General Chemistry I CHEMISTRY 103 Spring 2011

Updated 6/25/10 .

• **Instructor**: Dr. J. A. Wingrave; Office (204BRL); Phone (1676); e-mail (wingrave@udel.edu)

• **Lecture Meets**

- Lecture Section 010 (Lab 20-27) TR, from 11:00 pm to 12:15 pm in 101BRL

• **Workshop Schedule (Lecture on Wednesday Afternoon)**

- Sections: -020 to -029: W from 3:30-5:00 pm. First Workshop 0, ONLY in **100WLF**

• **Required Course Supplies** (Available at University Bookstore)

- **Textbook**: Tro, Chemistry, 2nd Ed., Pearson Prentice Hall, 2010. ISBN: 978-0-321-65178-5 (Copy in Chemistry Library, 201BRL)
- **CSB eHomework** Buy account access online at: http://www.mhhe.com/csb. ISBN: 0073206415 / 9780073206417
- **Lab Manual**: Laboratory Manual for General Chemistry, 2nd Ed., Kramer, Wingrave ISBN: 978-0-7380-3578-9
- **Lecture Manual:** Chem103 Lecture Manual, Wingrave, Spring, 2011.
- **Workshop and Activity-Based Pre-Lab Manual** Chem 103 Workshop, Activity-Based Pre-Lab and Computer Lab Manual, Wingrave & Kramer, Spring, 2011.
- **i>clicker Device** rf response key pad (a.k.a, "clicker")
- **Lab Protection**: Safety Goggles are **REQUIRED AT ALL TIMES IN THE LAB! Long Pants Shoes & Shirts with Sleeves Required. NO Shorts, Skirts, Sandals, Open Toed Shoes or Bare midriffs.**
- **Calculators** **ONLY Non-Programmable, Non-Graphing Calculators - NO EXCEPTIONS.** Required functions; +, -, x, ÷, log, ln, x^y, trig - Cheap about $15

• **Office Hours**

- Location (204BRL) - Time (**T,R,** 9:30 am -10:30 am & **W**, 8-9 am)
- TA office hours - M, T, W, R – Schedule and room to be announced

• **Other Resources**

- Course website - On your SAKAI account
- Workshop sessions for problem help. (More information on following pages.)
- End-of-chapter problems (Red numbered problems have answers in back of textbook.)
- Tutors (Private and Group) - For more info, see Mrs. Staib in BRL102 (831-2465)
- Academic Enrichment Center (See below)
- Student Solutions Manual for, Tro, Chemistry, A Molecular Approach (Copy in 201BRL)
- TA Office hours - Schedule to be announced

Updated 6/25/10 .

• Laboratory Safety Exam – REQUIRED eEXAM

- All students MUST complete the EHS Safety Training on the Web: "Basic Right-To-Know Safety Training for Undergraduate Teaching Laboratory Students", before they are allowed in lab. Access training at: http://www.udel.edu/ehs
- Students will be allowed in lab ONLY AFTER they hand their safety training certificate to TA.

• Laboratory

- Lab meets once a week. - First Lab meets Monday, February 14, 2011.
- Report to lab promptly each week in order to hear lab instruction presentation by TA.
- Due as you **ENTER** lab each week;
  - A Written Lab Procedure
  - An MSDS (from sections 1, 2 and 3) analysis for two chemicals used in that week's lab.
- Due as you **LEAVE** lab each week are ABPL Pre-Lab, Lab and Post Lab reports.
- Activity-Based Pre-Labs (ABPL) - short lab experiments done collaboratively at start of lab in groups of 4 students.
- Labs and make-up labs can only be done during the week scheduled **AND** with a lab pass.
- **Make-up Labs -** See Professor Wingrave (Ms. Cowgill in 104BRL) for a lab pass.
- **Missed labs** will be either EXCUSED or UNEXCUSED.
  - A score of zero (0) will be recorded for an UNEXCUSED LAB (AND Pre-Lab).
  - No score will be recorded for an EXCUSED LAB.
  - An EXCUSED LAB requires an acceptable note given to TA from parent or doctor.
- **IMPORTANT** - Each Unexcused missed lab will lower your lab score.
  - Each Excused missed lab will NOT affect your lab score.
  - An excessive number of missed labs (excused OR unexcused) will result in an incomplete grade for chem103S11.
- **Safety Goggles -** Must have either "ANSI" or "AS/NZS" on the lenses.
- **MSDS Link:** http://www.mallbaker.com/Americas/catalog/default.asp?searchfor=msds
- Lab is an inseparable part of chem103. Lab grade is part of your chem103 grade.
- **NOTE**: Excessive number of missed labs will result in an incomplete grade for chem103S11.

