Life and Physical Sciences
Texas A&M University
Core Curriculum

Initial Request for a lower division course included in the current Core Curriculum to be considered for the Fall 2014 Core Curriculum

This request is submitted by (department name):

1. Course prefix and number: ASTR 101

2. Complete course title: Basic Astronomy

3. Texas Common Course Number: ASTR 1304

4. Semester credit hours: 3

5. Physics & Astronomy PHYS 1311

6. This request is for consideration in the following Foundational Component Area:
   ___ Communication
   ___ Mathematics
   X ___ Life and Physical Sciences
   ___ Language, Philosophy and Culture
   ___ Creative Arts
   ___ American History
   ___ Government/Political Science
   ___ Social and Behavioral Sciences

7. This course should also be considered for International and Cultural Diversity (ICD) designation:
   ___ Yes   X ___ No

   8. How frequently will the class be offered? every Fall, Spring, and Summer semester

   9. Number of class sections per semester: 2-4 classes (1 class in first Summer semester)

   10. Number of students per semester: 360 to 530

   11. Historic annual enrollment for the last three years:


   12. This completed form must be attached to a course syllabus that sufficiently and specifically details the appropriate core objectives through multiple lectures, outside activities, assignments, etc. Representative from department submitting request should be in attendance when considered by the Core Curriculum Council.

13. Submitted by: [Signature]
    Course Instructor

14. Approvals:
    [Signature]
    Department Head

15. College Dean/Designee
    [Signature]

For additional information regarding core curriculum, visit the Texas Higher Education Coordinating Board website at www.thecb.state.tx.us/corecurriculum2014

See form instructions for submission/approval process.
Texas A&M University
Core Curriculum
Initial Request for a Course Addition to the Fall 2014 Core Curriculum

Foundational Component Area: Life and Physical Sciences

In the box below, describe how this course meets the Foundational Component Area description for Life and Physical Sciences. Courses in this category focus on describing, explaining, and predicting natural phenomena using the scientific method. Courses involve the understanding of interactions among natural phenomena and the implications of scientific principles on the physical world and on human experiences.

The proposed course must contain all elements of the Foundational Component Area. How does the proposed course specifically address the Foundational Component Area definition above?

ASTRONOMY 101 (3 credits): BASIC ASTRONOMY
A qualitative approach to basic stellar astronomy; earth–moon–sun relationships, then studies of distances to stars, stellar temperatures, and other physical properties; birth, life on the main sequence of the Hertzprung–Russell diagram, and ultimate fates of stars.

ASTR 101 enables students to understand, construct, and evaluate relationships in the natural world by understanding the basis for building and testing scientific theory. The course goal is to inculcate the students with an understanding and appreciation of the basic scientific method and principles, thus allowing students an opportunity for a better understanding and appreciation of our physical place in the Universe. The lectures cover a wide range of material including history of science and the development of the scientific method through explanation of the movement in the sky of the planets, Sun, and Moon; comparative description of the major planets and other minor Solar System bodies with their connection to formation models of the Sun and early solar nebula; the discovery of planets orbiting other stars; description of the properties of stars including the use of thermodynamic and energy balance arguments that explain the interior physics of stars and subsequent evolution over time; identification of the various components of galaxies including our Milky Way and the relationship of galaxy evolution to the dynamics, kinematics, formation, and development of large structures; and the observational evidence for Big Bang cosmology with our modern understanding of the state and evolution of the Universe over cosmic time. Through the material covered in ASTR 101, the students are introduced to nearly all fundamental topics of modern science.

For more information, please contact the Undergraduate Astronomy Coordinator Dr. Kim-Vy Tran (vy@physics.tamu.edu) and visit the website astronomy.tamu.edu

Core Objectives

Describe how the proposed course develops the required core objectives below by indicating how each learning objective will be addressed, what specific strategies will be used for each objective and how student learning of each objective will be evaluated.

The proposed course is required to contain each element of the Core Objective.
Texas A&M University
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Critical Thinking (to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information):

Astronomy 101 is structured around general questions about science and its place in our world. We stress the use of the scientific method in answering questions. We give instruction in astronomy specifically, but give an appreciation of the broader context of that knowledge. In particular, we will show that gaining a scientific body of knowledge involves mastery of concepts and specific viewpoints, much more than simply learning a set of facts. We show what types of questions can be posed and how they are answered in a scientific context; this necessarily involves explanation of how scientific theories are developed and tested and the nature of science and limits of empirical knowledge. Astronomy is well tuned to this sort of instruction; both due to its intrinsic interest, but also because the span of time and spatial scales involved are so much greater than human experience.

Astronomy 101 includes instruction in issues that connect astronomical knowledge and associated scientific methodology more generally to concepts that unify the natural sciences and that are related to a broader cultural context. We show the importance of cause and effect reasoning in the scientific world view, demonstrate the characteristic scales and proportions of natural phenomena, explain the ways in which the Universe and local environment change and evolve, reveal the general applicability of natural laws, illustrate the role of mathematics in science, and discuss the historical development of science and impact on culture and general intellectual progress.

Communication (to include effective development, interpretation and expression of ideas through written, oral and visual communication):

Communication is key to science and the students develop communication skills on multiple levels including analytic and written skills as part of the assignments as well as verbal skills during lectures, specifically with the lecture tutorials and in–class polling (see the following sections). The course components are designed to teach students how to explain the scientific process, describe basic physical concepts and general characteristics of astronomical objects, apply scientific thinking to the natural world, and formulate a scientific hypothesis. Individual student progress is assessed regularly throughout the semester using metrics that include homework, exams, and lab quizzes.
Empirical and Quantitative Skills (to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions):

ASTR 101 teaches students how to identify the differences among competing scientific theories, recognize scientific and quantitative methods and the differences between these approaches and other methods of inquiry, apply their analytical skills to understand the physical nature of the universe, and communicate their findings, analyses, and interpretation both orally and in writing. Specifically, there are regular homework sets (12 in total) and exams that are coordinated with the lecture material. The assigned questions include mathematical problems that develop familiarity with data analysis and numerical manipulation as well as short answer, discussion-style problems that utilize higher level cognitive skills.

Teamwork (to include the ability to consider different points of view and to work effectively with others to support a shared purpose or goal):

The ASTR 101 lectures incorporate two strategies to promote active learning through teamwork: (1) in-class polling with iClickers (during each lecture) and (2) lecture tutorials for group work (6–8 tutorials per course). With in-class polling, the lecturers are able to determine if students are understanding the new material. If a majority of the class answers a poll question incorrectly, the students are encouraged to discuss with each other using scientific arguments about which answer is most likely to be correct. Once discussion has ended, the poll is taken again. The process is repeated until through evaluation of the different points of view, the majority of the class has selected the correct answer.

Lecture-tutorials are an effective tool for promoting active learning through discussion and collaborative teamwork. During a lecture, the students work in small groups (2–3) on an astronomy tutorial that reinforces the introduction of new concepts by applying these concepts in a series of questions; students typically require 15–20 minutes to complete a tutorial. The tutorials have multiple discussion-style questions that the students evaluate using the scientific method and answer as a team. The class then reviews the tutorial which often promotes further discussion of the material.

Please be aware that instructors should be prepared to submit samples/examples of student work as part of the future course recertification process.
Syllabus for Astronomy 101 – “Basic Astronomy”

Section 503 – Prof. Lucas Macri

Fall 2012

Howdy! Welcome to Astronomy 101! This course covers a wide range of topics in modern astronomy and the laws of physics that govern the Universe. This course is intended for students who are not majoring in engineering or a physical science. Some basic knowledge of high-school physics would be helpful, but don’t worry if you never took it or if you’ve forgotten most of it – we will cover these topics in the first few weeks of class. I hope that by the end of the term you will have a firm understanding of the main areas of modern Astronomy and you will be able to explain to your friends and family how planets form, why stars shine, and what might be the ultimate fate of the Universe.

