Chemistry 324 -- Course Information

Meeting times: **9:00 - 3:50** Tuesday and Thursday in Room 309 Gilbert Addition
All students welcome at any time during these hours.
Reserve 8-12 hours per week (in **blocks of 3-4 hours**) for this course.

What you should do for the first day:

Go to the OSU Bookstores and purchase a lab notebook and textbook.

- Purchase Text Book: Daniel C. Harris, Quantitative Chemical Analysis (Current Ed.)

- Lab notebook. A **permanently bound** (not spiral bound) laboratory notebook with consecutively **numbered** pages is required. We recommend National #43-571. You may use other notebooks, including used ones, as long as they meet the requirements on page vi of the Laboratory Experiments. You must have your lab notebook **before** beginning lab work.

Check-in Bring: Bring Your Lab Goggles

- Follow directions on the last page of this handout.

Read General Information

- Read this handout for general information about the course; pay attention to the rules for the progress points given at the end of the **6th** lab period, and the **12th** lab period.

- Read Lab Experiments introduction (pp. i - xiv of the 324 the Laboratory Manual).

- Pass the Safety Test (which is based on material on pp. ix - xiv of the Laboratory Manual).

- **Bring Your Lab Goggles!** Start Experiment #1 if time allows.

Description of the course

CH 324 is a basic laboratory course in modern chemical analysis. The course is unlike almost any other course at OSU: the laboratory is self-paced with some intermediate deadlines; there are no lectures. The lab is open Tuesdays and Thursdays from 9:00 – 3:50, and students can work in the lab any time during these hours. However, students should still reserve a **minimum of eight hours per week**, **in 3-4 hour blocks**, during these times. If you do not have blocks of **at least 3 hours** you should not sign up for the course.

The course work consists of 10 laboratory experiments, which students pass by determining the unknown composition of a sample within a specified tolerance; 13 homework sets, the answers to which are submitted online; and 3 in-class tests. There are 2 deadlines in the middle of the term for making adequate progress on completing homework and laboratory experiments. The course work is described in more detail below, followed by a summary of the grading on p.4.

Laboratory Experiments

There are 10 laboratory experiments. For each experiment you will be issued a sample with an unknown composition and asked to determine the composition within a predetermined tolerance. If your answer is within the acceptable tolerance, you receive credit for that experiment and move on to the next experiment. If the value you submit is not within the acceptable tolerance, you have one chance to check your calculations and resubmit.

IF YOU HAVE ALREADY SUBMITTED TWO INCORRECT RESULTS FOR THE SAME UNKNOWN, YOU WILL HAVE TO START WITH A NEW UNKNOWN TO CONTINUE WORK ON THAT EXPERIMENT.

You will be issued as many unknowns as you need to pass an experiment. (Exception: because of the nature of Experiment #2, you may resubmit values for the same unknown as many times as necessary to pass the experiment --- but only for Experiment #2.) Each laboratory experiment is worth 10 points and there are 10 experiments for a **total of 100 points**.

Most experiments require access to expensive equipment which is in constant demand. As you're scheduling experiments make sure that you sign up in advance for the instrument you need. There are no experiments which require more than an hour of instrument time. You **may only sign up for one hour of instrument time in a block.** If you sign up for more than one hour, your name will be removed from all time blocks. Please respect your fellow students and their schedules.

***Lab Notebooks*.** You must maintain an experimental record in a permanently bound notebook that has numbered pages. **Use ink for these records**. To pass experiments your laboratory notebook must be filled out properly, including the recording of all data and observations, and a concise summary of the calculations made. Make sure the calculations and results are clearly presented in an orderly way. If you make a correction in your notebook, draw a **single line** through the error; do not erase or scratch out the error; a single line allows you to read an "error" that you later decide is not an error. **Leave no blank pages**. You are required to have three inspections of your notebook during the term.

Order of experiments:

- You **must pass** the open-book safety test before you begin any laboratory work.
- Next, you **must pass** all three parts of Experiment #1, as it tests skills necessary for all the other experiments.
- Next, you **must pass** Experiment #2.

