Chemistry 1465 AURAS Emerging Scholar Program
Fall 2013

ESP director Dr. Kevin A. Schug kschug@uta.edu Available to meet by Appt.
358 CPB (817)272-3541

Required materials: *Attendance;* Course materials (e.g. notes and textbook); notebook; pen/pencil; non-graphing calculator

Meeting Times & Places: Mondays, 1 – 2:50 (section 301) or 3 - 4:50 pm (section 302)
Pickard Hall (PKH) 305

Teaching Assistant (TA) and Peer-Assisted Learner (PAL):

Abegayl Thomas (TA)
abegayl.thomas@mavs.uta.edu
CPB 304
(817) 272-0606
Ofc hours: Wedn., 10 am – 12 pm and by appt.

Priscila Martinez (TA)
priscila.martinez@mavs.uta.edu
(cell) (817) 707-5355
Meetings by appt in main library

Emmanuel Varona (PAL/TA)
emmanuel.varona@mavs.uta.edu
(cell) (254) 319-1949
Meetings by appt in main library

Laura Lopez (PAL)
laura.lopez71@mavs.uta.edu
(cell) 682-553-8261
Meetings by appt in main library

For questions with labs and lab reports, you may attend the office hours of Abegayl Thomas, your regular Chem 1465 TA, or any Chem 1465 TA if you have questions. A list of TAs, their offices, and office hours can be found outside of CPB 114

A helpful website: Dr. Rogers Chem 1465 website (http://www.uta.edu/faculty/jimrogers/CHEM1465.htm)

Grading: The ESP program is a focused study and skills session that has been shown to provide a significant increase in grades for those who attend *every* session. **Formally, 5% of your Chem 1465 course grade is contingent on your attendance of ESP Monday sessions.**

Emerging Scholar Program: The Emerging Scholar Program, which will be held for 2 hours on Mondays, and is meant to supplement your understanding of chemistry, and foster your growth as a STEM major. A variety of activities have been designed to help you with the course at hand, as well as in future science courses.

We encourage you to better understand what kind of a learner you are and to understand the best ways to study. One way to do this is to visit: http://www.howtostudy.org/ and http://cas.lsu.edu/ and follow their exercises and suggestions.

Attendance: You are required to attend **all** Emerging Scholar Program activities (on Mondays) in order to be eligible for the paid Authentic Research/Internship Experiences offered by AURAS in subsequent semesters. If any ESP activities are missed, a valid written excuse (e.g. doctor's note) must be provided to the instructor in order to be excused for the absence. Formally, 5% of your Chem 1465 course grade is contingent on your attendance of ESP Monday sessions.

Daily Activities: Each day you will have a quiz, which will test future, current, and past knowledge. This is an important component of the program and its primary purpose is to provide an assessment of how well you are meeting course-related learning outcomes. These outcomes are listed below. We will appreciate your honest effort in completing the short quizzes, because it will help us tailor the lessons to help you learn what you need to be successful in this course. Additionally, you will be participating in group-style Process-Oriented Guided Inquiry Learning (POGIL) activities; these cover a variety of different topics consistent with course objectives.

Students with Disabilities: Students who need an accommodation based on disability should arrange to meet with the laboratory coordinator during to see that they are appropriately accommodated.

Students with Pregnancies: For students who are pregnant, it is recommended by the Chemistry and Biochemistry Dept. that you do not enroll into a chemistry lab at this time. If you become pregnant during the semester, we recommend dropping the course as soon as possible; and special provisions will be made to assist you in finishing the course at a later date. ***Please see your faculty instructor for assistance.***

Course Learning Outcomes

1.1 Perform unit conversions using dimensional analysis
2.1 Identify the groups, periods, and elements within the periodic table
2.2 Describe the general structure of an atom and master forming and naming formulas of compounds
3.1 Determine moles, molar mass, molarity, and percent composition based on chemical formulas
3.2 Be able to balance chemical equations and write combustion reactions
4.1 Use mole-to-mole ratios to solve stoichiometric problems
5.1 Apply the concepts of gas laws, the Kinetic Molecular Theory, and Dalton's Law of Partial Pressures
6.1 Be able to manipulate the relationship between wavelength, frequency, Planck's constant, and the energy of a photon
6.2 Understand and apply the various principles of quantum mechanics in the electronic arrangements of elements
7.1 Use the VSEPR theory, Lewis structure, and molecular models to determine molecular shapes
8.1 Describe the arrangement of atoms and calculate the packing efficiency for common cubic crystal lattices (BCC, FCC)
9.1 Use thermochemical equations to calculate thermodynamic properties (enthalpy, specific heat, heat capacity, heat of formation)
10.1 Know $\Delta G = \Delta H - T\Delta S$. Be able to calculate the free energy of a reaction and predict if a process is spontaneous
11.1 Derive the rate law for a reaction and use it to calculate rate constants, or reactant concentrations
11.2 Understand the components of a reaction energy profile
12.1 For equilibrium, understand the relationship $K_p = K_c(RT)^{\Delta n}$ and Le Châtelier's Principle.
12.2 Define Brønsted-Lowry acid/base. Be able to calculate pH, pOH, and the concentration of acids and bases
13.1 Understand oxidation-reduction reactions and be able to measure cell potential across a galvanic cell
14.1 Understand radioactivity and the various forms of nuclear decay