Important information

• Instructor: Prof. Lucas Macri
  o Imacri@tamu.edu, Mitchell Institute #423, (979) 314-1592

• Teaching Assistants: Steven Boada & Yi Yang
  o sboada@physics.tamu.edu; nge4594@physics.tamu.edu
  o Mitchell Institute #317 & #318

• Classroom: Mitchell Physics Building #203

• Lecture time: Tuesdays and Thursdays, 12:45 to 2pm


• Clicker: i>clicker (original version, not i>clicker 2 nor i>clicker+)

• Office hours (please make an appointment by email or phone call):
  o Lucas: Tuesdays 2-5pm, Thursdays 2-4pm
  o Yi: Mondays 4-7pm
  o Steven: Tuesdays 3-4:30pm & Wednesdays 9:30-11am
Homework

- There will be a total of 13 homework assignments (about one per week).
- Homework will count for 30% of the total grade.
- The assignments will always be due before class (12:45pm) on Tuesdays.
- Late homework will receive no credit.
- You may not collaborate with other students on the homework assignments.
- All assignments will be done online at http://www.masteringastronomy.com.
- You must register at the web site using a code that is included with each brand-new copy of the textbook. If you have a used textbook, you can purchase a code at the web site.
- Once you have registered at the website, you must “enroll” in our class by using the following class code: TAMUASTR101S503FA12.

Exams

- There will be a total of four exams. Each exam will count for 15% of the final grade.
- The exams will test your knowledge of the concepts discussed in class and the homework through a variety of multiple-choice and fill-in-the-blank questions.
- Each exam will cover the material presented in 3 or 4 chapters of the textbook.
- The first three exams will take place at the usual lecture time on Thursday, September 27th, Thursday, October 18th and Thursday, November 8th. The fourth exam will take place during finals week, on Wednesday, December 12th at 8am.
Class attendance and participation

- Reading the assigned chapters before lecture, attending class, and actively participating during class are integral parts of this course.

- You should set aside a minimum of two hours a week to read the assigned chapter in depth, review the summary of key concepts at the end of each chapter, and test your understanding of the material by answering the review questions.

- Reading and attendance will be monitored through the use of iClickers, which you must bring with you to every lecture.
  - We will use the clickers at the beginning of each lecture for a short “reading” quiz based on the assigned chapter and the material covered in the previous lecture. This will count for 5% of your final grade.
  - We will use the clickers throughout the rest of lecture for audience participation. This will count for 5% of your final grade.

- Asking a classmate to use your iClicker in your absence will be considered a violation of the Honor Code.

Use of electronic devices in class

- Using a cell phone, iPod or similar device during class for any reason (including texting) is strictly prohibited. These devices should be turned off or placed in silent mode prior to the start of class.

- The use of a laptop or a tablet during class is only allowed for class-related activities, such as taking notes.

- Any student found violating these rules will be asked to leave the classroom for the remainder of the lecture and will not be credited with class attendance or participation for that lecture.
Grading policy

If you miss an exam, only officially excused absences as outlined in the University Regulations will be accepted. In this case you have to contact the course instructor as soon as possible. Very few conditions qualify as an authorized excused absence, so avoid missing an exam under all circumstances.

Exam grades may be curved depending on special conditions for a particular exam. The course grade will be determined from the various components of the course as outlined in the preceding pages in the following way:

(a) Homework will count for 30%
(b) Each of the four exams will count for 15%, for a total of 60%
(c) iClicker quizzes and class participation will count for 10%

Tentative grading table (adjustments are possible):

- % of all possible points ≥ 90: A
- 80 ≤ % of all possible points < 90: B
- 70 ≤ % of all possible points < 80: C
- 60 ≤ % of all possible points < 70: D
- % of all possible points < 60: F
ADA Policy

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring special accommodation, please contact the Department of Student Life, Services for Students with Disabilities, in Room 126 of the Koldus Building or call 845-1637.

Your Responsibilities

Texas A&M University assumes that all students enroll in its programs with a serious learning purpose and expects them to be responsible individuals who demand of themselves high standards of honesty and personal conduct. All students are expected to behave at all times with respect and courtesy toward their fellow students and instructors and are to have the highest standards of honesty and integrity in their academic performance. Any behavior that disrupts the classroom learning environment or any attempt to present work that the student has not actually prepared as their own work, or to pass an examination by improper means, is regarded as a serious offense. The minimum penalty for such an offense is a failing grade for this course. Aiding and abetting the above behavior is also considered a serious offense resulting in equally severe penalties.

I consider it a privilege to work with students of such character as that of Aggies. The Honor Code sets Texas A&M apart from other universities, and you should be proud of the standard this sets. I expect that you will abide by the Aggie Code of Honor:

The Aggie Honor Code: An Aggie does not lie, cheat or steal, or tolerate those who do

Further information regarding the Honor Council Rules and Procedures may be found on the web at http://www.tamu.edu/aggiehonor
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Texas A&M University
Core Curriculum

Initial Request for a lower division course included in the current Core Curriculum
to be considered for the Fall 2014 Core Curriculum

This request is submitted by (department name):

1. Course prefix and number: 
   Physics & Astronomy
   ASTR 102

2. Texas Common Course Number:
   ASTR 1104
   PHYS 1111

3. Complete course title:
   Observational Astronomy

4. Semester credit hours:
   1

5. This request is for consideration in the following Foundational Component Area:

   Communication
   Mathematics
   Life and Physical Sciences
   Language, Philosophy and Culture
   Creative Arts
   American History
   Government/Political Science
   Social and Behavioral Sciences

6. This course should also be considered for International and Cultural Diversity (ICD) designation:

   Yes
   No

7. How frequently will the class be offered?
   Every Fall, Spring, and Summer semester

8. Number of class sections per semester:
   4 classes (1 class in each Summer semester)

9. Number of students per semester:
   160

10. Historic annual enrollment for the last three years:

This completed form must be attached to a course syllabus that sufficiently and specifically details the appropriate core objectives through multiple lectures, outside activities, assignments, etc. Representative from department submitting request should be in attendance when
considered by the Core Curriculum Council.

11. Submitted by: [Signature]
    Course Instructor

    Date: 01 March 2013

12. Approvals:
    [Signature]

    Date: 3/4/2013

13. Department Head
    [Signature]

    Date: 3/5/13

14. College Dean/Designee
    [Signature]

For additional information regarding core curriculum, visit the Texas Higher Education Coordinating Board website at www.thecb.state.tx.us/corecurriculum2014

See form instructions for submission/approval process.
Texas A&M University
Core Curriculum
Initial Request for a Course Addition to the Fall 2014 Core Curriculum

Foundational Component Area: Life and Physical Sciences

In the box below, describe how this course meets the Foundational Component Area description for Life and Physical Sciences. Courses in this category focus on describing, explaining, and predicting natural phenomena using the scientific method. Courses involve the understanding of interactions among natural phenomena and the implications of scientific principles on the physical world and on human experiences.

The proposed course must contain all elements of the Foundational Component Area. How does the proposed course specifically address the Foundational Component Area definition above?

ASTRONOMY 102 (1 credit): OBSERVATIONAL ASTRONOMY
Observational and laboratory course which may be taken in conjunction with ASTR 101 or ASTR 314. Use of techniques and instruments of classical and modern astronomy. Prerequisite: ASTR 101 or ASTR 314, or registration therein.

ASTR 102 is an autonomous laboratory course that teaches students how to understand and apply appropriate technology to the study of the natural sciences. Students obtain hands-on experience by learning and applying astronomical observational techniques on small commercial telescopes at the campus observatory and analyzing data obtained with those telescopes. Full development of scientific methods and thought are shown using direct observations of, e.g. the surface of the Moon (craters, mountains, valleys), phases of Venus and the Moon, and the motion of the moons around Jupiter, and how these early astronomical discoveries culminated in the development of Newtonian gravity and dynamics. A linked discussion of planetary systems around other stars also illustrates the limitations of the standard formation model of the Solar System. Throughout the course mathematical techniques are used to illustrate concepts, derive physical relations, and show the manner in which the need to explain natural phenomena led to the development of higher mathematical tools. For example, the need to have a mathematical framework to explain the movement of planets around the Sun led directly to the invention of calculus by Isaac Newton.