After you have passed the first two experiments, you may do the remaining experiments in any order. Some instruments may be available only at certain times - check the bulletin board for schedules. Use the sign-up sheets to reserve an instrument for your use at a specific time. Be sure to allow time for solution preparation when reserving time for an instrument.

WARNING: On the last day of class all instrumentation will be shut down at 3:00, allowing students time to calculate their last unknown values and check out.

Text Readings and Homework Assignments

All of the course homework is submitted on line at www.webassign.net. Starting on Wednesday, you'll be able to log onto Webassign. Your user name will be your onid user name, and your password will be your student ID#. There are **13** homework assignments based on selected sections of Chapters 0-5, 8, 14, 15, 17-21, 23-25, and 28 of the textbook. The specific sections that we'd like you to read in each chapter are shown in the table below. Attempting the homework questions before reading the sections in each chapter will probably waste a considerable amount of time. Attempting experiments in the lab before you've read the relevant material in Harris will also probably result in unnecessarily repeating experiments. The homework assignments are submitted online through the Webassign system. The Intro to Webassign exercise **does not count** as one of the homework assignments. Complete instructions for using Webassign and grading of the homework assignments are posted on Blackboard in the Course Information folder.

You will have **five** attempts to answer all of the questions correctly for each chapter. **If you haven't gotten the correct answer after three attempts, we strongly recommend that you discuss the problem with the course instructor or a TA.** If you answer **all** of the

questions from a chapter correctly, you will receive 5 points for that chapter. If you are unable to answer any part of **any** question correctly in five attempts, you will receive 0 points credit for that homework assignment. Each chapter is worth 5 point for a total of 65 points.

The first five chapters in the text (0 - 5) are the core chapters on the Analytical Process and should be completed early in the course.

HW Unit	Chapt.	Sections
1	0 Analytical Process	2
1	1 Measurements	All
2	2 Tools	1-8, 11
2	3 Error	1-3
3	4 Stats	8, 9
4	5 QA and Calibration	All
5	8 Activity	2, 3
5	14 E-Chem	1, 4
6	15 Potentiometry	2, 4-6
6	17 Amperometry	4
7	18 Basic Spectroscopy	1-5
8	19 Applied Spectroscopy	5
9	20 Spec HW	Intro, 2, 3
10	21 AA	1, 4
10	23 Separations	1-3
12	24 GC	1-3
12	25 HPLC	1, 2
13	28 Spl Prep	Intro, 2, 3

Exams

There are 3 exams based on material in the book, labs and the Laboratory Manual Appendix. Representative exam questions are in the Laboratory Manual Appendix, pp. 71-78. Seven of the exam questions are submitted online through the WebAssign system from the computers in the CH 324 testing area in Gb 309 during regular class hours. ***Complete instructions for using WebAssign and grading of the exams are posted on Blackboard*** in the Course Information folder. One of the exam questions will be administered in the CH 324 testing area and hand graded.

When you are ready to attempt a WebAssign exam question, you will present your green card to be given access to a computer in the CH 324 testing area. If you answer the question correctly, you will receive 1 point credit. If not, you may re-try other versions of the question up to a maximum of three attempts. **We strongly suggest that you discuss an incorrect answer with the course instructor or TA**. If you have not answered the question correctly in three attempts, you will not receive any credit for that question. Entry to the testing area ends at 3:30 PM and testing ends at 3:50 PM. Your final grades on the exams depend on the number of questions for which you receive credit by the deadlines for completing the exams, which are listed below.

Exam #1 has 4 WebAssign questions; you will be allowed 20 minutes for each attempt, and you are limited to 1 hour in the testing area in one sitting. Each question is worth 2 points for a maximum of 8 points for Exam #1.

Exam #2 has 4 WebAssign questions. You will be allowed 30 minutes per attempt, two attempts in a given day, and a total of three attempts altogether. Each question is worth 2 points

for a maximum of 8 points for Exam #2.

Exam #3 has 3 written questions; you will be allowed 20 minutes for each attempt. Each question is worth 3 points for a maximum of 9 points for the questions in Exam #3.

