week	Day	Date	Topic
1	M/W/F	Jan 12, 14 and 16	Chapter 1: Scientific Calculations
2	W/F	Jan 21 and 23	Chapter 2: Metric System
3	M/W/F	Jan 26, 28, and 30	Chapter 3: Significant Figures
4	M/W/F	Feb 2, 4 and 6	Chapter 3: Significant Figures ***Exam 1 (Fri, Feb 6)***
5	M/W/F	Feb 9, 11 and 13	Chapter 4: Conversion Factors
6	M/W/F	Feb 16, 18 and 20	Chapter 6: Atoms, Ions, and Periodicity
7	M/W/F	Feb 23, 25, and 27	Chapter 7: Naming of molecular and ionic compounds
8	M/W/F	Mar 2, 4 and 6	Chapter 8: Mole, molar mass, and balancing equations ***Exam 2 (Fri, Mar 6)***
UNT Spring Break			
9	M/W/F	Mar 16, 18 and 20	Chapter 8: Mole, molar mass, and balancing equations
10	M/W/F	Mar 23, 25 and 27	Chapter 9: Stoichiometry
11	M/W/F	Mar 30, Apr 1 and 3	Chapter 10: Molarity ***Exam 3 (Fri, Apr 3)***
12	M/W/F	Apr 6, 8 and 10	Chapter 11: Use Dimensions for Conversions
13	M/W/F	Apr 13, 15 and 17	Chapter 12: Concentration Calculations
14	M/W/F	Apr 20, 22 and 24	Chapters 16: Gas Laws I ***Exam 4 (Fri, Apr 24)***
15	M/W	Apr 27 and 29	Chapter 17: Gas Laws II; ***Apr 31 (Reading Day; No class)***
16	**W**	**May 6**	**Cumulative Final Exam (2-hour exam)**

* Class dates for topics are tentative and may change without notice.
* There is a chance that we might be ahead of the schedule above, and cover some sections of Chapter 18 Phases and Energy
* Any change in Exam dates will be announced in class and posted on the course website.

Grading

Your grade is determined by your performance in six categories. **Questions about any posted score must be submitted within seven days of the posted score; questions submitted afterwards may be declined.**

Four In-Term Exams 400 points

There are four 50-minute in-term exams held during classes. Each exam has 100 possible points. Your average will be calculated after dropping the lowest in-term exam score. If a student receives a "0" because of cheating, that grade cannot be used as the dropped grade.

The general rule is that No Make-up exams will be given. If you have an acceptable, documented reason for missing an exam (examples include documented illness, auto accident, participation in UNT-sponsored event, observance of religious holiday), you will be allowed to replace the missed exam with your score on the final exam. You need to bring the document to Dr. Kinyanjui within 3 days of the exam.

Final Exam 150 points

The Final exam is scheduled on Wednesday, May 6th at the SAGE Hall Testing Center. As with the other exams, the drop-in time window is from 9 am – 3 pm. The Final exam is a coordinated exam by the university, and your score will be out of 150 possible points. The final exam is mandatory. Students who do not take the final exam will necessarily receive a failing grade in the class, regardless of other scores earned in the class.

Smartwork5 Homework 150 points

You will have a weekly homework assignment using Smartwork5. *Smartwork5* is a different type of learning system that is adaptive, so it can take a while to complete the objective assignments. All assignments are due on Fridays at 11:59 pm, starting from Friday, January 23rd. There are 14 assignments with 10 points each. At the end of the semester, the total will be computed and weighted at 150 points. The deadlines for the homework assignments are firm and cannot be extended. It is recommended that you attempt the assignments well before the deadline.

In-Class Quizzes 100 points

There are in-class paper quizzes on Fridays. The questions are from Practice A (B, C, etc) of each Lesson or Review Quiz at the end of each chapter in the textbook.

Exam Review Quizzes 100 points

There are 4 Canvas review quizzes throughout the semester, with 25 points each. They are given and due before each in-term test. The total will be capped at 100 points at the end of the semester.