Texas A&M is one of only a few schools that offer such an observational astronomy course and it is extremely popular among our students. When students complete the 102 course, they have the skills and knowledge to be competent amateur astronomers.

For more information, please contact the Undergraduate Astronomy Coordinator Dr. Kim-Vy Tran (vy@physics.tamu.edu) and visit the website astronomy.tamu.edu

Core Objectives

Describe how the proposed course develops the required core objectives below by indicating how each learning objective will be addressed, what specific strategies will be used for each objective and how student learning of each objective will be evaluated.

The proposed course is required to contain each element of the Core Objective.
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Critical Thinking (to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information):

**Astronomy 102** is focused on applying the scientific method by acquiring astrophysical observations and analyzing the resulting data to test hypotheses. We engage the students in understanding experimental design and troubleshooting through laboratory exercises that are designed to enhance understanding and comprehension of the physical phenomena observed in the night sky. Students learn to navigate the night sky using a celestial coordinate system to determine when objects rise and set and how to locate objects on a given date and time. Night sky targets include stars, the Moon, and objects from the Messier catalog and New General Catalog; the latter include galaxies, star clusters, planetary nebulae, etc. By observing objects in the night sky, students analyze how the night sky changes and develop a deeper appreciation of the underlying physical concepts.

Communication (to include effective development, interpretation and expression of ideas through written, oral and visual communication):

**Astronomy 102** is based at our Physics Observatory and students learn general astronomy, coordinate systems, star charts and telescope design in a classroom environment while making observations using sophisticated telescopes in an outdoor environment. In this existing construct, three to four students share a telescope as a lab group and the students assist each other during their laboratory time. In learning to navigate the night sky, students must learn to read star charts and communicate to their peers about how to locate and observe night sky objects. Each student learns how to explain the concepts during one-on-one discussions with their teacher, specifically by showing where objects are in the night sky and how to locate them. The students also keep a lab manual where all of their observations are recorded; the lab manual is examined at the end of the semester and is included in the final course grade.
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Empirical and Quantitative Skills (to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions):

ASTR 102 teaches students how to navigate the night sky by learning about the celestial coordinate system (Right Ascension and Declination), reading star charts, and determining when objects rise and set. Several of these steps require manipulation of numerical data, e.g. target coordinates to determine position on a given date and time, and empirical knowledge to use the telescope. Several fundamental physical concepts are taught by observing night sky phenomena. For example, observing the Moon’s surface demonstrates that it must be spherical and has features including mountains, craters, and valleys. Observation of binary stars illustrates how gravity works on large scales and that stars have different temperatures (colors). Identifying galaxies beyond the Milky Way gives a sense of the vast physical and times scales in the Universe.

Student understanding is evaluated using regular quizzes, keeping a semester-long lab manual, and with one-on-one discussion with the teacher to identify objects in the night sky.

Teamwork (to include the ability to consider different points of view and to work effectively with others to support a shared purpose or goal):

ASTR 102 is arguably one of the best courses to develop cooperative learning skills for students spanning the range in personality because teamwork is an essential component of active learning in the course. Students learn to work effectively in small groups to take astronomical observations, obtain and analyze data, and interpret their results. The telescopes require at least two students to operate successfully, and students need to discuss which objects they will observe and how to locate the object in the night sky using star charts and celestial coordinates. While the students are evaluated individually, their participation and ability to learn with others is key to their success in ASTR 102.

Please be aware that instructors should be prepared to submit samples/examples of student work as part of the future course recertification process.
ASTR 102: OBSERVATIONAL ASTRONOMY
(FALL 2012)

Meeting:

Observatory Phone Number: (979) 845-0536
Map to Observatory: http://observatory.tamu.edu/directions.html

All sections begin meeting the first week of classes.

Section 501 meets on Monday nights from 7:30 to 10:30 PM, beginning August 27th
Section 502 meets on Tuesday nights from 7:30 to 10:30 PM, beginning August 28th
Section 503 meets on Wednesday nights from 7:30 to 10:30 PM, beginning August 29th
Section 504 meets on Thursday nights from 7:30 to 10:30 PM, beginning August 30th

Students are responsible for their own transportation to and from the observatory. While on the property, drive slowly and be cautious of wildlife as this is also a preservation area. The maximum speed limit is 25 mph. Speed is restricted to 10 mph in the parking area. Failure to obey these speed restrictions will result in a significant decrease in your final point total!

Managing the Gate:

The “white” gate noted on the map will either be opened or closed when you arrive for your first class at the observatory. If it is closed, wait patiently in your vehicle and your instructor will meet you at the gate and lead you to the observatory. If the gate is opened when you arrive, carefully follow the map and drive directly to the observatory.

Once you have been introduced to the area and after the first week of classes, you are responsible for managing the white gate. When you arrive, let yourself in the gate and lock it behind you. This gate must remain locked at all times. Failure to manage the gate properly becomes a burden on the entire class as the class lock will have to be removed. The combination to the class lock is: 0218 Note: this lock is only on the gate during class time.

Fire Danger Notice:

Due to the extended drought, the fire danger is extreme. Absolutely no object that emits a flame i.e.(matches, cigarette lighter) is permitted on any property owned by Ecology Conservation and Range Science or the Department of Physics & Astronomy (Observatory). Likewise, no smoking is allowed on the property, regardless of your physical location. Do not drive your vehicle onto any grass unless an emergency or unavoidable conditions warrant such behavior. This especially includes the area along the unpaved roadway.
Attendance:

You are expected to arrive on time. You will only receive half credit for arriving after a lab assignment has been given to the class. There are no make-ups for students who do not have an official, written excuse as outlined in the student rules. For those with an excused absence, make-ups are given on an as-needed basis and coordinated with your instructor. You must attend the section for which you are enrolled. You will not receive credit for work completed while attending another section.

Quizzes & Exam:

There will be a minimum of five (5) quizzes given during the course. The dates for these quizzes may not be announced in advance. Quiz questions are generated from discussions in class and the readings in the text. You may elect to take an optional exam at the end of the term. If so, your quiz and exam scores will account for 20% (each) of your final grade. If no exam is taken, your quiz grades will account for 40% of your final grade.

Lab Practicals:

You will have two lab practicalls during the course to test your knowledge of the night sky and your telescope pointing skills. Dates for lab practicalls are dependent on the weather and progress of the individual class. Therefore, dates for lab practicalls will be announced by the instructor at least one class night in advance of the practical.

Correspondence:

Throughout the course, any additional information regarding the class will be sent via email to your Neo email account. It is your responsibility to check your email before coming to class each class night. Typically, emails will not be sent after 5:00 PM. If you need assistance with your Neo email, visit the Student Computing Center on campus.

Additional Course Rules:

- Students must have: red filtered flashlight; something with which to write; star charts; and a calculator with common functions such as Sin, Cosine, etc. We will discuss the flashlight in our first class.

- Students must print the star charts, which can be found on the web site. Bring these charts with you to your first class. http://observatory.tamu.edu/courses/observational/

- Do Not Bring Food To The Observatory! Eat dinner or a snack before coming to class. Drinks are okay to bring into the classroom/observing area; however, you must take it with you when you leave. Drinks are not allowed near the computers in the classroom. Failure to obey these simple guidelines will result in a 40 point reduction in your final grade!

Lab Manual:
You must visit the url below to download and print the lab manual. The manual must be printed, punched and placed inside of a simple 3-hole folder. Hard binders are discouraged and your instructor may require that you replace a hard binder with a folder. You will be leaving the manual at the observatory for the duration of the course. You must have the manual with you on your first class day. Instructors grade the work in your lab manual. If you fail to bring a manual, you cannot receive credit for any work completed.

Lab Manual Download: http://observatory.tamu.edu/courses/observational/manuals/

Grading:

(Grading will be on a 100-point scale. There is no curve.)