Exam #1 Opens Tues of week 3, Closes 3:50 PM Thurs of week # 5	**Points**
Four question covering:	
1. Concentration unit conversions - Laboratory calculation section 1.0	2
2. Preparation of standard solutions - Laboratory calculation sections 1.1-1.2	2
3. Dilutions - Laboratory calculation sections 1.3-1.5	2
4. Titration and concentration calculations involving stoichiometry – Laboratory calculation sections 2.0-2.3	2
Total	8
Exam #2 Opens Tues of week 6, Closes 3:50 PM Thurs of week # 8	
Four question covering:	
1. Data plotting and analysis - Laboratory calculation sections plus text	2
2. Standard additions - Laboratory calculation sections 4.0-4.1, 5.2	2
3. Standard additions with finite volumes- Lab. calculation sections 4.0-4.1, 5.2	2
4. Sample treatment, calculations of detection limits, % recovery, and standard addition	2
Total	8
Exam #3 Opens Tues of week 8, Closes 3:50 PM Thurs of week # 10	
Questions for the 3rd exam deal with the instrumentation you've been using. You will be expected to answer basic questions about how the instruments work, and be able to draw a block diagram of how the instruments work. You'll be allowed to pick your test topic. The areas you may chose from are; **GC HPLC AA Amperometric Biosensors Fluorescence UV/Visible Sampling Potentiometry**	3 x 3 = 9

Progress Points

"Progress points" will be added to your grade as an incentive and reward for making steady progress in the course (that is, not putting everything off until the last minute). Please note: **the Web Assign Tutorial DOES NOT COUNT** as a homework assignment. These points are based on the number of homework assignments and labs for which you have received credit for (**passed not attempted**) by the following deadlines:

Deadline 1 for Labs and Homework - End of 6th lab period of the term And 11:59 PM of the next day, Friday		
Homework Assignments Credited	Labs Credited	PROGRESS POINTS
any 6	#2	5
any 3	#2	3
any 1	#2	1

Deadline 2 for Labs and Homework - End of the 12th lab period of the term 11:59 PM of the next day, Friday		
Homework Assignments Credited	Labs Credited	PROGRESS POINTS
any 9	any 5, including #2	5
any 6	any 4, including #2	3
any 4	any 3, including #2	1

Summary of Grading for CH 324

Item	Number of assignments	Points each	Total Points
Laboratory experiments	10	10	100
Homework assignments based on text by Harris	13	5	65
Exam 1 - Web Assign questions	4	2	8
Exam 2 - Web Assign questions	4	2	8
Exam 3 – Instrument questions	3	3	9
Progress Points at Deadline #1		5	5
Progress Points at Deadline #2		5	5
Total for course			200

A	**A-**	**B+**	**B**	**B-**
190-200	180-189	174-179	166-173	160-165
C+	**C**	**C-**	**D+**	**D**
154-159	146-153	140-145	134-139	126-133

A Winning Strategy

Be sure you understand the grading criteria, and be sure to work efficiently throughout the quarter. It is a good policy for you to **do as much as possible in this course during the first several weeks.** We do have the occasional (exceptional) student **finish the lab in 4 weeks (almost always with an A)**. Being ahead in CH 324 when you are having mid-terms in other courses is advantageous. Although there are 10 experiments listed for the course most student end up doing 15-18 experiments, and it's not uncommon to find student doing more than 20 experiments. This is because there is no partial credit for merely completing the lab. Either you get the correct answer and the full 10 points, or you get the wrong answer and 0 points. Since you are allowed to repeat the labs until you get the correct answer, the only penalty for a wrong answer is wasted time. It is, however, very easy to waste time. You should plan time into your schedule for repeating about half the labs.

The good news is that the course is self paced. The bad news is that the course is self paced. You can work at your own pace, but you still must meet the two deadlines to earn 10 of the possible 200 course points used to determine your grade. Do not be seduced into being lax in your efforts by the lack of a specific hour-by-hour schedule for class meetings and lab periods. **This is a difficult course** and you must be disciplined, organized, and industrious if you are to do well.