AURAS EXPECTATIONS

In order to retain more students within the engineering and science majors, The University of Texas at Arlington developed a retention program to support STEM students. Arlington Undergraduate Research-based Achievement for STEM (AURAS) includes an Emerging Scholar Program (ESP) that has provided a supplemental classroom support system for challenging courses such as Precalculus, Calculus, and *Chemistry*. Foremost in AURAS, offerings are content-intensive collaborative learning sessions, which allow AURAS students in these courses to learn together – and they work! Table 1 shows the significant difference in the exam scores of ESP students vs. non-ESP students.

Table 1. Composite results: Fall 2010, Spring 2011, Fall 2011, and Fall 2012

COURSE	A	B	C	Pass	D	F	I	Q	W	Drop	Total
Chem 1465 ESP	**28**	**34**	**44**	**68%**	**14**	**24**	**0**	**0**	**13**	**8%**	**157**
Chem 1465 Non-ESP	**43**	**100**	**160**	**53%**	**90**	**105**	**2**	**5**	**97**	**17%**	**567**

AURAS OBJECTIVES:

1. Students will be able to identify and understand chemistry concepts critical in their learning
2. Students will be more confident with the chemistry language
3. Students will be more confident in problem solving techniques, thus applying their knowledge to challenging problems
4. Students will interact and be connected to a community of students in a collaborative learning environment

AURAS GUIDELINES AND EXPECTATIONS:

To be successful in AURAS students are expected to

1. Attend all classroom lectures
2. Attend your assigned AURAS session
3. Participate in all activities on that given day
4. Complete and return all in class and out of class assignments
5. Spend time studying on your own and in groups
6. Make use of all available resources (textbook, tutoring clinic, professor, peers, etc.)

AURAS will be taught via:

1. Quizzes at the beginning of each period
   - Assessing your understanding and mastery of course material

2. Group work/activities
   - Emphasizing active learning and collective efforts to solve challenging problems
   - Encouraging team participation through Process Oriented Guided Inquiry Learning (***POGIL***) activities
   - Evaluating how well students retain and explain key concepts

3. Test reviews
   - Gauging your readiness and understanding of material for up-coming examinations

4. Out of class assignments
    - Providing work to reinforce material learned during lecture
    - Fostering self-discipline and responsibility to meet deadlines

Satisfactory performance in AURAS is required to continue in the program. Examples of non-satisfactory performance: frequent absences, failure to actively participate or ESP grade < 70%.

AURAS grades (worth 5% of course grade) will be calculated as follows:

Attendance – 50%
Homework – 25%
Participation & Quiz – 25%

Attendance: Attendance will be recorded at the beginning of each period. Students coming in after ten minutes of the start of AURAS will be marked absent. If you would like to excuse an absence, contact facilitator Abegayl Thomas (abegayl.thomas@mavs.uta.edu) no later than the next day, Tuesday at 3:00 pm. The email should include the reason of absenteeism and any supporting documentation as an attachment.

Homework: Homework assigned will be collected at the beginning of the subsequent session. Students are responsible for neatly writing the solutions to the problems and turning them in at the beginning of the session. NO late work will be accepted. If you are absent, it is your responsibility to obtain any handouts given during AURAS from one of your peers. If you know you will be late or absent, it is your responsibility to get the work to one of the TA's prior to the time it is due (work may be given to a TA during office hours or left with the Chemistry Department front desk (CPB 130)).

Participation: Partly our assessment, quizzes, and peer evaluations.

Teachers' Responsibilities: *Facilitators*

- Do not answer questions directly, but refer students back to data/model
- Roam classroom recording misconceptions to be discussed as a class or within a group
- Ask students/groups questions, but not to interrupt group work

Student Responsibilities/Expectations:

- Students are to work as a team with specific roles as:

    1. **Time keeper/cheerleader** → ensures that the group is working efficiently within the allotted time
    2. **Reader** → gives the instructions of the activities in order that the group works together
    3. **Recorder/quality control** → writes the solutions as discussed by the group to any problem the group may be given ***(neat and legible)***
    4. **Reporter** → communicates to the audience on behalf of the group based on any asked questions

- All students are mandated to fully participate. **NO** one student should be doing all the work

- Healthy discussions are required with your team members
- **NO** laptops/tablets are to be out or open.
- **NO** texting or phone calls will be permitted.
- Only NON graphing calculators are allowed; **NO** cellphone calculators are to be used
- You may use lecture notes and any other hand-written materials you have created. Textbooks will be used in class when necessary.