<table>
<thead>
<tr>
<th>With Optional Exam</th>
<th>Without Optional Exam</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lab Work</td>
<td>Lab Work</td>
</tr>
<tr>
<td>40%</td>
<td>40%</td>
</tr>
<tr>
<td>Exam</td>
<td>Quizzes</td>
</tr>
<tr>
<td>20%</td>
<td>40%</td>
</tr>
<tr>
<td>Quizzes</td>
<td>Practical(s)</td>
</tr>
<tr>
<td>20%</td>
<td>20%</td>
</tr>
<tr>
<td>Practical(s)</td>
<td>Equip Care</td>
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<tr>
<td>20%</td>
<td>Up to -100% *</td>
</tr>
<tr>
<td>Equip Care</td>
<td></td>
</tr>
<tr>
<td>Up to -100% *</td>
<td></td>
</tr>
</tbody>
</table>

* Equipment and Facilities Care: This category cannot increase your final grade, but can significantly reduce your grade. Misuse of any equipment; not driving at appropriate speeds; not putting the equipment away properly; and not obeying the general rules outlined in this syllabus including the Observatory Safety Rules (below), can all result in a decrease in points for the term. Your instructor has sole discretion to remove points from your total for the reasons stated above.
Observatory Safety Rules

The following is a list of safety and related rules that must be followed by all who visit or attend classes at the observatory. The rules are separated into three main categories: Fire and Emergency, Telescope and General Safety. A list of emergency telephone numbers can also be found below for reference. Students are required to sign the Observatory Safety Rules Agreement online through Howdy. If you fail to do this by the end of the drop/add period, your name will be removed from the grade book and you will not receive credit for your work. Further, you will not be allowed at the observatory. Students who do not follow the rules may have their final grade reduced significantly as mentioned in the “Grading” section. If the agreement is not available to sign via Howdy, your instructor will inform you to sign and return the physical copy at the end of this document.

Emergency Telephone Numbers

Emergency Operator (All life-threatening Emergencies) 9-911

Area Maintenance V (Building Problems and Repair) 5-5542
24 hr Radio Room (Elevator & Pest problems, After-hours Maintenance) 5-4311

Environmental Health & Safety Dept. (Chemical spills/problems) 5-2132
After normal work hours call the Radio Room at 5-4311.

Evacuation Coordinator 5-0536

University Police 5-2345
University Hospital 5-1511

College Station Fire Department (Non-Emergency) 764-3700
College Station Police Department (Non-Emergency) 764-3600

Bryan Police Department (Non-Emergency) 361-3680
Bryan Fire Department (Non-Emergency) 361-3888

Fire and Emergency Safety

The "grassy area" mentioned below refers to the intersection of the parking area and eastern fence line. Your instructor will familiarize you with this area. It is important to know the location of the grassy area as it is the meeting place for all persons during any emergency that requires you to exit the buildings. Do not drive away in your vehicle! Remain in the grassy area until you are dismissed by your instructor or emergency personnel.
There are two numbered buildings at the observatory:

1. Building #1238 (0.5 Meter Observatory): The small, double room observatory near the east fence line.

2. Building #1239 (Student Observatory / Classroom): The large building containing the classroom, restrooms and water fountains. The restrooms and water fountains are located in Rm 109.

Four fire extinguishers are located inside the observatory that are accessible to all persons:

1. Inside the classroom against the west wall near the exit door.

2. Inside the main entrance door to the student observatory against the east wall.

3. Second floor of the student observatory between the elevator and stairwell exit.

4. Inside the door leading into the 0.5 meter observatory.

There are Fire Alarm Pull Stations located next to each exit door in both buildings and on the second floor inside the stairwell of the student observatory.

If you are in Building #1238 (0.5 Meter Observatory): All occupants are to proceed through the only marked exit door to the grassy area.

If you are in Building #1239 (Student Observatory / Classroom) First Floor: If in the classroom (Rm 106), exit through either of the marked exit doors and proceed to the grassy area. If in any area other than the classroom and if possible, proceed through the marked exit door in Rm 109. Proceed to the grassy area.

If you are in Building #1239 (Student Observatory / Classroom) Second Floor: All occupants are to proceed down the stairs and exit through the marked exit door in Rm 109 (first floor where the restrooms and water fountains are located). Proceed to the grassy area.

The observatory is at the top of a hill near the Easterwood Airport and is exposed to all weather conditions. Severe weather can develop suddenly, especially during the summer months when prevailing winds are from the south. Straight Line Winds exceeding 80 mph have been recorded during summer thunderstorms and are dangerous conditions. As a result, your instructor may not allow you to leave until the threat has passed, even if class is officially over by the clock! You are required to remain at the observatory until you are dismissed by your instructor.

In the event of an emergency, follow the instructions given to you by your instructor. Above all, remain calm and quiet so that instructions can be heard by all. If you are asked to perform a duty by your instructor, follow their instructions.
Telescope Safety

When picking the telescope up from ground level, be certain to lift with your legs and not your back. Although the 8" telescopes weigh less than 30 pounds, serious back injury can occur from improper lifting.

Before moving the telescope to an object in the night sky, be certain that all persons are clear of the telescope to prevent getting hit.

Warning! Never look directly at the Sun with the naked eye or with a telescope. Permanent and irreversible eye damage may result. Never use a telescope to project an image of the Sun onto any surface. Internal heat build-up can create a fire causing personal injury. Damage to the telescope and/or any accessories attached to it can also occur.

Never use an eyepiece solar filter or a Herschel wedge. Internal heat build-up inside the telescope can cause these devices to crack or break, allowing unfiltered sunlight to pass through to the eye.

Never leave the telescope unsupervised when children are present or with adults who may not be familiar with the correct operating procedures of the telescope.

Never point the telescope at the Sun unless you have the proper solar filter. When using the telescope with the correct solar filter, always cover the finder scope. Although small in aperture, finder scopes have enough light gathering power to cause permanent and irreversible eye damage. In addition, the image projected by the finder is hot enough to burn skin or clothing.

The 12' safety ladders in the domed observatories must be set so they cannot roll when a person is climbing. The first step of the ladder releases the wheels to prevent rolling. Hold the ladder up by the hand rails and press down on the first step with your foot and gently lower the ladder to the ground. Hold the hand rails at all times when climbing or standing on the ladders.

General Safety

All persons must wear shoes that completely cover the feet, such as tennis shoes or boots. Sandals or open toe shoes or open heel shoes are prohibited.

The student observing deck is where you will setup a telescope to complete your observational laboratory assignment. The deck is made of wood planks that can become detached and pose a tripping hazard. Likewise, notebooks and other necessary items can be laying on the deck while you are working and can pose a tripping hazard. You are required to have a red filtered flashlight at all times when outdoors at the observatory. Red light allows you to maintain your night vision while working in the dark. Use your light when walking on the deck or between the deck and the classroom building to avoid tripping.
The maximum speed limit on the unpaved section of road leading to the observatory is 25 mph. Speed is restricted to 10 mph in the parking area next to the observatory. Be cautious of automobiles, tractors and utility vehicles that may be moving without headlights. Be cautious of pedestrian traffic, especially near the observatory. Pedestrians can be very difficult to see since the road is narrow and there are trees and tall grass along the road’s edge.

All persons should be aware that the property surrounding the Physics Teaching Observatory is open rangeland and prone to poachers (a person who hunts illegally), especially during the fall and winter months. If you witness any person(s) with a rifle or any firearm within the property, contact University Police immediately! If you are at the observatory, let your instructor know immediately and they will be responsible for contacting law enforcement.

During active mosquito months, all persons visiting or taking classes at the observatory must use insect repellent when outside for protection against viruses that can be transmitted by mosquitoes and other biting insects.

