

**ACADEMIC EXCELLENCE. REDEFINED**

**American University of Ras Al Khaimah**

**General Chemistry-I Laboratory (CHEM-112)**

**I. Instructor Information: TBD**

**II. Course:**

Course Credit Hours: 1

Co-requisites: CHEM 111

**III. Course Description**: (1:0:2.40) Lab techniques and reactions arranged to accompany General Chemistry-I. This laboratory course provides experience in measurement, synthesis based experiments, qualitative, and quantitative analysis.

**IV. Course Materials and Basic Resources:**

Textbook and other learning resources

Experimental Chemistry, 8th edition, J. F. Hall, 2010, Houghton Mifflin, USA, ISBN-13:978-0-547-16854-8

Handouts containing detailed procedures will be provided for some laboratory exercises

Other materials and supplies:

1. Exploring Chemical Analysis, 3rd edition, Daniel C. Harris, W. H. Freeman, 2004, ISBN: 0-7167-0571-0

Web resources: http://chemistry.about.com/od/chemistrylabexperiments/General\_Chemistry\_Lab\_Experiments.htm

MIT OpenCourseWare-MASSACHUSETTS INSTITUTE OF TECHNOLOGY (MIT, USA)

<http://ocw.mit.edu/courses/chemistry/5-310-laboratory-chemistry-spring-2003/download-course-materials/>

**V. Course Goals:**

To provide a laboratory-rich learning environment where students will learn proper laboratory protocols, plan and conduct experiments in areas of general chemistry, practice the scientific method, analyze data, and reach logical and reasonable conclusions

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| **VI. Student Learning Outcomes**  At the end of this course student will be able to:  **CSLO 1:** Applied laboratory procedures, safety rules, scientific methods while performing general  chemistry experiments.  **CSLO 2:** Collect the experimental data, analyze the result and provide reasonable conclusion.  **CSLO 3:** Create a clear and concise scientific report including laboratory observation and experiments. | | |
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| |  |  | | --- | --- | | **VII. Evaluation Plan** | | |  |  | | * Lab Report and Skills 30% * Quizzes 20% |  | | * Midterm Exam 20% |  | | * Final Exam 30% |  | | |  |  |  | | --- | --- | --- | | Assessment Tool (number) | CSLO achieved | Weightage | | Lab reports and Skills | CSLO 1, CSLO 2, CSLO 3 | 30% | | Quizzes (2) [closed book, consisting of problem-solving, Multiple choice questions and True/False] | CSLO 1, CSLO 2, CSLO 3 | 20% (each quiz is worth 10%) | | Midterm Examination (closed book, consisting of problem-solving and multiple choice, true and false and short answer questions and a practical element) | CSLO 1, CSLO 2, CSLO 3 | 20% | | Final Examination (closed book consisting of multiple choice, true and false, short answer questions and experiments problems) | CSLO 1, CSLO 2, CSLO 3 | 30% | |  | | | |

Knowledge, understanding and application of the basic principles and concepts of General chemistry based on the material taught in class will be examined by “closed-book” quizzes and midterm and final examinations. Self-study and directed learning will be assessed by assignments and presentations. Written feedback will be provided to students on assignments, quizzes and presentations and examinations to highlight deficiencies in student responses and aspects that need particular attention by way of improvement.

**VIII. Weekly Topics and Assignments**

**Tentative Schedule**

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| --- | --- | --- | --- | --- |
| **Week** | **Experiment**  **No.** | **Topics of experiment** | **Quiz due date** | **SLO** |
| 1 | 01 | Introduction, safety, check in |  | 1 |
| 2 | 02 | Measurements |  | 1,2 |
| 3 | 03 | Graphing/ Density of solutions |  | 1,2 |
| 4 | 04 | Empirical formula of zinc iodide |  | 1,2 |
| 5 |  | **Quiz** |  |  |
| 6 | 05 | Absorption spectroscopy |  | 1,2 |
| 7 |  | **Midterm Examination** |  |  |
| 8 | 06 | Thin layer chromatography (TLC) |  | 1,2 |
| 9 | 07 | Synthesis and purification of Aspirin |  | 1,2,3 |
| 10 | 08 | Volumetric analysis |  | 1,2 |
| 11 | 09 | Heat of reaction |  | 1,2,3 |
| 12 | 10 | Periodic properties: Anion analysis |  | 1,2,3 |
| 13 |  | **Quiz** |  |  |
| 14 | 11 | VSEPR theory and molecular modelling |  | 1,3 |
| 15 |  | **Final Examination** |  |  |