You may develop your own strategy but consider the following; A good strategy is to pass 3 homework assignments for core chapters by the end of the first week, 5 core chapters by the end of the 2nd week and 7 core chapters at the beginning of the 3rd week. This strategy is sound for two reasons. First, this ensures that you will not be penalized at the end of the 3rd week for not having passed 5 core chapters. As detailed in the "Requirements for Grades" sheets, the minimum requirements for progress at the end of the 3rd week are based mainly on the core chapters and one lab. Second, the first five core chapters provide much of the background necessary to understand the experiments. It is also best if you complete a few labs (especially 1 and 2) in the first three weeks if you are going for a high grade.

A word on the homework; If you have attempted the same problem 3 times and gotten it wrong, get thee to the course instructor or a TA to receive some tutoring. This is where the teaching part of the course happens. If you come to the instructor after you've used up all 5 answers for a question, game over.

The same thing for the tests; If you've missed a test question, write down the problem and then find the instructor or a TA to teach how to do the problem. That's why we give you the extra tries.

During the term from 9:00 am to 3:50 pm on Tuesdays and Thursdays Dr. Neal Sleszynski, and several teaching assistants (TA's) will be ready to help you with explanations, examples, demonstrations, to issue you samples for analysis, to answer your questions, to resolve minor problems, and to give you guidance. The lab will be open regular times during dead week. **There will be no laboratory sessions or tests during finals week**. There are no lectures.

The 10 laboratory experiments are not all of the same degree of difficulty. Several are particularly challenging and require that you to be very well organized and utilize your very best laboratory technique. You are advised to prepare thoroughly before beginning the experiments.

The chapter homework assignments, quantitative exams and the laboratory experiments for this course are separate but related. The Harris chapters contain information which will help you perform well on your experiments and will help you pass the exams.

Record of Progress in CH 324

At the progress points and test deadlines, a summary of your grades will be accessible on Black Board. Any questions on the official record should be directed to;

Dr. Neal Sleszynski.
Gilbert 143
neal.sleszynski@oregonstate.edu
541-737-6761

Office hours will be announced at the beginning of the class.

CH 324 LABORATORY Check-in Procedure

1. You will be issued a key for your locker and a yellow check-in sheet by a CH 324 staff member. You will be asked to sign the locker list indicating that you have received your key and showing what items you are purchasing (goggles, lab coat, lab manual and WebAssign access etc.). You will be using some instruments that cost more the $40,000 to replace. Since you don't want to be billed for breaking one of those, a $40 breakage insurance fee will appear on you bill. It reduces the bill on all expensive breakages (>$10 replacement cost, such as glass electrodes, syringes, burettes, volumetric flasks, etc.) to a $10.00 deductible per item. This is in addition to the normal $44 lab fee for chemicals consumed during the course of your lab experiments.

   Note : If you don't already have a pair of indirectly vented safety goggles, buy a pair at this time. (If you have a pair from another class, check with an instructor to see if they meet our safety standards).

2. Locate your locker and check to see that it contains the apparatus listed on the Check-in Sheet and that the apparatus is in good condition. Be sure to check the tips on all pipets. Note any missing, seriously chipped or broken apparatus on the Check-in Sheet. Then contact a CH 324 staff member who will sign the list enabling you to obtain or exchange the apparatus. **If you do not catch a broken or missing piece of apparatus at this time, you will be responsible for replacing it at the end of the term.** If the instructor decides that the condition of the apparatus is satisfactory and you doubt it, you may protect yourself by describing the apparatus' condition in writing on the Check-in Sheet and having the instructor sign it.

3. Check with a CH 324 staff member for the procedure to replace missing or damaged items. Free replacements are only available the first week of class.

4. After you are satisfied that your locker contains all the equipment on the list and that it is all in good condition sign the bottom of the yellow check-in sheet and return it to a CH 324 staff member.

Other charges: The lab manual is produced at OSU, which saves you money over a commercially produced book. The following are additional charges that will apply;

Lab manual, handouts and WebAssign Fees:	$40	(required)
Goggles	$ 6	(you may supply your own)
Lab coat	$ 4	(optional)

WARNING: Even if you withdraw from or drop the course, you must formally check-out your locker (see the "Lab Experiments" handout) before the end of the quarter. Failure to do so will cost you $45.00 plus a key charge of $10.00, plus the cost to replace any missing, broken, or exceptionally dirty glassware.