Chemistry 1104 Introduction:

- **Time requirements. Start early.**
- **Need help. See instructor early and often. Only requirement: be prepared.**
- **Understanding vs. memorization.**
- **Chemistry requires practice. Use problem sets, textbooks, website.**

Chemistry 1104 Introduction cont..:

- **Must achieve 50% on theory(40 pt/80 pt) to pass course.**
- **Must achieve 50% on lab(10 pt/20 pt) to pass course.**
- **Lab important. Need lab to pass course. Miss 3 labs and very likely to fail course. If completed lab component within last year do not have to repeat lab. See lab instructor.**
- **Minitests taken during class. Dates for midterm and exam.**

Dimensional Analysis:

Mathematical method used in basic calculations and converting from one set of units to another.

Ex:1 How many eggs are in 2 dozen?

1 dozen = 12 eggs

Ex:2 If a crate holds 20 dozen, how many eggs are in 8 crates?

1 dozen = 12 eggs

1 crate = 20 dozen

Dimensional Analysis cont..:

Ex:3 How many centimeters are in 5.00 in?

1.00 in = 2.54 cm

CHEMISTRY

The study of matter and the changes that can occur.

Matter - Anything that hass mass and occupies space.

Substance - Matter that has a constant composition and distinct properties.

Mixture - Combination of two or more substances.

Chemistry cont…

Element- Substance that cannot be broken up into simpler substances by chemical means.

Compound - Substance composed of two or more elements united in fixed proportions.

Homogeneous mixture - Composition the same throughout.

Heterogeneous mixture - Nonuniform composition.

Measurement:

• Mass	gram	g
• Length	meter	m
• Time	second	s
• Temperature	kelvin	K
• Amount of substance	mole	mol
• volume	litre	L

Measurement and Prefixes:

Prefix	Symbol	Multiple
kilo	k	1000
deci	d	0.1
centi	c	0.01
milli	m	0.001
micro	μ	1×10^{-6}
nano	n	1×10^{-9}

Temperature:

Familiar with Celsius and Fahrenheit scales.

Kelvin Scale:

Invented by Lord Kelvin. Goes from absolute zero(0 K) to infinity.

$$K = {}^{o}C + 273.15$$

Ex: Convert 25 ^{o}C to Kelvin.

Rules For Determining the Number of Significant Figures:

1. **All numbers greater than zero are significant.**

Number	# Sig Figs
14.2	3
1218	4
2	1

Sig. Figs cont..

2. Zeros between non-zero numbers are significant.

Number	# Sig Figs
101	3
1001	4

Sig. Figs cont..

3. Zeros used to locate decimal places and to the left of non-zero digits are not significant.

Number	# Sig Figs
0.005	1
0.0211	3
0.7	1

Sig. Figs cont..

4. All zeros to the right of a non-zero digit containing a decimal are significant.

Number	# Sig Figs
0.00501	3
10.010	5
12.001	5

Sig. Figs. cont…

5. Zeros to the right of a non-zero digit containing no decimal are not significant.
Ex: 400 contains one significant figure.
If 400 contains 2 or 3 significant figures it can be indicated as follows:

$\underline{}$
400 or 4.0×10^2 for 2 significant figures

$\underline{}$
400 or 4.00×10^2 for 3 significant figs

Sig. Figs cont..

6. Exact values such as definate values and counting numbers(1,2,3, etc.) have an infinite number of significant figures.
Ex: 1 L = 1000 mL, the number 1000 has an infinite number of significant figures.

Rounding Significant Figures:

1. If the first unwanted digit is less than five, discard all unwanted digits and leave all wanted digits alone.

Ex: If 3.7247 is rounded to 3 significant figures, the result is 3.72

2. If the first unwanted digit is greater than five, discard all unwanted digits and increase the last wanted figure by one.

Ex: If 8.56473 is rounded to 4 significant figures, the result is 8.565

Rounding Significant Figures cont.:

3. If the first unwanted figure is a five with non-zero digits after it; drop the 5 and increase the last wanted figure by one.
If the first unwanted figure is a five with no other figures or only zeros; drop the 5 and leave alone the last wanted figure.

Ex1: If 8.250 is rounded to 2 significant figures, the result: 8.2

Ex2: If 7.10501 is rounded to 3 significant figures, the result: 7.11

Calculations Using Significant Figures:

- **Addition/Subtraction:**
- **The result of the calculation must be rounded off to the same number of decimal places as the term used in the problem with the least number of decimal places.**

Ex: 161.032

5.6 ← **contains one digit after decimal**

+ 32.4524

199.0844 calculator **round to 199.1**

Calculations Using Significant Figures cont..:

- **Multiplication/Division:**
- **The result of the calculation must contain the same number of significant figures as the term used in the calculation with the least number of significant figures.**

Ex: 152.06 ⇐ contains 5 significant

×0.24 ⇐ contains 2 significant

36.4944

must be rounded to 36

Scientific Notation:

Used to express very large and very small numbers. For significant figures only consider numbers before $\times 10^{exp}$.

Number	Equivalent	Sci Notation
55	5.5×10	5.5×10^{1}
555	$5.55 \times 10 \times 10$	5.55×10^{2}
5555	$5.555 \times 10 \times 10 \times 10$	5.555×10^{3}
0.55	$5.5 \times 1/10$	5.5×10^{-1}
0.055	$5.5 \times 1/10 \times 1/10$	5.5×10^{-2}