**IX. Evaluation of Learning**

The grade breakdown is as follows:

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| --- | --- | --- |
| **Methods** | **Dates** | **Weights** |
| Lab report and Skills | - | 30% |
| Quizzes | - | 20% |
| Midterm Examination | - | 20% |
| Final Examination | - | 30% |

**X. Grading System and Scale**

University course work is measured in terms of quantity and quality. A credit normally represents one hour per week of lecture or recitation or not less than two hours per week of independent or laboratory work throughout a semester. The number of credits is a measure of quantity. The grade is a measure of quality. The university system for undergraduate grading is as follows:

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| --- | --- | --- |
| **Grade** | **Score** | **Quality Points** |
| A | 90-100 | 4 |
| A- | 87-89 | 3.7 |
| B+ | 84-86 | 3.3 |
| B | 80-83 | 3 |
| B- | 77-79 | 2.7 |
| C+ | 74-76 | 2.3 |
| C | 70-73 | 2 |
| C- | 67-69 | 1.7 |
| D+ | 64-66 | 1.3 |
| D | 60-63 | 1 |
| F | 0-59 | 0 |

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| **XI. Methodologies for Teaching and Learning**: |

One of the primary methods of instruction for this course is lecture and demonstrations that train students in the methodology used for problem-solving as well as performing standard laboratory techniques in general chemistry. Laboratory exercises involving problem-solving will take the form of in-class and homework assignments and are geared to provide students with fundamental experiments skills required to analyze and interpret data of different experiments. In addition to students working individually, pair/group work will also be encouraged during the performance of laboratory exercises to foster the building of teamwork, leadership and organizational skills by students. Laboratory reports communicate the experimental laboratory exercises in writing and require students to exercise data, interpretation, analysis and written presentation skills. Students will be provided a general rubric for writing of lab reports and will be informed of any additional requirements for specific laboratory reports. Assignments, quizzes and discussion sessions are intended to reinforce learning. Assignments will consist of data analysis and/or review questions based on the laboratory exercise. Methods that foster active participation as well as individual and cooperative learning will be employed and these include student–led discussions, question and answer sessions and data analysis. The application of the methodologies and techniques used in the laboratory for general chemistry based research will also be emphasized. Quizzes and examinations will assess student knowledge; understanding and application of laboratory-based methodologies used in general chemistry.

**XII. Relevant Policies**

**Relevant policies [Except for the policy on academic misconduct, the inclusion of the following is only suggested and is at the discretion of the instructor].**

**A. Academic Misconduct. A. Academic Misconduct:**

**The Honor Code and Honor System**

The Honor Code is an integral part of university life. Students are responsible, therefore, for understanding the code’s provisions. Cheating and attempted cheating, plagiarism, lying, and stealing of academic work and related materials constitute Honor Code violations. In the spirit of the code, a student’s word is a declaration of good faith acceptable as truth in all academic matters. To maintain an academic community, according to these standards, students and faculty must report all alleged violations to the Honour Committee.

AURAK expects its students to uphold high standards of academic integrity and conduct. In particular, students are required to:

* Attend classes regularly and punctually.
* Be actively involved in class discussions and other course related classroom activities.
* Complete assignments on time.
* Meet the requirements for course and program completion.
* Abide by high standards of academic integrity, ethics, and honesty.
* Refrain from cheating on homework and examinations, plagiarizing other people’s work

by submitting it as their own, or any other forms of academic dishonesty.

* Adhere to the published test or examination rules and regulations.
* Make every effort to maintain good academic standing.

