Course Description
This course details nomenclature, atomic structure, quantum theory, bonding theories and molecular geometry, chemical equations, stoichiometry, thermochemistry, solid, liquid and gaseous states and related forces, gas laws, solutions and colligative properties, periodic relationships, and acid base theories. Laboratory exercises are quantitative in nature and are related to the lecture topics. This is the first semester of a one-year course in chemistry intended for majors in the natural sciences (chemistry, biochemistry, biology, physics, pre-medicine), mathematics, and engineering.

Prerequisites
Chemistry 60 or Chemistry 68, or Chemistry 65 and Mathematics 125 with a satisfactory grade better. (Advisory: English 28 and 67.)

Required Materials
MasteringChemistry access code
Lab Manual (online)
Scientific calculator (non-programmable, non-graphing, with log functions and exponential notation; TI-30XA or TI-30XIIS is recommended)
Lab notebook Book (with carbon copy paper)
Chemical splash goggles (Instructor approved)
Scantron forms #882 for exams
Other (flash dive, printer paper, notebooks, ball point pens, and permanent markers as needed)

All required materials are available from the bookstore. They must be purchased by the 2nd class meeting!!! Your calculator must be brought in each day of class!!!

Grading
Your grade for Chemistry 101 will be based on the percentage of the total possible points that you earn. A total of 1000 points are possible as indicated below:

- **Exams** 300 points (150 points x 2 exams)
- **Quizzes** 150 points (15 points each; most no-exam weeks)
- **Homework** 100 points (traditional assignments and MasteringChemistry)
- **Lab Work** 250 points (lab reports and worksheets)
- **Comprehensive Final** 200 points

Course grades will be assigned according to the following breakdown:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>A</td>
<td>85 – 100%</td>
</tr>
<tr>
<td>B</td>
<td>75 – 84%</td>
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<tr>
<td>C</td>
<td>60 – 74%</td>
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<tr>
<td>D</td>
<td>50 – 59%</td>
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<tr>
<td>F</td>
<td>0 – 50%</td>
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Notes:  
(1) **No student can pass** the course without a passing grade in lab, regardless of point total.  
(2) A student **must have a grade of 50.0% or better on the Final Exam** in order to achieve a grade of “C” or higher in the course.

Attendance
Attendance in lecture and laboratory is expected and required. If you are absent, it is your responsibility to make sure work is handed in on time and to find out
what you missed in class. There will be no make-up exams or quizzes. A missed exam or quiz will be counted as zero, except in rare, extenuating circumstances. A student may be dropped from class when the number of hours absent exceeds the number of hours the class meets per week. However, you are reminded of your responsibility to drop the course if you choose to stop participating. Any student remaining on the official roll sheet after the last day to drop classes must (by state law) be assigned a letter grade of "A" through "F" and cannot be assigned a grade of "NC", "W", or "I". Before you drop, you must check out of your lab drawer and have a card signed by the stockroom.

Behavior in Class
Let's treat each other with respect! Our learning experience in this class will involve a community. The more support and courtesy you give this community the better you and your fellow students will perform. Please arrive on time and prepared, do not annoy or distract others during lectures, refrain from talking to classmates while the instructor is speaking. You are not allowed to use cell phones, computers, or other electronic devices (except for a scientific calculator) unless the instructor gives you permission. Please, obey all safety rules in the laboratory. During lecture, please refrain from consuming any food drinks except water! At any time, under any circumstances, neither drinks nor food are allowed in lab. I strongly encourage you to ask questions during lecture to clarify misunderstanding. I will try my best to answer your questions. If you are not satisfied with my answer for any reason or just need further clarification, you are welcome to come to me right after the lecture. In case you noticed any error or misspelling on the board or on a slide, I would appreciate if you let me know immediately. Please take time to look through “Standards of Student Conduct” in 2015-2016 College Catalog. Most of the time conflicts between a student and the instructor results from minor misunderstanding and can be solved easily and peacefully.

Cheating
Any form of dishonesty in the lab or lecture will result in a failing grade to the examination or assignment in which it occurred and the Academic Dishonesty Report Form will be submitted the Division Office. Cheating includes, but is not limited, to the following: allowing another student to copy one's answers or copying the answers of other students; exchanging information during examinations, creation of a distraction for the purpose of cheating; changing answers on a previously scored test, assignment or experiment; inventing information and/or data. If, in the judgment of the instructor, one student knowingly allows another student to copy from his or her paper, both students will be subjected to disciplinary actions.

Homework
To do well in Chem 101 you will need to spend a considerable amount of time in private study. The pertinent reading of the text should be done in advance of the lecture presentation and should be repeated at least once during the lecture week. However, simply reading your textbook/notes will not be sufficient. The only way to learn and succeed is to regularly work through as many problems as possible. Text problems will be recommended for each chapter studied and additional problem sets will be given by the instructor. Some exam and quiz questions may come directly from your homework. You are encouraged to study in a quiet, non-distracting environment: this will give you the greatest chance for success. Depending on your background, how easily you grasp the material and how effectively you listen, take notes and study, the time you will need to spend outside of this class will vary. The recommended "formula" is that you should engage in 2 hours of study outside class for every 1 hour of lecture (minimum of 6 hours per week).