Bats are flying mammals indigenous to our region. The bat population living near the observatory have been known to carry rabies. If you find a bat on the ground whether dead or alive, do not touch or come in contact with the animal in any way! Alert the person in charge. Environmental Health and Safety will be contacted and will be responsible for the proper handling of the animal. If a bat flies inside any building, leave the building; prop open an outside door; and stand clear of the door. Bats will typically fly out on their own within 10 or 15 minutes. If the bat cannot get out, contact University Pest Control to remove the animal. Do not attempt to catch or handle the bat! If you do come in contact with a bat, let your instructor know immediately so the animal can be quarantined if possible and tested properly. Wash the area of contact vigorously with soap and water and see your health professional as soon as possible for guidance.
Observatory Safety Rules Agreement
(ASTR 102 ALL SECTIONS)

I acknowledge that I have received the course syllabus either from my instructor or by internet download and that my instructor has reviewed the syllabus with me personally or with my class.

By signing below, I agree to follow all of the Course Requirements and Observatory Safety Rules as established in the course syllabus. This includes following the instructions given to me by my instructor and new rules that may be adopted during the course of the semester.

In addition, I acknowledge that I have read the information below regarding the Americans with Disabilities Act; the Aggie Honor Code; and syllabus amendment information.

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact the Department of Student Life, Services for Students with Disabilities, in Room B118 of Cain Hall, 979-845-1637.

The Aggie Honor Code is "An Aggie does not lie, cheat, or steal or tolerate those who do." For more information, refer to the Honor Council Rules and Procedures on the web at http://www.tamu.edu/aggiehonor/.

While the information in this syllabus was accurate at the time of writing, it may be necessary to amend information and policies during the course of the semester. Such amendments to this syllabus will be announced via email and by your instructor.

Print Full Name ____________________________

Signature ____________________________ Date ________________
Texas A&M University

Core Curriculum

Initial Request for a lower division course included in the current Core Curriculum to be considered for the Fall 2014 Core Curriculum

This request is submitted by (department name):

Course prefix and number: ASTR 111

Complete course title: Overview of Modern Astronomy

Texas Common Course Number:

 Semester credit hours:

This request is for consideration in the following Foundational Component Area:

☐ Communication
☐ Mathematics
☒ Life and Physical Sciences
☐ Language, Philosophy and Culture

☐ Creative Arts
☐ American History
☐ Government/Political Science
☐ Social and Behavioral Sciences

This course should also be considered for International and Cultural Diversity (ICD) designation:

☐ Yes ☒ No

How frequently will the class be offered?

Number of class sections per semester:

2 to 4 classes with total of 12 to 16 lab sections

Number of students per semester:

Historic annual enrollment for the last three years:

F2011/S2012: 381
F2010/S2011: 280
F2009/S2010: not yet available

This completed form must be attached to a course syllabus that sufficiently and specifically details the appropriate core objectives through multiple lectures, outside activities, assignments, etc. Representative from department submitting request should be in attendance when considered by the Core Curriculum Council.

Submitted by: 01 March 2013

Date

Course Instructor

Date

Date

Date

See form instructions for submission/approval process.
Texas A&M University  
Core Curriculum  
Initial Request for a Course Addition to the Fall 2014 Core Curriculum

Foundational Component Area: Life and Physical Sciences

In the box below, describe how this course meets the Foundational Component Area description for Life and Physical Sciences. Courses in this category focus on describing, explaining, and predicting natural phenomena using the scientific method. Courses involve the understanding of interactions among natural phenomena and the implications of scientific principles on the physical world and on human experiences.

The proposed course must contain all elements of the Foundational Component Area. How does the proposed course specifically address the Foundational Component Area definition above?

ASTRONOMY 111 (4 credits): OVERVIEW OF MODERN ASTRONOMY
Roots of modern astronomy; the scientific method; fundamental physical laws; the formation of planets, stars, and galaxies; Introduction to cosmology; includes an integrated laboratory that reinforces the lecture topics, including hands-on experience with telescopes and imaging of celestial objects; not open to students who have taken ASTR 101 or ASTR 314.

The science of astronomy involves centuries of discovery and analysis, along with the (sometimes radical) revision of our understanding of the entire universe. As such, it casts its net over the widest possible array of topics, from the interaction of light with matter at the atomic level to the gravitational interaction of clusters of galaxies. Astronomical discoveries from the Greeks to the present provide many illustrative examples of the scientific method whereby observations are analyzed, hypotheses are formulated, predictions are made, and hypotheses are confirmed, revised, or rejected. ASTR 111 provides a solid foundation for students to understand what science is and what science is not. The lectures introduce students to nearly all fundamental topics of modern science including basic natural forces (Gravity, Electromagnetism, and the Strong and Weak forces), thermodynamics, Special and General relativity, quantum mechanics, modern particle physics, and cosmology. By applying scientific thinking to the natural world, students learn, e.g. why nights are shorter in summer and longer in winter, what powers the sun, how stars die, why galaxies differ in shape, and how the universe began. The integrated laboratory component of the course consists of scientific experiments that test hypotheses and reinforce class material. These experiments give the students hands-on experience with small commercial telescopes, the analysis of data obtained with those telescopes, and access to recent digital data obtained with professional-caliber facilities.

For more information, please contact the Undergraduate Astronomy Coordinator Dr. Kim-Vy Tran (vy@physics.tamu.edu) and visit the website astronomy.tamu.edu

Core Objectives

Describe how the proposed course develops the required core objectives below by indicating how each learning objective will be addressed, what specific strategies will be used for each objective and how student learning of each objective will be evaluated.

The proposed course is required to contain each element of the Core Objective.
Texas A&M University

Core Curriculum

Initial Request for a Course Addition to the Fall 2014 Core Curriculum

Critical Thinking (to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information):

Astronomy 111 is structured around general questions about science and its place in our world. We stress the use of the scientific method in answering questions. We give instruction in astronomy specifically, but give an appreciation of the broader context of that knowledge. In particular, we will show that gaining a scientific body of knowledge involves mastery of concepts and specific viewpoints, much more than simply learning a set of facts. We show what types of questions can be posed and how they are answered in a scientific context; this necessarily involves explanation of how scientific theories are developed and tested and the nature of science and limits of empirical knowledge. Astronomy is well tuned to this sort of instruction; both due to its intrinsic interest, but also because the span of time and spatial scales involved are so much greater than human experience.

Astronomy 111 includes instruction in issues that connect astronomical knowledge and associated scientific methodology more generally to concepts that unify the natural sciences and that are related to a broader cultural context. We show the importance of cause and effect reasoning in the scientific world view, demonstrate the characteristic scales and proportions of natural phenomena, explain the ways in which the Universe and local environment change and evolve, reveal the general applicability of natural laws, illustrate the role of mathematics in science, and discuss the historical development of science and impact on culture and general intellectual progress.

Communication (to include effective development, interpretation and expression of ideas through written, oral and visual communication):

Communication is key to science and the students develop communication skills on multiple levels including analytic and written skills as part of the assignments as well as verbal skills during lectures and lab. The course components are designed to teach students how to explain the scientific process, describe basic physical concepts and general characteristics of astronomical objects, apply scientific thinking to the natural world, and formulate a scientific hypothesis. Individual student progress is assessed regularly throughout the semester using metrics that include homework, exams, and lab quizzes.
Empirical and Quantitative Skills (to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions):

In addition to regular homework and exams that help develop empirical and quantitative skills, ASTR 111 includes a laboratory component that supplements and reinforces the lecture material by guiding the students through a series of experiments to test hypotheses and thus learn the scientific process. The students apply the scientific method by acquiring data from existing archives, and they learn skills involving data reduction, analyzing their experimental results, and interpreting their scientific conclusions. The lab includes collecting digital night-time astronomical data as well as learning fundamentals of statistical and random errors, simple statistics, analysis of results oriented towards topics related to concurrent lecture material (i.e. the properties of light, atomic structure, the surface temperature and spectrum of stars, distances to the nearest stars), and connections between theory and data.

