Welcome to Chem101

Chem 101

Chemistry Department

Los Angeles City College

COURSE MATERIALS

You will need to purchase/acquire/find the following:

1) **CANVAS via LACC (contains assignments & mastering chemistry)**

2) **Mastering Chemistry ~$75 - access only via canvas**

3) **My website:** http://www.lacc-terryb.com

4) **Email address that you check every day (M-Th)**

5) **THE FULL SYLLABUS IS ONLINE IN VIDEO OR PDF FORM. WATCH OR READ IT THOUGHLY.**

Point Distribution

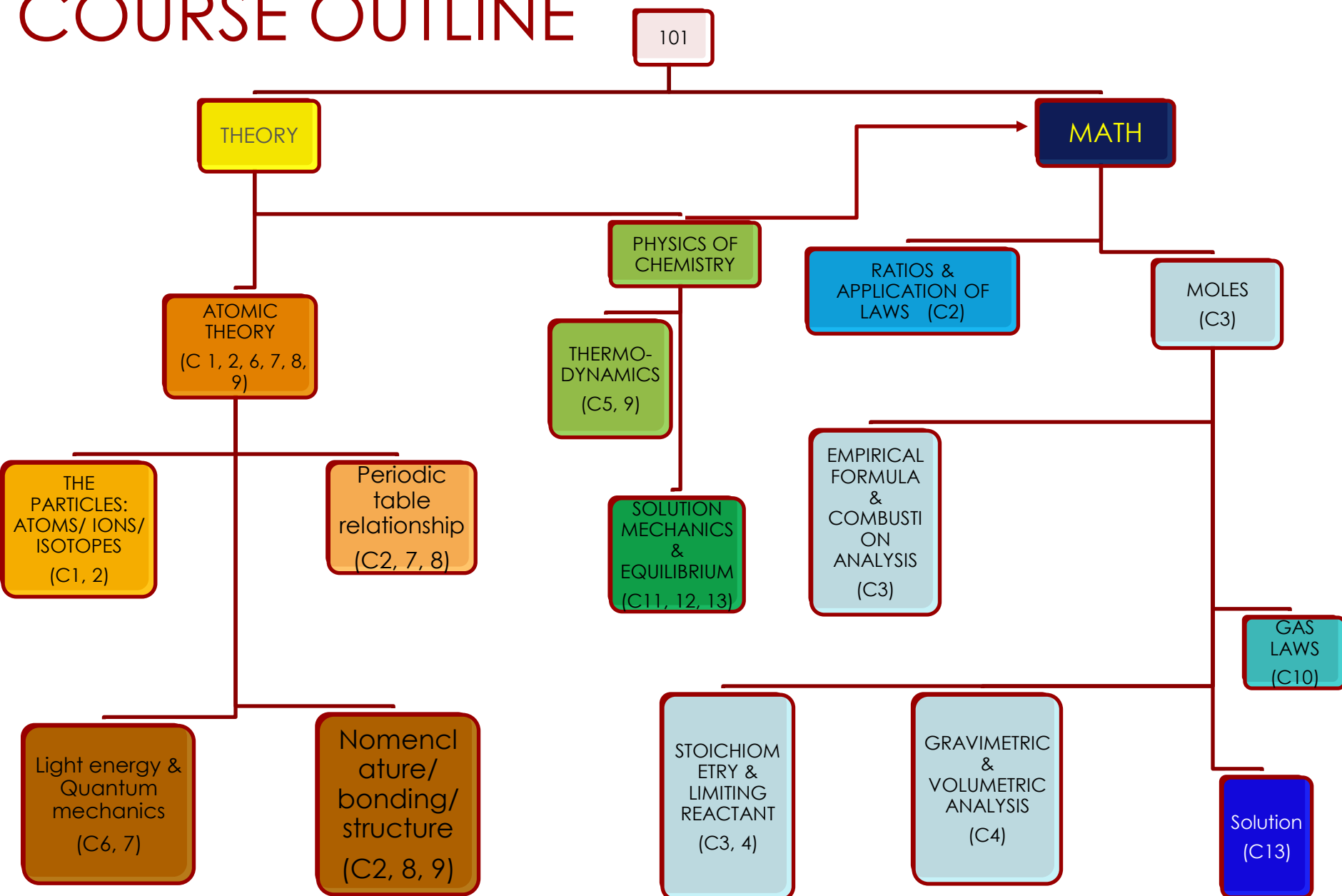| Activity	points	% of grade
Lab Reports & experiment technique	933	47%
EXAMS	550	28%
Mastering chemistry	192	9.5 %
Self-study Activities	325	16 %
total	2000	100%