Lecture Attendance Quizzes 50 points

Attendance at every lecture is expected, and attendance quizzes will be given during every lecture. Groupwork is emphasized as a perfect study strategy. Nothing compares to the ability to bounce ideas off of your peers as well as the ability to explain chemistry concepts to them and answer their questions. Explaining a concept/s to someone else is the best way to learn and retain the knowledge. The questions in these quizzes are mostly drawn from Lecture material either covered that day or the previous class.

Research has shown that students who attend class are more likely to be successful. You should attend every class unless you have a university excused absence such as active military service, a religious holy day, or an official university function as stated in the Student Attendance and Authorized Absences Policy (PDF) (https://policy.unt.edu/policy/06-039). If you cannot attend a class due to an emergency, please let me know. Your safety and well-being are important to me.

Total Points Possible for Semester/Grading Scale = 1000

Types of Assignments	Points per Item	Number of Assignments	Capped Total points	Percentage
In-term exams (1 drop)	100	4	400	40%
Final Exam (cumulative)	200	1	200	20%
Smartwork5 Weekly Homework	/	14	150	15%
Friday Quizzes	/	/	100	10%
Exam Review Quizzes	25	4	100	10%
Attendance Quizzes	/	/	50	5%
Course Total Points			**1000**	**100%**

Total Points /Grading Scale

900 - 1000	=	A
800 - 899	=	B
700 - 799	=	C
600 - 699	=	D
< 600	=	F

Please note, the passing grade of the course is B!!!

Late Work Policy

Late work on homework, quizzes, and exams will not be accepted beyond the deadlines except for university excused absences and extremely extenuating circumstances, which I reserve the right to define). There will be no makeup exams for missed exams. The Final exam will replace the lowest exam grade if it is higher than the exam grade. **If you have a valid reason for missing a mid-term exam then, you must email me ASAP. I get to decide the validity of your reasons.** A missed exam (without an excused absence) earns a zero grade, which is eligible to be replaced by the Final exam. Under extremely extenuating circumstances, I may give a makeup exam or extend due dates for assignments. So please let me know your reasons for missing an exam so that I'm able to decide what we need to do about it.

Some very limited concessions will be provided as per the advice of the office of the Dean of Students due to COVID issues and other matters that are traditionally arbitrated by the Dean of Students. So, if you have any COVID related issues, religious holidays, or debilitating family, mental or emotional issues, **you MUST report them FIRST to the Dean of Students' office**, then to the instructor of record.

For absences due to religious holidays which you are aware of ahead of time, you must talk to me about them at the beginning of the semester. Otherwise, the absence will **NOT** be excused if you tell me about it either after the fact or on the day of. This also applies to scheduled surgeries, doctor's appointments and work-related or University related travel that you know about ahead of time.

Class Attendance Policy

Research has shown that students who attend class regularly are more likely to be successful. You should attend every class unless you have a university excused absence such as active military service, a religious holy day, or an official university function as stated in the Student Attendance and Authorized Absences Policy (PDF) (https://policy.unt.edu/policy/06-039). If you cannot attend a class due to an emergency, please let me know within reasonable time. Your safety and well-being are important to me.

Attendance will be taken and there will be group activities that will be turned in for grades during every lecture. Students are expected to attend class meetings regularly and to abide by the attendance policy established for the course as per UNT policy. It is important that you communicate with the professor and the instructional team prior to being absent, so you, the professor, and the instructional team can discuss and mitigate the impact of the absence on your attainment of course learning goals. Please inform the professor and instructional team if you are unable to attend class meetings because you are ill, or in mindfulness of the health and safety of everyone in our community.

Class Recordings

I record all my lectures and make the Zoom recordings available to you in Canvas. I provide the recordings as a resource to help you review all the lecture material at your own pace at home with all the step-by-step procedures for problem solving right at your fingertips. You need to make very good notes for yourself during the class lecture. Then you can watch and re-watch the recorded lecture to cement your understanding of the concepts.

Groupwork

Groupwork is highly encouraged as it is virtually impossible to do well on any science course without tons of help from your peers. Prioritize forming a study group and consider it your first line of defense against failure. Meet with them often to work on the course material and teach each other the new concepts that you have learned. Assign each other different concepts for each person in the team to master. Then, arrange to have a meeting where everyone articulates the concepts they have mastered for everyone else's benefit. Learn from each other that way.