Teamwork (to include the ability to consider different points of view and to work effectively with others to support a shared purpose or goal):

As part of the integrated lab for ASTR 111, students learn to work effectively in teams and as part of a larger group to take astronomical observations, obtain and analyze data, and interpret their results. The students work in pairs on the lab experiments which include building individual telescopes, measuring light from celestial objects, plotting measurements and assessing errors, determining relations between variables, and applying scientific theory to understand the underlying physical explanation. The students must be able to work as a team to understand the basic scientific concepts, test their understanding, apply their knowledge, and determine the correct outcome.

Please be aware that instructors should be prepared to submit samples/examples of student work as part of the future course recertification process.
Astronomy 111 Syllabus – Dr. Kim-Vy Tran (Fall 2011)

Astronomy 111: Overview of Modern Astronomy (Fall 2011)

Course Description: Roots of modern astronomy, the scientific method, fundamental physical laws, the nature and formation of planets, stars, and galaxies. Introduction to cosmology. Course includes an integrated laboratory that reinforces and includes supplemental information related to the lecture topics, including hands-on experience with telescopes and digital imaging of celestial objects. Not open to students who have taken ASTR101 or ASTR314.

Prerequisites: None. Course uses basic (high school level) algebra and geometry.

Course Content: 3 Lecture hours and 2 Laboratory hours each week (4 credit course)

Course Objectives: By the conclusion of this course, students should be able to:

- Explain the scientific process and how scientific theories are developed and tested.
- Recall basic physical concepts such as gravitational and conservation laws, and how light and matter interact.
- Describe the general characteristics of our solar system and the universe.
- Apply scientific thinking to the natural world to understand, e.g. what powers the sun, why galaxies differ, and how the universe began.
- Formulate a scientific hypothesis, identify a testable prediction, verify by carrying out an experiment, and assess the results.
- Work effectively in a laboratory group.

Logistics

Lecturer: Asst. Prof. Kim-Vy Tran (vy@physics.tamu.edu)

Phone Number: Google voice 1-979-258-1054
(instantly rings my phone, sends text of voicemail, and sends voicemail recording to my email)

“Astronomy 111 Handbook” (available at Notes & Quotes; www.agilenotes.com)

Equipment: iClicker
(Register your iClicker in class with roll call)

Lectures (section 511 & 201): 08:00 – 09:15 on Tuesdays & Thursdays in MPHY 213
Lectures (section 505 – 510): 12:45 – 14:00 on Tuesdays & Thursdays in MPHY 203

On Demand Office Hours: Please email or call me to request an appointment at any time. My office is in the Mitchell Institute (MIST 324).

Class Website: http://faculty.physics.tamu.edu/vy/ASTR111-fall11/

ELearning Website: http://elearning.tamu.edu/
Check here for links to class website and online homework, and exam grades.

Laboratory Coordinator: Dr. Jennifer Marshall, Munneryn Astronomical Lab Building, marshall@physics.tamu.edu

All lab sections meet the second week of classes (starting 05 September) in MPHY 331.
Astronomy 111 Syllabus – Dr. Kim-Vy Tran (Fall 2011)

Bring sturdy Lab or Composition Notebook with about 80 pages and the Astronomy 111 Lab Handbook (Fall 2011 Edition, purchase at Notes & Quotas).

<table>
<thead>
<tr>
<th>Section</th>
<th>Day</th>
<th>Time</th>
<th>TA</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>201</td>
<td>Monday</td>
<td>11:30-13:30</td>
<td>Mike Smitka</td>
<td><a href="mailto:mike.smitka34@neo.tamu.edu">mike.smitka34@neo.tamu.edu</a></td>
</tr>
<tr>
<td>511</td>
<td>Monday</td>
<td>16:10-18:10</td>
<td>Mike Smitka</td>
<td><a href="mailto:mike.smitka34@neo.tamu.edu">mike.smitka34@neo.tamu.edu</a></td>
</tr>
<tr>
<td>505</td>
<td>Thursday</td>
<td>09:35-11:35</td>
<td>Heath Shiple</td>
<td><a href="mailto:heath.shipley@tamu.edu">heath.shipley@tamu.edu</a></td>
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<tr>
<td>506</td>
<td>Wednesday</td>
<td>13:50-15:50</td>
<td>Ting Li</td>
<td><a href="mailto:sszabi@neo.tamu.edu">sszabi@neo.tamu.edu</a></td>
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<tr>
<td>507</td>
<td>Tuesday</td>
<td>15:55-17:55</td>
<td>Adam Tomczak</td>
<td><a href="mailto:alam.tamczak@neo.tamu.edu">alam.tamczak@neo.tamu.edu</a></td>
</tr>
<tr>
<td>508</td>
<td>Wednesday</td>
<td>16:10-18:10</td>
<td>Adam Tomczak</td>
<td><a href="mailto:alam.tamczak@neo.tamu.edu">alam.tamczak@neo.tamu.edu</a></td>
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<tr>
<td>509</td>
<td>Monday</td>
<td>09:10-11:10</td>
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<td>Ting Li</td>
<td><a href="mailto:sszabi@neo.tamu.edu">sszabi@neo.tamu.edu</a></td>
</tr>
</tbody>
</table>

**Class Requirements**

- **Homework (10%)**: 12 assigned, only 10 count towards final grade (late homework receives no credit). The 11th and 12th homeworks count as extra credit. Online homework is: http://smartwork.wwnorton.com/
- **Class Participation (5%)**: in-class questions & polling with iClicker; tutorials
- **Three Mid-term Exams (45%)**: fill-in the blank and essay questions. If your Final exam grade is higher than your (single) lowest mid-term grade, the Final exam grade will replace the (single) lowest mid-term grade. 

  *If you receive a “0” for any of the mid-term exams, the “0” will not be replaced.*
- **Final Exam (15%)**: fill-in the blank and essay questions
- **Laboratory (25%)**: 11 labs completed over the course of the semester; will include two trips to the TAMU Physics Observatory. See syllabus in ASTR111 Lab Handbook for more details.

**Approximate Grading Scale:**

A (≥90%), B (80–89%), C (70–79%), D (60–69%), F (<60%)

**Time Investment**: For the Lecture component, you are expected to spend approximately 12 hours total per week on the material (3 hours in lecture, 6 hours reading, and 3 hours on homework). For the lab component, you are expected to spend 4 hours per week (2 hours in lab and 2 hours preparing/finishing labwork).

**Homework Structure**

There will be a total of 12 homeworks assigned during the semester but only 10 will count towards your homework component of 10%. The 11th and 12th homeworks count as extra credit, e.g., if you missed one of the previous 10 homeworks. Each of the 12 homeworks is worth 1% towards your final grade, meaning that there is a potential 2% worth of extra credit if you complete all 12 homeworks.

Each assignment is due by 17:00 on Tuesday and late homework receives no credit. All assignments need to be completed online at:

http://smartwork.wwnorton.com/
You must first register at the Smartwork website with a code that is included in each new copy of the textbook; if you have a used textbook, you will need to purchase a new code on the Smartwork website. Only use your first and last name to register, i.e. do not include your university ID number. Once you have registered at the website, you must "enroll" in our class using the following enrollment key:

If your lecture is at 08:00 on Tuesdays & Thursdays: **BLUMEN1680**
If your lecture is at 12:45 on Tuesdays & Thursdays: **BLUMEN1688**

Mobile phones, Electronic Devices, & Electronic Communication

There is a strict no laptop/no mobile devices policy for this class; all laptops and mobile devices must remain closed during lecture.

This is hopefully obvious, but you should turn off your mobile phone prior to the start of class; texting or any other use of a mobile phone during class is not allowed. Texting via your laptop with, e.g. iChat or Skype, is also not allowed. The no electronic communication/distraction policy also applies to iPods, iPhones, Blackberries, and any other such devices. These activities during class are distracting and disrespectful to both your fellow students and me.