GRADES
1760 - 2000 points earns an A;   (88% minimum)
1520 - 1759 points earns a B;   (76% minimum)
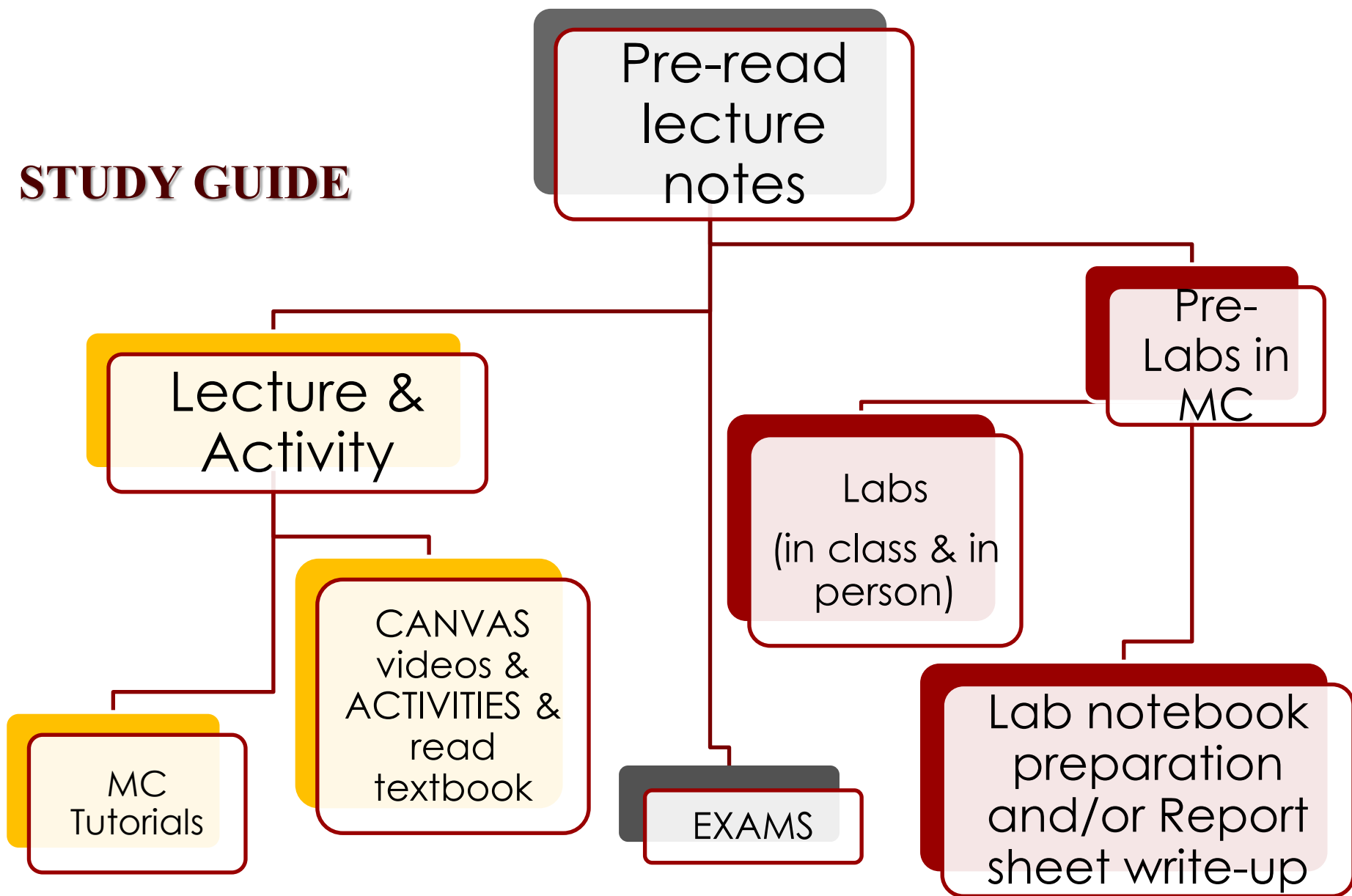1200 - 1519 points earns a C;   (60% minimum)

Attendance

- Attendance taken daily (via in-person activities or LAB)

- Plan on doing about 9 hours per week of homework in either canvas activities, mastering chemistry or lab report write-up

- If you are not completing 50% of the assignments on time, you will be dropped from the course. Check announcements regularly.