Course Binder
It is important to be organized in any undertaking to be efficient and successful. Each student is highly recommended to maintain a Chemistry 101 Course Binder. The binder can be divided into a number of sections according to the following order: (1) current course syllabus and schedule, (2) lecture materials, (3) worksheets from the lab, (4) exams. The best way to arrange the materials in each section is in chronological order. You are encouraged bring your course binder to each class.
Office Hours
Each student is strongly encouraged to regularly attend office hours. You are welcome to see me whenever you need help or just to chat about your concerns. Come alone or with your study group. Bring your homework, worksheets, quizzes or other work so we can see what you are having difficulty with. During office hours we can discuss problems solving strategies using problems from current homework assignments, worksheet and quizzes, discuss effective study skills, and review selected topics prior to exams.

Students with Disabilities
If you have any physical impairment (visual, hearing or other) or a learning disability (attention deficit, dyslexia or other), please talk to me individually to bring up any issues of that kind as soon as possible. Students with a verified disability who may need authorized accommodation(s) for this class are encouraged to notify the instructor and the Office of Special Services (DPS) (SSV 100, 323-953-4000, ext. 2270) at least two weeks before any exam or quiz. All information will remain confidential.

Course Objectives
1. The student will become more proficient in the ability to use scientific terminology; name and write chemical formulas for inorganic compounds: binary nonmetal compounds, salts, acids and bases; write and classify chemical equations for elementary chemical reactions and perform stoichiometric calculations involving chemical reactions.

2. The student will be able to provide a historical picture of the development of atomic theory; state the fundamentals of quantum theory; assign quantum numbers and construct orbital diagrams; predict and explain periodic trends of elements in terms of electronic configurations; describe and illustrate the structure and bonding of molecules by constructing Lewis structures, sketching and labeling the molecular geometries of a molecule, describing the hybridization of the atoms involved, and determining polarity; predict and explain properties of molecules in terms of structure and bonding and predict and explain properties of conductors, semiconductors and insulators in terms of structure and bonding.

3. Use the Kinetic Molecular Theory to explain the behavior of gases; compare and contrast various gas laws; perform gas law calculations; relate intermolecular forces to observed properties of solids, liquids and gases; interpret phase diagrams and describe basic crystal systems.

4. Explain solubility in terms of properties of both solute and solvent; determine concentrations of solutions quantitatively and experimentally; give qualitative and quantitative descriptions of solution properties as a function of solute type and solute concentration; classify solutes as strong, weak, or non-electrolytes and write net ionic equations for chemical reactions.

5. Compare and contrast acid-base theories; predict acid strengths based on structure and write and classify acid-base reactions.

6. Determine oxidation numbers; balance oxidation-reduction equations; identify oxidizing and reducing agents.

7. Apply the First Law of Thermodynamics; relate ΔE to ΔH; calculate ΔH through calorimetry, Hess’ Law, enthalpy of formation, and bond energies.

8. Compare and contrast properties and reactions within a family of compounds; describe the role of nonmetals and nonmetal compounds in pollution; draw Lewis structure and name simple organic compounds; identify the classes of organic compounds.

9. Learn fundamental chemistry techniques such as gravimetric analysis, spectral analysis, titration, use of pH meter; become proficient in the use of the following laboratory equipment: analytical balance, spectrophotometer, pH meter, burets, pipets, volumetric flasks; illustrate basic principles of gases, solutions, acids and bases, and oxidizing and reducing agents through experimental set ups.

Student Learning Outcome Statement
By the end of this course you will be able to solve a stoichiometry problem in which the limiting reactant is not identified in the problem. Given a stoichiometry problem in which the limiting reactant is not identified in the problem, the student will be able to correctly interpret the problem, develop a correct solution, and generate a correct answer to the correct number of significant figures.
Chemistry 101 Laboratory

Safety is of the utmost importance, you must always comply with the safety rules found in the SAFETY RULES AND REGULATIONS section of your lab manual. Failure to obey these rules will result in your dismissal from this class. Safety goggles are REQUIRED at all times in the lab unless otherwise stated by the instructor. If you have not acquired safety goggles by the second week of class then you will not be allowed in the lab until you have them. Attendance is also mandatory for the lab. Laboratory experience can only be attained by actually being present in the lab and actually performing the experiment. If you miss more than 3 labs (9 hours) you may be dropped from the course. Make sure you have put away all equipment and locked your drawer before leaving!!!

A video will be shown and a test will be given on the first day covering safety issues. Although most of the information is common sense, it is imperative that everyone understands and complies with safety regulations.