Given the internet and easy access to information and knowledge sources, the University is committed to students’ learning in an ethical manner. For all academic assignments, project work, and presentations, students need to ensure that due acknowledgement is given to the source of any information which they incorporate in their work. The following are some examples of academic misconduct:

* Cheating/using unfair means in examinations
* Significant paraphrasing in written academic work that is unacknowledged
* The unacknowledged use of information or ideas unless such ideas are commonplace
* Citing sources which student has not read or referred to
* Breaching the word limit of assignments and mention­ing wrong word count
* Plagiarism

**Plagiarism.** Plagiarism is a serious academic offence. Plagiarism is the use of someone else’s ideas, words, projects, artwork, phrasing, sentence structure or other work without properly acknowledging the ownership (source) of the property (item). Plagiarism is dishonest because it misrepresents the work of someone else as one’s own. It is intellectual theft as it robs others of credit for their work. Plagiarism takes many forms, including:

* Using someone else’s words without putting those words in quotation marks and providing full information about their source, sufficient information so that another person could easily locate the words that are being quoted, whether it is in an article, a book, or on the web.
* Using unique, original ideas, phrases, sentences, paragraphs, or other materials, etc. from a single source or a variety of sources such as a text, journal, web page, electronic source, design, artwork, etc. in one’s work without citing all sources. For a student found plagiarizing, the punishment will be a failing grade in the assignment without the right to redo the assignment up to a failing grade in the course.

**Examples of Cheating.** Acts of cheating include, but are not limited to, the following:

1. Copying from another student’s paper during an exam, or allowing or encouraging another student to copy from your paper during an exam.
2. Having someone else take your exam in your place, or taking an exam for someone else.
3. Obtaining unauthorized access to exams and accepting exams obtained by unauthorized access.

**Examples of Plagiarism. Acts of plagiarism include, but are not limited to, the following**

1. Handing in as ‘original’, a work prepared by someone else or preparing/completing someone else’s work.
2. Copying from a book or other publication without citing sources.
3. Using the same work to satisfy the requirements of two or more courses (during the same or different terms).
4. Having someone else rewrite a rough draft or rewriting a rough draft that is not your own work.

Violations of plagiarism are subject to evaluation according to the criterion of “reasonable doubt”. The student’s right to appeal and the procedures to be followed in carrying out the appeal of the University’s decision clearly states in the *Student Handbook*.

Any violations of the University’s academic rules, regulations or directives are reported to the Deputy Vice Chancellor Academic Affairs and may result in one of the following disciplinary measures.

* Verbal or written warning
* Repeating the term
* Dismissal from the University

Please refer to the relevant section in the *Handbook* and ensure a clear understanding of the provisions of the University honor code and honor system in order to avoid infringement of the policy and attendant penalization.

**B**. **Concerns about grades or other course materials**. Students are responsible for their learning experiences. If you are concerned about a class matter, first discuss it with the instructor. If the matter is not resolved, the next step is to meet with the Program Chair. If you still have a concern, meet with the Dean. The matter is likely to be resolved before it reaches that point, but if it is not, then the following positions are next on the organization chart: the Deputy Vice Chancellor for Academic Affairs, and, finally, the Vice Chancellor. Students who decide to “jump to the top” will be referred back to the appropriate next step.

**C**. **Assignments.** University policy is that assignments are due on the date assigned. Instructors may refuse to accept late assignments or lower the grade that would be otherwise given.

**D. Attendance**. University policy is that students are to attend all classes and to arrive on time. Verified emergencies may require an absence or delay, but habitual tardiness or absence affects your learning and disrupts the class. Your presence is important since student contributions are a significant part of classroom activities and absence deprives others of your contributions. According to the AURAK resolution no.: 84-1-106/2013 *Student Attendance Policy* as follows:



**E. Mobile Phones:** All mobile phones, pagers and/or other communication devices should be turned off before entering the classroom.

**F. Diversity and the Use of English.** English is the common language of the AURAK campus, the use of which includes everyone. It is the only language to be used in the classroom. AURAK brings together students and faculty from diverse cultural and linguistic backgrounds, which is one of the strengths of the university. This diversity provides an opportunity to share our different experiences and enlarge our understanding of the world. Classroom discussions and other activities are to be conducted with courtesy and civility and respect for one another and for our differences.