Remember!!! You are not looking for people to teach you from among your classmates. Rather, you are looking for people that you can teach the concepts that you have mastered! Your study group will consist of people that want to bounce ideas and concepts off of each other.

How much Outside Class Study Time?

- The rule of thumb that research has found to work for most students is the 2 – 3 hours outside of class study time, for every hour of Lecture.
- This means that **you must spend at least 6- 9 hours studying CHEM 1980 and working with your study group every week** in order to succeed in this class. The more you can do the better.

TIPS FOR SUCCESS

We will be using an active and student-centered approach to learning. We will use simulations, teamwork collaboration, and group discussions. Your peers will be the first place you can turn to ask questions or verify your knowledge of the topics we are discussing. I will ask questions during class and will wait for responses. Even wrong answers are okay! It helps me know where you are at in the discussion.

Before Class

You should be doing the following things before attending class: review material from the last class, read from the textbook about the material in the upcoming class, write down any questions you have, review upcoming topics (5-10 minutes), and download/print the lecture slides for the upcoming class.

During Class

While in class, you should: stay awake, follow along with the notes, ask questions, work through problems, and collaborate with your peers. You should NOT simply be re-writing the notes.

After Class

After each class, take time to: review notes, work through homework problems, attend PLTL sessions, and ask questions in the CRC or drop-in student/office hours.

Academic Dishonesty

Students caught cheating or plagiarizing will receive a "0" for that particular assignment or exam. Additionally, the incident will be reported to the Office of Academic Integrity, who may impose further penalty. According to the UNT catalog, the term "cheating" includes, but is not limited to: (a) use of any unauthorized assistance in taking quizzes, tests, or examinations; (b) dependence upon the aid of sources beyond those authorized by the instructor in writing papers, preparing reports, solving problems, or carrying out other assignments; (c) the acquisition, without permission, of tests or other academic material belonging to a faculty or staff member of the university; (d) dual submission of a paper or project, or resubmission of a paper or project to a different class without express permission from the instructor(s); or (e) any other act designed to give a student an unfair advantage. The term "plagiarism" includes but is not limited to: (a) the knowing or negligent use by paraphrase or direct quotation of the published or unpublished work of another person without full and clear acknowledgment; and (b) the knowing or negligent unacknowledged use of materials prepared by another person or agency engaged in the selling of term papers or other academic materials.

Acceptable Student Behavior

Student behavior that interferes with an instructor's ability to conduct a class or other students' opportunity to learn is unacceptable and disruptive and will not be tolerated in any instructional forum at UNT. Students engaging in unacceptable behavior will be directed to leave the classroom and the instructor may refer the student to the Dean of Students to consider whether the student's conduct violated the Code of Student Conduct. The university's expectations for student conduct apply to all instructional forums, including university and electronic classroom, labs, discussion groups, field trips, etc. The Code of Student Conduct can be found at http://deanofstudents.unt.edu.

Rules of Engagement

Rules of engagement refer to the way students are expected to interact with each other and with their instructors online. Here are some general guidelines:

- Treat your instructor and classmates with respect in email or any other communication.
- Always use your professors' proper title: Dr. or Prof., or if in doubt use Mr. or Ms.
- Unless specifically invited, don't refer to your instructor by first name.
- Use clear and concise language.
- Remember that all college level communication should have correct spelling and grammar (this includes discussion boards).
- Avoid slang terms such as "wassup?" and texting abbreviations such as "u" instead of "you."
- Use standard fonts such as Ariel, Calibri or Times new Roman and use a size 10- or 12-point font
- Avoid using the caps lock feature AS IT CAN BE INTERPRETTED AS YELLING.
- DoN't Do ThIs WeIrD WaY oF tYpInG.
- Be cautious when using humor or sarcasm as tone is sometimes lost in an email or discussion post and your message might be taken seriously or sound offensive.
- Be careful with personal information (both yours and other's).
- Do not send confidential information via e-mail

See these Engagement Guidelines (https://clear.unt.edu/online-communication-tips) for more information.