- Adding the class
  - You only have the first 2 weeks to add, fall session

- Dropping the Class

- http://www.lacitycollege.edu/Calendar/Academic-Calendars/

COURSE OUTLINE

101

THEORY

MATH

PHYSICS OF CHEMISTRY

RATIOS & APPLICATION OF LAWS (C2)

MOLES (C3)

ATOMIC THEORY (C 1, 2, 6, 7, 8, 9)

THERMO-DYNAMICS (C5, 9)

THE PARTICLES: ATOMS/ IONS/ ISOTOPES (C1, 2)

Periodic table relationship (C2, 7, 8)

SOLUTION MECHANICS & EQUILIBRIUM (C11, 12, 13)

EMPIRICAL FORMULA & COMBUSTION ANALYSIS (C3)

GAS LAWS (C10)

Light energy & Quantum mechanics (C6, 7)

Nomenclature/ bonding/ structure (C2, 8, 9)

STOICHIOMETRY & LIMITING REACTANT (C3, 4)

GRAVIMETRIC & VOLUMETRIC ANALYSIS (C4)

Solution (C13)

STUDY GUIDE

Pre-read lecture notes

Lecture & Activity

MC Tutorials

CANVAS videos & ACTIVITIES & read textbook

EXAMS

Labs (in class & in person)

Pre-Labs in MC

Lab notebook preparation and/or Report sheet write-up

Chapter 1

Scientific Method
&
Significant Figures

The Scientific Approach to Knowledge

- philosophers try to understand the universe by reasoning and thinking about "ideal" behavior; they argue and/or discuss their best ideas.

- scientists try to understand the universe through empirical knowledge gained through observation and experiment; ie. The scientific method.
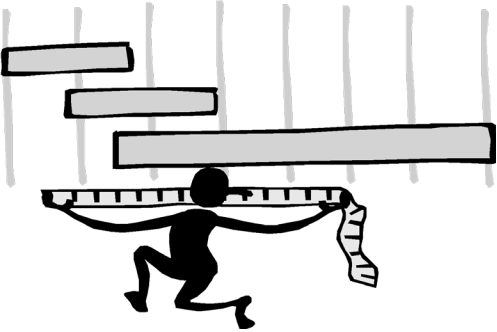
SCIENTIFIC METHOD

1.   **FACT** :   An observable event; indisputable evidence which does not explain but simply is.

2.   **HYPOTHESIS:**   A guess to try to explain an observation.

3.   **EXPERIMENT:**   A systematic exploration of an observation or concept.

4.   **THEORY:**   An explanation of the facts; it can be proven by experiment and it confirms an hypothesis.

5.   **LAW:**   A theory which has undergone rigorous experimentation and no contradiction can be found.

Note: **MODEL:**   A visual or mathematical device or method used to demonstrate a theory or concept.

MEASUREMENTS
Scientific Notation

Many measurements in science involve either very large numbers or very small numbers (#). Scientific notation is one method for communicating these types of numbers with minimal writing.

GENERIC FORMAT: # . # #… x 10#

A negative exponent represents a number less than 1 and a positive exponent represents a number greater than 1.

6.75×10^{-3} is the same as 0.00675

6.75×10^{3} is the same as 6750

MEASUREMENTS
Scientific Notation Practice

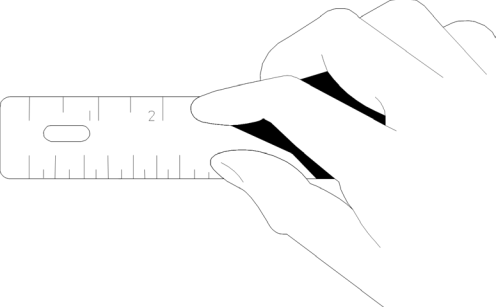Give the following in scientific notation (or write it out) with the appropriate significant figures.

1. $528900300000 = 5.289003 \times 10^{11}$

2. $0.000000000003400 = 3.400 \times 10^{-12}$

3. $0.23 = 2.3 \times 10^{-1}$

4. $5.678 \times 10^{-7} = 0.0000005678$

5. $9.8 \times 10^{4} = 98000$

MEASUREMENTS
Significant Figures

I. All nonzero numbers are significant figures.

II. Zero's follow the rules below.

1. Zero's between numbers are significant.

30.09 has 4 SF

2. Zero's that precede are NOT significant.

0.000034 has 2 SF

3. Zero's at the end of decimals are significant.

0.00900 has 3 SF

4. Zero's at the end without decimals are either.

4050 has either 4 SF or 3 SF
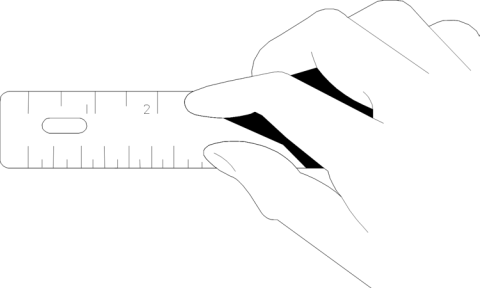
MEASUREMENTS
Significant Figures & Calculations

Significant figures are based on the tools used to make the measurement. An imprecise tool will negate the precision of the other tools used. The following rules are used when measurements are used in calculations.