• Quizzes (i>clicker) – In Lecture

- There will be 4 quiz questions per week and your **i>clicker device (clicker) is REQUIRED FOR CREDIT.**
- Quizzes will be an open-book problem working session.
- All quizzes will be summed together for a total of 40 points over the course of the semester.
- If half or more of the quiz questions are answered correctly, a quiz grade of 40 will be earned.
- No make-ups & no credit earned if absent OR if i>clicker response device ('clicker") doesn't work.
- Answer ONLY with your own 'clicker'. Do NOT answer with more than one 'clicker'.
- Answering with more than one 'clicker' constitutes a breach of academic ethics and will result in a zero Quiz Score.

• **ChemSkill Builders (CSB) – Electronic Homework**

- Purchase a CSB account online. Not available at bookstore.
- Open CSB site by logging on to http://www.mhhe.com/csb.
- IF: You had a chem103 CSB account in a previous semester (good for 12 months):
  - Log onto your old chem103 CSB account and click on "Account Information",
  - Fill in course (chem103s11), Professor (Wingrave) and lab section (040L, 051L, 060L, etc.) number then you're ready to LOGIN and start working problems.
- IF: You do NOT have a chem103 CSB account:
  - Click on "Purchase ChemSkill Builder", and purchase a CSB.account.
  - After purchasing a CSB account, open CSB site and click "New Student Registration".
  - Fill in course (chem103s11), Professor (Wingrave) and lab section (040L, 051L, 060L, etc.) number.
  - Create your own password and you're ready to LOGIN and start working problems.
- Units are divided into sections, each section consisting of 10-20 problems, requiring ~2 hours.
- Each section can be worked and reworked but **ONLY** highest section score will be recorded.
- Computer will randomly change problems in each section each time a section is reworked.
- **CSB SECTIONS ARE DUE AT EACH EXAM AND FINAL EXAM. FOR ASSIGNED SECTIONS**: See "Topics for Exams" on SAKAI website.

• **Workshops, Wednesday 3:35-5:00 pm**

- Workshops will be held each Wednesday except exam weeks.
- Workshop problems will be worked from the Workshop and Pre-Lab Manual.
- Workshop problems are taken from old exams given by Profs. Kramer and Wingrave.
- **First Workshop** - Workshop 0 in 131SHL on February 9.
- **ALTERNATE-TIME WORKSHOPS** – Scheduled ONLY during Workshop 0.
- A total of forty (40) points TOTAL for the whole semester are possible.
- **WORKSHOP GRADE** – Based on group work. No credit for working by yourself OR working problems prior to Workshop.
- **MAKEUP WORKSHOPS** – Only for EXCUSABLE absences.
  - Work all Workshop problems you missed prior to next Workshop.
  - Next Workshop show your Workshop Leader:
    1. the worked problems you missed and,
    2. a note explaining why you missed the previous Workshop.
  - If work and note are satisfactory, Workshop leader will give credit for the Workshop you missed.
- DATES: See Schedule below ROOMS: To be announced

Updated 6/25/10 .

• **Web Resources**

- Chem103S11 Website on your SAKAI account

• **Academic Enrichment Center Group Tutoring Session**

- Location and Time - TBA

• **Exams**

- Three (3) in-class exams will be given. No make-up exams will be given.
- Missed exams will either be:
  - UNEXCUSED – An exam score of zero (0) will be recorded.
  - EXCUSED – Final exam score will replace an excused/missed exam(s). Requires a note from parent or doctor to be given to professor.
- Lowest exam score will be replaced by final exam score. An EXCUSED exam score will be considered a "lowest exam score".
- Exams Cover: textbook, lecture, laboratory, CSB, i>clicker, Workshop & Lecture Manual material.

* Exam corrections must be made prior to next exam.

- You will need ONLY a pen/pencil and non-programmable calculator for an exam.
- Everything except a pen/pencil and a non-programmable calculator must go to the front of the exam room prior to the start of the exam.
- "Everything else" includes but is not limited to: book bags, clothing, cell phones & other electronic devices, books, notebooks, scratch paper, calculator lids etc.
- Possessing items during an exam OTHER THAN a pen/pencil and a non-programmable calculator constitutes a breach of academic ethics and will result in a zero score for the exam in question.
- Exams for regrading must be received by the professor before the subsequent exam.
- An exam regrade will constitute a regrade of the ENTIRE exam by the professor.
- The **FINAL EXAM** will be given on the date scheduled by the University. **NO EARLY OR LATE FINAL EXAM** will be given for any reason. The makeup exam date(s) will be announced after the start of the semester.
- **MAKEUP FINAL EXAM DATE(S)** will be scheduled after the end of the semester and announced during the semester.
- **Makeup Final Exams** given by Reservation ONLY in, July, 2011 and September, 2011. Contact Prof. Wingrave.
- An Excessive Number of MISSED LABS or a MISSED FINAL EXAM will result in a grade of "INCOMPLETE" for chem103S11.
- An "INCOMPLETE" grade in chem103S11 converts to a grade of "F" in September, 2011.