Student Support Services

UNT provides mental health resources to students to help ensure there are numerous outlets to turn to that wholeheartedly care for and are there for students in need, regardless of the nature of an issue or its severity. Listed below are several resources on campus that can support your academic success and mental well-being:

- Student Health and Wellness Center (https://studentaffairs.unt.edu/student-health-and-wellness-center)
- Counseling and Testing Services (https://studentaffairs.unt.edu/counseling-and-testing-services)
- UNT Care Team (https://studentaffairs.unt.edu/care)
- UNT Psychiatric Services (https://studentaffairs.unt.edu/student-health-and-wellness-center/services/psychiatry)
- Individual Counseling (https://studentaffairs.unt.edu/counseling-and-testing-services/services/individual-counseling)

Other student support services offered by UNT include

- Registrar (https://registrar.unt.edu/registration)
- Financial Aid (https://financialaid.unt.edu/)
- Student Legal Services (https://studentaffairs.unt.edu/student-legal-services)
- Career Center (https://studentaffairs.unt.edu/career-center)
- Multicultural Center (https://edo.unt.edu/multicultural-center)
- Counseling and Testing Services (https://studentaffairs.unt.edu/counseling-and-testing-services)
- Pride Alliance (https://edo.unt.edu/pridealliance)
- UNT Food Pantry (https://deanofstudents.unt.edu/resources/food-pantry)

Academic Support Services

- Academic Resource Center (https://clear.unt.edu/canvas/student-resources)
- Academic Success Center (https://success.unt.edu/asc)
- UNT Libraries (https://library.unt.edu/)
- Writing Lab (http://writingcenter.unt.edu/)
- MathLab (https://math.unt.edu/mathlab)

UNT POLICIES

COVID-19

If you test positive for COVID, I would like to refer you to the current CDC Guidelines (https://www.cdc.gov/coronavirus/2019-ncov/index.html). You will need to provide documentation of a positive test and/or medical treatment in order to meet UNT's Student Attendance & Authorized Absence policy. Please visit the Dean of Students if you need assistance documenting authorized absences due to COVID or any other allowed reason.

ODA Statement

The University of North Texas makes reasonable academic accommodation for students with disabilities. Students seeking reasonable accommodation must first register with the Office of Disability Access (ODA) to verify their eligibility. If a disability is verified, the ODA will provide you with a reasonable accommodation letter to be delivered to faculty to begin a private discussion regarding your specific needs in a course. You may request reasonable accommodations at any time, however, ODA notices of reasonable accommodation should be provided as early as possible in the semester to avoid any delay in implementation. Note that students must obtain a new letter of reasonable accommodation for every semester and must meet with each faculty member

prior to implementation in each class. Students are strongly encouraged to deliver letters of reasonable accommodation during faculty office hours or by appointment. Faculty members have the authority to ask students to discuss such letters during their designated office hours to protect the privacy of the student. For additional information, refer to the Office of Disability Access website at http://www.unt.edu/oda. You may also contact ODA by phone at (940) 565-4323.

Emergency Notification and Procedures

UNT uses a system called Eagle Alert to quickly notify you with critical information in the event of an emergency (i.e., severe weather, campus closing, and health and public safety emergencies like chemical spills, fires, or violence). The system sends voice messages (and text messages upon permission) to the phones of all active faculty staff, and students. Please make certain to update your phone numbers at http://www.my.unt.edu. Some helpful emergency preparedness actions include: 1) know the evacuation routes and severe weather shelter areas in the buildings where your classes are held, 2) determine how you will contact family and friends if phones are temporarily unavailable, and 3) identify where you will go if you need to evacuate the Denton area suddenly. In the event of a university closure, please refer to Blackboard for contingency plans for covering course materials.

Retention of Student Records

Student records pertaining to this course are maintained in a secure location by the instructor of record. All records such as exams, answer sheets (with keys), and written papers submitted during the duration of the course are kept for at least one calendar year after course completion. Course work completed via the Canvas online system, including grading information and comments, is also stored in a safe electronic environment for one year. You have a right to view your individual record; however, information about your records will not be divulged to other individuals without the proper written consent. You are encouraged to review the Public Information Policy and the Family Educational Rights and Privacy Act (FERPA) laws and the university's policy in accordance with those mandates at the following link: http://essc.unt.edu/registrar/ferpa.html

Disclaimer

The descriptions and timelines outlined in this document are subject to change at the discretion of the Instructor.