Your Responsibilities

Texas A&M University assumes that all students enroll in its programs with a serious learning purpose and expects them to be responsible individuals who demand of themselves high standards of honesty and personal conduct. All students are expected to behave at all times with respect and courtesy toward their fellow students and instructors and are to have the highest standards of honesty and integrity in their academic performance. Any behavior that disrupts the classroom learning environment or any attempt to present work that the student has not actually prepared as their own work, or to pass an examination by improper means, is regarded as a serious offense. The minimum penalty for such an offense is a failing grade for this course. Aiding and abetting the above behavior is also considered a serious offense resulting in equally severe penalties.

The Honor Code sets Texas A&M apart from other universities, and you should be proud of this standard. I expect that you will abide by the Aggie Academic Integrity Statement and Policy:

**AN AGGIE DOES NOT LIE, CHEAT OR STEAL, OR TOLERATE THOSE WHO DO.**

Further information regarding the Honor Council Rules and Procedures may be found on the web at [http://www.tamu.edu/aggiehonor](http://www.tamu.edu/aggiehonor)

ADA Policy

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information visit [http://disability.tamu.edu](http://disability.tamu.edu).
## Astronomy 111: Class Schedule (Fall 2011)

http://smartwork.wwnton.com/

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<thead>
<tr>
<th>Week</th>
<th>Lecture</th>
<th>Date</th>
<th>Assignment (Read Chapters Before Lecture)</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>30 Aug</td>
<td>Ch. 1, 2</td>
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<tr>
<td></td>
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<td>* HW1 assigned on Ch. 1, 2 (due 06 Sept)</td>
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<tr>
<td></td>
<td>2</td>
<td>01 Sept</td>
<td>Ch. 2; Tutorial (Seasons)</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>06 Sept</td>
<td>Ch. 3; Tutorial (Kepler’s 2nd Law)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>* HW2 assigned on Ch. 3 (due 13 Sept)</td>
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<tr>
<td></td>
<td>4</td>
<td>08 Sept</td>
<td>Ch. 3; Tutorial (Newton’s Laws &amp; Gravity)</td>
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<tr>
<td></td>
<td>5</td>
<td>13 Sept</td>
<td>Ch. 3, 4</td>
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<tr>
<td></td>
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<td>* HW3 assigned on Ch. 4 (due 20 Sept)</td>
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<tr>
<td></td>
<td>6</td>
<td>15 Sept</td>
<td>Ch. 4; Tutorial (Blackbody Radiation)</td>
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<tr>
<td></td>
<td>7</td>
<td>20 Sept</td>
<td>Ch. 4; Summary &amp; review</td>
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<td>8</td>
<td>22 Sept</td>
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<td><strong>Mid-term #1</strong></td>
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<td></td>
<td>9</td>
<td>27 Sept</td>
<td>Ch. 5; Tutorial (Telescopes)</td>
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<td>10</td>
<td>29 Sept</td>
<td>Ch. 5, 6; Tutorial (Solar System)</td>
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<td>11</td>
<td>04 Oct</td>
<td>Ch. 6, 7; Tutorial (Earth’s Changing Surface)</td>
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<td>* HW5 assigned on Ch. 6, 7 (due 11 Oct)</td>
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<td>7</td>
<td>12</td>
<td>06 Oct</td>
<td>Ch. 7, 9</td>
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<td>13</td>
<td>11 Oct</td>
<td>Ch. 9, 10</td>
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<td>* HW6 assigned on Ch. 9, 10 (due 18 Oct)</td>
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<td>14</td>
<td>13 Oct</td>
<td>Ch. 10; Summary &amp; review</td>
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<td>15</td>
<td>18 Oct</td>
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<td><strong>Mid-term #2</strong></td>
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<td>16</td>
<td>20 Oct</td>
<td>Ch. 13; Tutorial (The Parsec)</td>
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<td>17</td>
<td>25 Oct</td>
<td>Ch. 13, 14</td>
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<td>* HW7 assigned on Ch. 13 (due 25 Oct)</td>
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<td></td>
<td>18</td>
<td>27 Oct</td>
<td>Ch. 14, 15; Tutorial (Star Formation)</td>
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<td>19</td>
<td>01 Nov</td>
<td>Ch. 15, 16</td>
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<td>* HW9 assigned on Ch. 16, 17 (due 08 Nov)</td>
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<td>20</td>
<td>03 Nov</td>
<td>Ch. 16, 17</td>
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<td>21</td>
<td>08 Nov</td>
<td>Ch. 17; Summary &amp; review</td>
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<td>22</td>
<td>10 Nov</td>
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<td>11</td>
<td>23</td>
<td>15 Nov</td>
<td>Ch. 18; Tutorial (Expanding Universe)</td>
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<td>* HW10 assigned on Ch. 18, 19 (due 22 Nov)</td>
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<td>24</td>
<td>17 Nov</td>
<td>Ch. 18, 19; Tutorial (Galaxy Classes)</td>
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<td>25</td>
<td>22 Nov</td>
<td>Ch. 19, 20</td>
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<td>* HW11 assigned on Ch. 19, 20 (due 29 Nov)</td>
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<tr>
<td>12</td>
<td>26</td>
<td>24-25 Nov</td>
<td><strong>THANKSGIVING HOLIDAY</strong> (no classes)</td>
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<td></td>
<td>27</td>
<td>01 Dec</td>
<td>Ch. 20, 21</td>
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<td>* HW12 assigned on Ch. 21, 22 (due 06 Dec)</td>
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<td>13</td>
<td>28</td>
<td>06 Dec</td>
<td>Redefined Thursday; Summary &amp; review</td>
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<td>16</td>
<td>29</td>
<td>29 Nov</td>
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<td>31</td>
<td>06 Dec</td>
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<tr>
<td>16</td>
<td>32</td>
<td>09 Dec</td>
<td><strong>Final Exam: 12:30-14:30 (for lecture TR@12:45)</strong></td>
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<tr>
<td>16</td>
<td>33</td>
<td>13 Dec</td>
<td><strong>Final Exam: 13:00-15:00 (for lecture TR@08:00)</strong></td>
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</tbody>
</table>
Texas A&M University

Core Curriculum

Initial Request for a lower division course included in the current Core Curriculum to be considered for the Fall 2014 Core Curriculum

1. This request is submitted by (department name): Department of Biology

2. Course prefix and number: BIOL 113 (123) Essentials in Biology (and Essentials in Biology Lab)

3. Texas Common Course Number:

4. Complete course title:

5. Semester credit hours: 4

6. This request is for consideration in the following Foundational Component Area:
   - Communication
   - Mathematics
   - Life and Physical Sciences
   - Language, Philosophy and Culture
   - Creative Arts
   - American History
   - Government/Political Science
   - Social and Behavioral Sciences

7. This course should also be considered for International and Cultural Diversity (ICD) designation:
   - Yes
   - No

8. How frequently will the class be offered? every spring and fall semester

9. Number of class sections per semester: 2 (fall), 3 (spring)

10. Number of students per semester: 300

11. Historic annual enrollment for the last three years: '09-10 = 389

   '10-11 = 446

   '11-12 = 434

This completed form must be attached to a course syllabus that sufficiently and specifically details the appropriate core objectives through multiple lectures, outside activities, assignments, etc. Representative from department submitting request should be in attendance when considered by the Core Curriculum Council.

12. Submitted by: Ira F. Greenbaum

   Date: 22 January 2013

13. Course Instructor: Director Biology Lower Division

14. Department Head

   Date: 2/5/13

15. College Dean/Designee

   Date: 2/5/13

For additional information regarding core curriculum, visit the Texas Higher Education Coordinating Board website at www.thecb.state.tx.us/corecurriculum2014

See form instructions for submission/approval process.
Texas A&M University
Core Curriculum
Initial Request for a Course Addition to the Fall 2014 Core Curriculum

Foundational Component Area: Life and Physical Sciences

In the box below, describe how this course meets the Foundational Component Area description for Life and Physical Sciences. Courses in this category focus on describing, explaining, and predicting natural phenomena using the scientific method. Courses involve the understanding of interactions among natural phenomena and the implications of scientific principles on the physical world and on human experiences.