Updated 6/25/10 .

- **Minimum requirements for obtaining a passing grade in CHEM-103S11 are:**
  - Successful completion of all twelve (12) laboratory experiments.
  - Successful completion of the final examination
  - Earning a total of at least 400 points on the "Grading Schedule" outlined below.
  - MISSED FINAL EXAM or Excessive Number of MISSED LABS (EXCUSED plus UNEXCUSED MISSED exams) will result in a grade of "INCOMPLETE" for chem103S11.
  - An "INCOMPLETE" grade in chem103S11 converts to a grade of "F" in September, 2011.

- **Tentative Grading Scheme**
  - **Three Examinations (3 x 120 points, 45 %)**
  - **Laboratory Grade (200 points, 25 %)**
  - **Final Examination (120 points, 15 %)**
  - **CSB eHomework (40 points, 5%)**
  - **Workshops (40 points, 5%)**
  - **Quizzes in Lecture (40 points, 5%)**
  - **Midterm Grade Will Be Estimated from Exam #1 Grade – ONLY – No Lab Grade !**
  - **If You Have No Exam #1 Score, Your Midterm Grade Will Be An "N".**

TTL POINTS (%)	GRADE	TTL POINTS (%)	GRADE	TTL POINTS (%)	GRADE
800-720 (90)	A	625-600 (75)	B -	475-450 (56)	D +
720-700 (88)	A -	600-575 (72)	C +	450-425 (53)	D
700-675 (84)	B +	575-500 (63)	C	425-400 (50)	D -
675-625 (78)	B	500-475 (59)	C -	400-0	F

General Chemistry I **CHEMISTRY 103** **Spring 2011**

Updated 6/25/10 .

Tro	Lecture Topics & Number	CSB
1	0. Syllabus	**- -**
1	1. Graphs & Uncertainty	**1**
1	2. Density, Temperature, Sig. Figs., Dimensional Analysis, Statistical Analysis	**2**
2,3	3. Sub-Atomic Particles, Atoms, Molecules, Ions, Periodic Table	**2**
3	4. Periodic Table. Inorganic Nomenclature, Balancing Chemical Equations	**3, 4.1-3**
3	5. % Composition, Empirical & Chemical Formulas, Limiting Reagents & Yields, Hydrates	**4.4-6**
20	6. Organic 1 Hydrocarbon Nomenclature and Isomers	**24.1,2,6**
20	7. Organic 2 Functional Groups & Common Names	**24.1,2,6**
20	8. Organic 3 Polymer Nomenclature	**25.1,2**
4	9. Electrolyte Strength, Solubility, Net Ionic Equations, Molarity Calculations	**5.1-5**
4,12.5	10. Concentration Units & Conversions	**6.1-4**
4,15	11. Dilution, Neutralization & Strong Acids/Bases, pH	**18**
15, 16	12. Chemical Equilibrium, Weak A/B, K_{eq}, Salt Hydrolysis, Buffers & Titration	**17.1, 19.1-4**
7,8	13. Light, Spectroscopy, Quantum Mechanics, Atomic Orbitals, Electron Configuration, Electronegativity, Polarity	**9, 12.1**
9, 10	14. Lewis & VSEPR Structure, Formal Charge	**12**
13	15. Kinetics	**16.1-3,5**
17	16. Thermodynamics 1 - Thermodynamic Variables & Laws.	**21.1-4**
6	17. Thermodynamics 2 – Calorimetry	**8**
17	18. Thermodynamics 3 – Formation Property Calculations	**21.1-4**
18	19. ElectroChemistry 1 - Half Reactions, Redox Equations, Oxidation Numbers	**5.6,10**
18	20. ElectroChemistry 2 – Voltaic Cells & Nernst Equation and Band Theory	**22**
Green	21. Environmental Chemistry	**- - -**
	FINAL EXAM	

Updated 6/25/10 .