LAB REPORTS: Lab reports are due the next lab period after the completion date of the experiment. Late reports will be subjected to very heavy late penalties and may not be returned. You are responsible for downloading experiments in advance of doing the experiments; no hardcopies will be distributed.

LAB NOTEBOOK: The lab notebook is used for your raw data and any information that you feel is important. Anyone who does not have the appropriate notebook by the sixth day of class will be excused from the laboratory. All notes must be taken down in the notebook. Pre-labs will be checked at the beginning of each lab. A copy of the lab notes must be handed in at the end of each lab period.

FORMAL REPORT: A formal lab report (on one of the experiments, instructor’s choice) will be due at the discretion of the instructor.

Lab Course Requirements in detail:

Before Lab begins
1. Record Name/Title/Purpose /procedure in notebook (checked at the beginning of lab, 5 pts, & the carbon copy turned in with the lab report)

During Lab
2. Collect and record all primary data directly in notebook, you must have the lab notebook signed at the end of each lab day.

After all primary data is collected
3. Calculations (neatly written in you lab notebook, the carbon copy turned in)
4. Discussion/Conclusion (neatly written in you lab notebook, the carbon copy turned in)
5. Post-Lab Questions: (neatly written on the sheet)

To do before the lab begins: (you will not be allowed to start the lab if all are not complete)
1. Record the following in your lab notebook:
The second part of the pre-lab consists of filling out the Name/Title/Purpose /procedure in notebook prior to class time. A brief (2 or 3 sentence max) introduction to the experiment that includes the goal of the experiment and the method(s) used must be written neatly in the lab notebook. Do not copy the purpose straight from the lab book!

Example: Purpose: To determine the percent water in an unknown hydrate salt by repeated heating and weighting a sample.

Procedure: A step-by-step version written in your own words. This should be detailed enough that someone else could use it to replicate the experiment. Complete sentences are not necessary and diagrams can and should be used where appropriate. Tables are often useful for procedural descriptions and can dramatically reduce the length of the procedure section. In this section, you should only mention any changes in the procedure that I told you to make or that were necessary to make due to difficulties

Example: Procedure: Clean crucible; dry to const wt. w/heating; add about 5 g unknown; heat gently 1st, then strongly for 10-15 min; cool-weigh-reheat-cool-weigh-repeat to const wt.
During Lab
2. Collect and record all primary data directly in notebook
Before you leave lab, all relevant measurements and observations must be recorded directly in your laboratory notebook. Include anything noteworthy that you observe such as color and temperature changes, formation of a precipitate, etc. Large collections of data should be organized into tables for clarity. All numerical entries must have appropriate units. Since data sheets tend to be “works in progress” and to be information recorded as the experiment is performed, they do not need to be perfectly neat, but they should be readable with data always recorded to the correct number of significant figures and with units. If you make a mistake recording data cross it out with ONE line. If you have to cross out an entire trial use a large X, and include a brief note as to why you did not include the data. Don’t forget to record the numbers of any unknowns.

After the lab in complete
3. Sample Calculations
For any and all calculations involved in the experiment, a sample calculation must be show. The sample calculations should clearly show the formula used (if any), the numeric values that were plugged into the formula including units, and the final answer obtained including units. The use of tables for data and calculations is always recommended. This provides a quick and easy way for the grader to find the appropriate information.

4. Discussion/Conclusion
The conclusion should be a paragraph in which you describe the results of the experiment. You should also include any major errors that might have affected your results and any other problems that you encountered during the lab. Keep in mind that the errors you should identify should not only be any mistakes that you know you made (like I spilled the beaker) but also errors due to the limitations of the chemicals or equipment (such as certain solutions might decompose in sunlight).
Discuss what you have learned, and what trends the data may show. If there were no trends, but you thought there should have been, discuss that also. Reflect back to the purpose of the lab -- did the lab accomplish what it set out to do? Why or why not? How could the techniques used be applied to other situations?

Example-Discussion/Conclusion: The theory involves the neutralization of acids and bases where the moles of acidic hydrogens are equal to the moles of the base used to neutralize it at the equivalence point. Since phenolphthalein was used as an indicator, the end point and the equivalence point are fairly close to each other. All volumes were to measured .01 ml, and the standardized NaOH solution was .1102 M leading to an accuracy for the concentration of acetic acid of .001 M. Our results were slightly higher than the class average, which stands to reason considering many of the end point of other students were flaming red making their results too low. We are therefore confident that our results are accurate since all end points were the slightest pink perceivable.

5. Post-Lab Questions
Frequently, additional questions will be assigned. Answer these on the sheet provided in your lab packet and turn in with your lab report. The answers to post lab questions should be in complete sentences.

Late labs will be accepted for one week after the due date with a late penalty of 1-point per day it is late. After one week, the lab report will no longer be accepted.