Adding/subtracting:

The result should be rounded to the same number of decimal places as the measurement with the least decimal places.

Multiplying/dividing:

The result should contain the same number of significant figures as the measurement with the least significant figures.

Multiplication and Division with Significant Figures

- **when multiplying or dividing measurements with significant figures, the result has the same number of significant figures as the measurement with the fewest number of significant figures**

$$5.02 \times 89{,}665 \times 0.10 = 45.0118 = 45$$

3 sig. figs.   5 sig. figs.   2 sig. figs.   2 sig. figs.

$$5.892 \div 6.10 = 0.96590 = 0.966$$

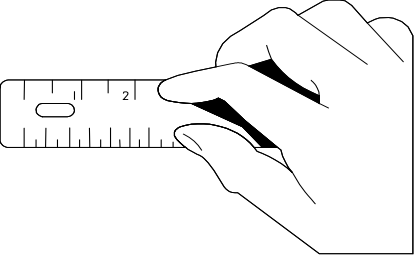4 sig. figs.   3 sig. figs.   3 sig. figs.

Addition and Subtraction with Significant Figures

- **when adding or subtracting measurements with significant figures, the result has the same number of decimal places as the measurement with the fewest number of decimal places**

5.74   +   0.823   +   2.651   =   9.214   =   9.21

2 dec. pl.   3 dec. pl.   3 dec. pl.   2 dec. pl.

4.8   -   3.965   =   0.835   =   0.8

1 dec. pl   3 dec. pl.   1 dec. pl.

MEASUREMENTS
Significant Figures & Calculations

Adding & Subtracting

Are any of the options incorrect?

345.678	0.07283	1587
+ 12.67	- 0.0162789	- 120
358.348	0.0565511	1467
358.35	0.05655	If 3 SF: 1470 or 1.47×10^3

Multiplication & Division

(12.034)(3.98) = 47.89532   47.9 is correct

98.657 ÷ 43 = 2.294348837   2.3 is correct

$\dfrac{(13.59)(6.3)}{12}$ = 7.13475   7.1 is correct

Practice #1

1. Express each of the following numbers in scientific notation & 3 significant figures.

A) 46490087 _____   C) 0.0000068 _____

Correct value with correct significant figures

2. 1.084 - 0.029832 = _____

3. (52.456 + 2.45) / (0.035 – 5.00234) = _____

answers

1. Express each of the following numbers in scientific notation & 3 significant figures.

A) 46490087   **4.65 x 10^7**   C) 0.0000068   **6.8 x 10^{-6}**

Correct value with correct significant figures

2.   1.084 - 0.029832 =   **1.054**

3.   (52.456 + 2.45) / (0.035 – 5.00234) =   **-1.105 x 10 $^{+1}$**

GROUP LECTURE QUIZ #1

Show your work for the following questions. Always give the correct significant figures. Sp2022

1. Express each of the following numbers in scientific notation & 3 significant figures.

A) 6590087 _____   B) 0.00002368 _____

C) 0.00000000001243 _____   D) 945460 _____

2. 0.000496 - 0.00298 = _____

3. (3.36 + 5.6) / (8.298 + 2.4) = _____

4. $4.45 \times 10^{-33} / 8.345 \times 10^{-19}$ = _____

5. $[(26.7 \times 10^{-8}) (47 \times 10^{13})]^4 / (8.54 \times 10^{17})^{1/2}$ = _____

TURN IN ACTIVITY IN CANVAS ON SIG FIG & SCI NOT.

GROUP PROJECT

DAY 2 ASSIGNMENT

- **I WILL NOT BE COVERING CHAPTER 1 MATTER IN CLASS. THE LECTURE IS ONLINE. PLEASE VIEW IT BEFORE COMING TO CLASS AND BE READY TO ANSWER QUESTIONS.**

- **WE WILL BE COVERING THE MATH ON DAY 2 IN CHAPTER 1 SO BRING YOUR CALCULATOR.**

- **BUY MASTERING CHEMISTRY OR GET THE FREE 14 DAY TRIAL – become familiar with your canvas shell and the general assignments. We will be graphing with excel so bring your computer.**