• Lab, Exam and Workshop Schedule

Week of	**Wk**	Experiment Subject	**Workshop**
2/6	1	NO LAB	Workshop 0 2/9
2/13	2	**Lab Safety** 1) Lab#1 – Lab Techniques	Workshop 1 2/16
2/20	3	2) Lab#2 - Density	Workshop 2 2/23
2/27	4	3) Lab #3 - Physical & Chemical Properties	Workshop 3 3/2
3/6	5	4) Lab #5 - Properties of Hydrates	Workshop 4 3/9
3/13	6	5) Lab #6 - Limiting Reagents	**Exam #1** **3/16**
3/20	7	6) Lab #32 - Phosphates in Water with Statistical Data Analysis	Workshop 5 3/23
3/26 to 4/3	8	**SPRING BREAK – NO LAB** **3 / 26 - 4 / 3**	**No Workshop**
4/3	9	7) Lab #27 Vitamin C Analysis with Computer Data Analysis	Workshop 6 4/6
4/10	10	8) Lab #13 - Types of Reactions	**Exam #2** **4/13**
4/17	11	9) Lab #19 - Equivalent Weight with Statistical Data Analysis	Workshop 7 4/20
4/24	12	10) Lab #10 - Spectroscopy	Workshop 8 4/27
5/1	13	11) Lab #11 – Lewis Structures	Workshop 9 5/4
5/8	14	12) Lab #15 – Calorimetry with Computer Data Analysis	**Exam #3** **5/11**
5/15	15	Last Lecture 5/19	
	15	**FINAL EXAMS 5/18-5/25**	

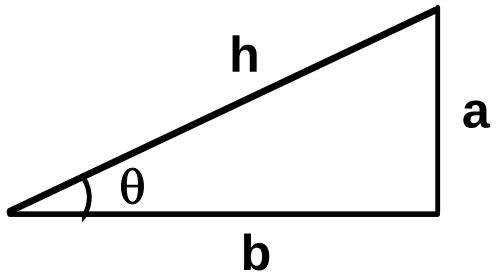
BASIC MATH FUNCTIONS

A. Exponents

1. $x^2 \bullet x^3 = x^{2+3} = x^5$
2. $x^5 \bullet y^5 = (xy)^5$
3. $x^3 \bullet y^4 = x^3\, y^4 = y\left(x^3\, y^3\right) = y(x\, y)^3$
4. $\left(x^2\right)^5 = x^{(2\bullet 5)} = x^{10}$
5. $\sqrt[3]{x^6} = \left(x^6\right)^{1/3} = x^{(6/3)} = x^2$
6. $\sqrt{x^6} = \left(x^6\right)^{1/2} = x^{(6/2)} = x^3$
7. $x^{-4} = \dfrac{1}{x^4}$
8. $\dfrac{x^5}{x^3} = x^{5-3} = x^2$

B. Logs

1. $\log 1000 = +3.0$ ⋮ $10^{+3} = 10^{\log 1000} = 1000$
2. $\ln 1000 = +6.91$ ⋮ $e^{+6.91} = e^{\ln 1000} = 1000$
3. $pH \equiv -\log\left[H^+\right]$ ⋮ $\left[H^+\right] = 10^{-pH}$
4. $\log x^7 = 7 \bullet \log x$
5. $\ln x^6 = 6 \bullet \ln x$
6. $\ln x = 2.303 \log x$
7. $\log xy = \log x + \log y$
8. $\log \dfrac{y}{x} = \log y - \log x$
9. $\log (x+y) = \log (x+y)$



10. $\sin\theta = \dfrac{\text{opposite}}{\text{hypotenuse}} = \dfrac{a}{h} = \dfrac{1}{\sec\theta}$
11. $\cos\theta = \dfrac{\text{adjacent}}{\text{hypotenuse}} = \dfrac{b}{h} = \dfrac{1}{\csc\theta}$
12. $\tan\theta = \dfrac{\text{opposite}}{\text{adjacent}} = \dfrac{a}{b} = \dfrac{1}{\cot\theta} = \dfrac{\sin\theta}{\cos\theta} = \left(\dfrac{a}{h}\right)\left(\dfrac{h}{b}\right) = \dfrac{a}{b}$
13. $1 = \sin^2\theta + \cos^2\theta$

D. Mensuration:

1. $C = \pi d = 2\pi r$ ⋮ Circumference of circle
2. $A = \pi r^2 = \dfrac{\pi}{4} d^2$ ⋮ Area of circle
3. $A = 2\pi r L$ ⋮ Area of cylinder
4. $A = 4\pi r^2$ ⋮ Area of sphere
5. $A = \dfrac{1}{2} bh$ ⋮ Area of RIGHT triangle
6. $A = 6L^2$ ⋮ Area of cube
7. $V = L^3$ ⋮ Volume of cube
8. $V = \dfrac{4}{3}\pi r^3$ ⋮ Volume of sphere
9. $V = \pi r^2 L$ ⋮ Volume of cylinder

E. Quadratic Equation : $ax^2 + bx + c = 0$ ⋮ $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$