CHE 134. General Chemistry III

Kahveci Group

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Course Details

General Chemistry III

Note: CHE 134 General Chemistry III (undergraduate level) was taught by Murat Kahveci at DePaul University in Autumn 2020. CHE 134 Course URL

Chemistry 134 is the third course in the three-quarter general chemistry sequence. It is designed to give students a fundamental understanding of chemistry and may be used by non-science majors to fulfill a Scientific Inquiry learning domain requirement in the Liberal Studies Program. The topics covered in Chemistry 134 include:

- acid-base equilibria and applications thereof;
- solubility equilibria; thermodynamics;
- electrochemistry; radioactivity; and
- coordination chemistry.

In addition to you gaining an understanding of the topics listed, it is a major goal of this course to develop your problem-solving and critical-thinking skills. You will be given the opportunity to work through problems starting from first principles and challenged to fully understand the meaning of your results. Accomplishing these objectives will require a significant time commitment. *You should spend approximately twelve hours per week outside of watching lecture videos working on the material for this course.* The bulk of this time should be spent working on problems, including: completing on-line Mastering Chemistry homework assignments, reviewing problems presented in online lectures, and working extra problems suggested from your textbook. Working on problems does not mean that you should read a problem and then immediately look at the solution. This approach will not help you succeed on exams. You should look at the solution to a problem only after you have spent a significant amount of time (15 – 20 minutes) attempting to complete the problem on your own.

Textbook and Materials

Required

1. Textbook and Modified Mastering Chemistry (ISBN 9780134565613)
    - Tro, N. J. *Chemistry: Structure and Properties*, 2nd Ed. Pearson Education, Inc. Upper Saddle River, NJ, 2018. This text is available from the bookstore in hardbound, loose-leaf, and e-text formats.
    - The Modified Mastering Chemistry subscriptions should be done within the course website. Please follow these steps in order to find the correct course at the Modified Mastering Chemistry webpage:
        - Sign in to Brightspace and enter your Brightspace course at https://d2l.depaul.edu/d2l/home/773469 .
        - Select the widget, named *Pearson's MyLab and Mastering*, on the Brightspace course's home page and follow on screen instruction to register.
2. Non-graphing calculator for use on exams. Suggested models include:
    - TI-30X family of calculators (available at the bookstore)
    - CASIO fx-260solar or CASIO fx-250HC

Recommended

1. Tro, N. J.; Shaginaw, K. T.; Kramer, M. B., Solutions Manual for Chemistry:Structure and Properties, Pearson Education, Inc., Upper Saddle River, NJ, 2017. ISBN 9780134460673

Tentative Schedule

Tentative Outline – CHE 134-101

MONDAY	WEDNESDAY	FRIDAY
Sep 7th (No Class)	9th **1** §16.2-4: Acid-base definitions; factors affecting acid strength	11th **2** §16.5-7: Acid ionization constant Ka; autoionization of water; pH for solutions of strong acids and strong bases
14th **3** §16.7: Acid equilibria for weak acids	16th **4** §16.8-9: Base equilibria for weak bases; acid and base properties of ions	18th **5** §16.10-11; §17.2: Polyprotic acids and bases; Lewis acids and bases; buffers
21st **6** §17.2-3: Buffers, including buffer range and capacity	23rd **7** §17.4: Strong acid, strong base titrations	25th **8** Review for Exam 1
28th **9** **Exam 1**	30th **10** §17.4: Strong-weak and polyprotic acid-strong base titrations	Oct 2nd **11** §17.5-6: Solubility equilibria and factors affecting these equilibria
5th **12** §17.7: Complex ion equilibria	7th **13** §18.2-4: Entropy, spontaneity, and probability; second law of thermodynamics; state changes and entropy	9th **14** §18.5-6: Heat transfer; Gibbs free energy; Gibbs free energy and spontaneity
12th **15** §18.7-9: Standard molar entropies; third law of thermodynamics; ΔS° and ΔG°; ΔG vs. ΔG°	14th **16** §18.10: ΔG and equilibrium, dependence on T	16th **17** Review for Exam 2
19th **18** **Exam 2**	21st **19** §19.2: Balancing redox equations	23rd **20** §19.3-4: Galvanic cells; standard electrode potentials
26th **21** §19.5: Cell potential and equilibrium	28th **22** §19.6: Nernst equation	30th **23** §19.7-8: Batteries and electrolysis; corrosion
Nov 2nd **24** §20.3-4; §22.1-3: Radioactivity; coordination compounds	4th **25** §22.4-6: Isomers and bonding in coordination compounds	6th **26** Review for Exam 3
9th **27** **Exam 3**	11th **28**	13th **29**
16th **30** Review for the Final Exam; OTEs.	18th **31**	20th **32**
23rd **33** **Final Exam: 8:30 – 10:45 am**	25th **34**	27th **35**

I reserve the right to make changes to this schedule, as necessary.