******We are working with you in this program. We hope that you feel free to voice any questions, concerns or criticisms. In addition, please know that the TA's and PALS are here to help you in whatever way we can. The goal is to have some fun and really LEARN CHEMISTRY. Let's reach this goal together.

Continued use of the AURAS program has seen the correlation of ESP attendance and course grade as shown in the graph below.

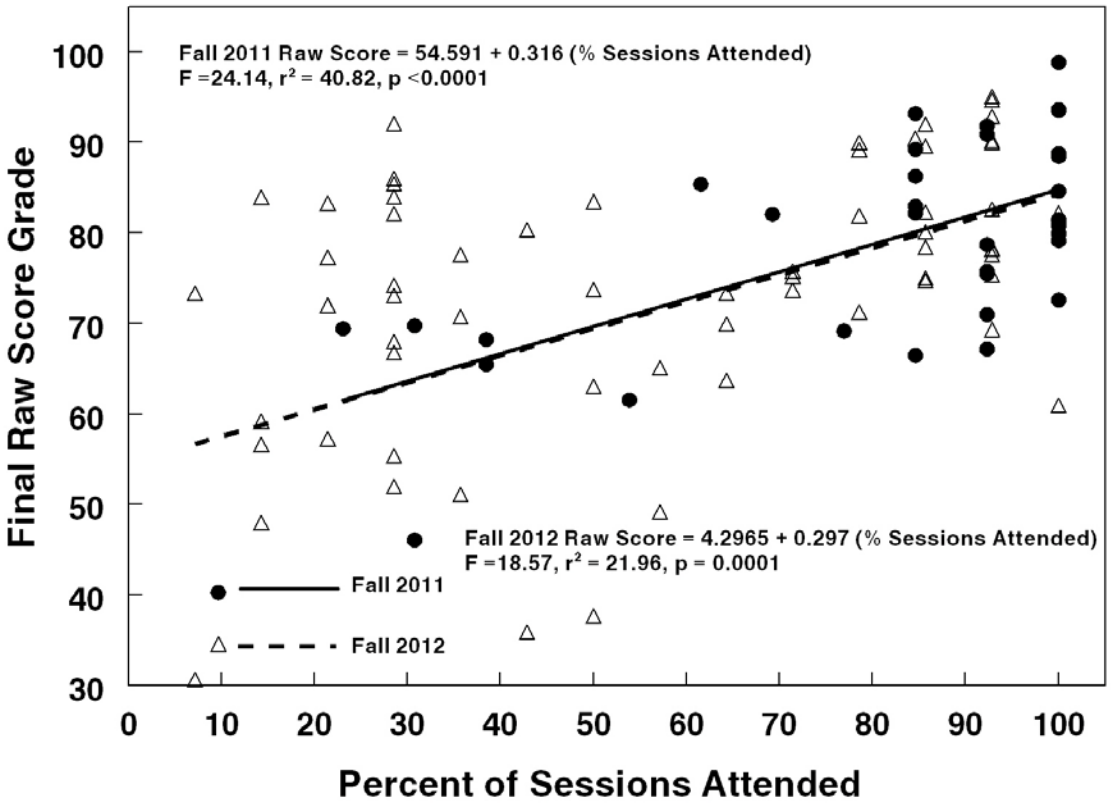

Figure 1. Fall 2011 and Fall 2012 Percent ESP Attendance vs. Final Course Grade

"Secrets for success in Chemistry"

Students often ask for advice on how to do better in General Chemistry courses. To provide a response, undergraduates who completed these courses with an A – grade were interviewed to learn how they did it. ***Here are their secrets, revealed!***

In general:

- Plan to devote 9-12 hours each week to studying chemistry, make a study timetable that helps in ensuring that you put in the needed time
- Be sure to get enough sleep, exercise, and good nutrition, especially before exams
- Your textbook is your first resource, then your classmates or teacher
- Take the time and study for your exams, **NOT** the night before. Identify the key ideas; understand what they mean; and how they are used in problem solving.
- Do the practice problems in your text, as well as going over your homework assignments

Before class:

- Read lecture material before going to lecture

During class:

- Listen, take notes, and mark problems that are unclear

After class:

- Review your lecture notes and use text to help working through issues
- Try to work homework problems without looking at the example problem/notes
- Carefully read your assigned reading, work example problems, and note any key points
- Always complete your homework. Also, practice problems at the end of each chapter in the text is an added bonus for getting stronger at problem solving
- Make mnemonics for yourself to help remember facts and equations
- Make use of diagrams/mental picture of concepts discussed in lecture
- Participate in a study groups where homework assignments and extra practice can be done
- Go to office hours/tutoring regularly to discuss problems
- If your assignments are scored by your instructor, consider going over your solutions from a master answer key
- If solutions are not understood, talk it over with your classmates or friends, if still stuck ask your instructor.

PLEASE REALIZE THAT YOU CAN STILL DO WELL EVEN IF YOU'VE DONE POORLY ON A QUIZ OR TEST…