How does the proposed course specifically address the Foundational Component Area definition above?

Biology 113/123 (Essentials of Biology and Essentials of Biology Lab) is a one-semester survey of basic biological principles highlighting chemical basis of life, cell biology, bioenergetics, genetics, evolution, diversity, form/function, the interaction of organisms with their environment and how each of these impact the human experience. Course includes a weekly laboratory component that implements use of the scientific method to reinforce and provide supplemental information related to lecture topics.

Core Objectives

Describe how the proposed course develops the required core objectives below by indicating how each learning objective will be addressed, what specific strategies will be used for each objective and how student learning of each objective will be evaluated.

Critical Thinking (to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information):

The scientific method is the fundamental basis of both lecture and lab. Lectures expose students to historical scientific experiments allowing them to hypothesize possible outcomes, reinterpret results, and explore alternative methodologies. Particular lecture topics (DNA profiles, cancer causes/treatments, Y-chromosome analysis, mitochondrial DNA interpretations) require students to examine, infer, compare, and contrast data. Lecture exams provide a variety of questions to assess students’ ability for critical thinking, analysis, application, and synthesis of these course topics. The laboratory provides a hands-on, active learning approach with scientific method based exercises that support students developing their own hypotheses, and independently generating, analyzing, and interpreting data. Experimental conclusions are critiqued, evaluated and summarized in quizzes, homeworks and in-class assignments.

Communication (to include effective development, interpretation and expression of ideas through written, oral and visual communication):

Students interpret laboratory experimental results in written in-class and homework assignments implementing graphs, tables, figures, and text. Lab introductions and summaries involve instructor/student interaction with examination and summarization of concepts through the vehicle of review questions.

Empirical and Quantitative Skills (to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions):

All laboratory exercises involve the generation and/or manipulation and subsequent analysis of numerical data. These data are presented and summarized in tabular and/or graphic form for homeworks and in-class assignments and quizzes. Specific lecture topics, specifically biological chemistry, STR (short-tandem repeat) analysis, fossil dating, and genetics, also require students to manipulate and interpret numerical data. Students’ aptitude in these practices are evaluated via computational problems on lecture exams, weekly lab quizzes and graded homework and in-class
Texas A&M University

Core Curriculum

Initial Request for a Course Addition to the Fall 2014 Core Curriculum

Teamwork (to include the ability to consider different points of view and to work effectively with others to support a shared purpose or goal):

The majority of laboratory exercises require students to work in groups (typically of four students). Different groups or members of each group typically perform separate components of the lab exercise; the groups or group members then interact to produce a set of group-compiled results. Each student subsequently uses the group-compiled results as the basis for his/her written lab assignment (in-class or homework). Teamwork is assessed by direct observation by the lab instructor and the assignment of appropriate participation points. During interactive lab summaries and lecture discussions of specific experiments, students have the opportunity to consider different explanations of data and how these might yield different points of view. During lecture, students have the opportunity to interact with classmates to solve problems presented via a classroom interactive media mechanism. Students may discuss the problem, assist others with understanding the concept, and then independently infer and submit their answers electronically (via Top-Hat Monode software).

Please be aware that instructors should be prepared to submit samples/examples of student work as part of the future course recertification process.
PROPOSED SYLLABUS - BIOLOGY 113 ESSENTIALS IN BIOLOGY - FALL 2014

Professor: Dr. Leslie Kelso Winemiller  e-mail: lesliew@mail.bio.tamu.edu
Office: 320 Heldenfels  phone: 979-862-7484
Office Hours: Tuesdays and Thursdays (9:30-10:30 am; 2:30-3:30 pm) or by appointment

COURSE DESCRIPTION: Biology 113 is a one-semester course (4-credits) in introductory biology for non-majors. The course covers the chemical basis of life, cellular and molecular biology, genetics, evolution, biodiversity, and interaction of organisms with their environment. The course includes a laboratory that reinforces and provides supplemental information related to the lecture topics.

LEARNING OUTCOMES: Biology is the scientific study of life. The main objective of this course is to introduce students to the fundamentals of biology by exploring current topics relevant to today's changing world. Upon completion of Biology 113 students should be able to demonstrate a basic knowledge of major biological theories that encompass the following topics:

1. The process of science: seeking answers to questions on the basis of observation and experimentation
2. Functional characteristics of living organisms
3. Cell structure and cell interactions with one another and the environment
4. Energy requirements and utilization of energy in living organisms
5. Structure, function, and expression of DNA molecules
6. Cell division processes and their role in growth, repair, development, and reproduction
7. Gene inheritance and the role of genes in the structural and functional organization of life
8. Genetic changes within populations, evolution, and the formation of new species.
9. Anatomical, physiological, and ecological characteristics of biologically diverse organisms

COURSE MATERIALS:
3. Top Hat Monocle Subscription ($20.00) - purchase at http://www.tophatmonocle.com; to be used in conjunction with a cell phone, smart phone, laptop computer, or iPod touch.

GENERAL INFORMATION:

Lower Division Biology Instruction Office: Information is available online at http://www.bio.tamu.edu/ldl or in Heldenfels 315 (Monday - Friday, 8 am - 5 pm, phone 845-4651, e-mail introbio@mail.bio.tamu.edu).


Absence Policy: The Lower Division Instruction Program does not accept the TAMU Explanatory Statement of Absence Form as an adequate verification for an absence. Students who miss class and want to make up missed assignments must provide verification for the reason of absence (see Student Rules 7, http://student-rules.tamu.edu/). Prior notification of absence is expected whenever possible (Student Rule 7.3). For an absence due to illness or injury, each student must notify the instructor within two working days of the absence. Additionally, the student must provide, within one week, written and signed evidence of consultation with a medical professional confirming that the injury or illness was serious enough to justify the absence. Submitted evidence will be verified prior to approval of any makeup.

Grade Release: Family Educational Rights and Privacy Act of 1974 (FERPA) prohibits faculty or staff from posting grades by phone or e-mail. Grades will be online via Vista/Blackboard. To access this site: Logon to http://elearning.tamu.edu, select TAMU LOGON, logon with NetID and password, select Biology 113.

Q-Drop: Tuesday, April 2 (5:00 pm) is the deadline for dropping a course with no penalty (Q grade). If students have any question as to whether or not to Q-drop, they should talk to their instructor before this date. After this date, students will be assigned a letter grade or must negotiate a W (withdrawal) or NG (no grade) through your academic dean (see Student Rule 10.3).
**Academic Integrity:** "An Aggie does not lie, cheat, steal, or tolerate those that do."
Upon accepting admission to Texas A&M University, a student immediately assumes a commitment to uphold the Honor Code, to accept responsibility for learning, and to follow the philosophy and rules of the Honor System. Students will be required to state their commitment on examinations, research papers, and other academic work. Ignorance of rules does not exclude any member of the TAMU community from the requirements or the processes of the Honor System. Academic misconduct involves any of the following offenses: cheating, fabrication, falsification, multiple submissions, plagiarism, and complicity in any of these offenses. All incidents of academic dishonesty will be referred to the Biology Lower Division Program, are subject to academic penalties, and will be reported to the Texas A&M Honors System Office at http://aggiehonors.tamu.edu/.

**Disability Statement:** The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation for their disabilities. Students who have a disability requiring an accommodation should contact the Disability Services in Cain Hall, Room B118, or call 845-1637. For additional information visit http://disability.tamu.edu.

**Copyright Statement:** The handouts used in this course are copyrighted. "Handouts" are all materials generated for this class, which include but are not limited to syllabi, quizzes, exams, power point slides, lab problems, in-class materials, review sheets, and additional problem sets. Because these materials are copyrighted, students do not have the right to copy the handouts, unless the instructor expressly grants permission.

**Copyright 2013** as to this syllabus and all lectures. Students are prohibited from selling (or being paid for taking) notes during this course to or by any person or commercial firm without the express written permission of the professor teaching this course. Students are also prohibited from posting notes on the internet without the express written permission of the professor teaching this course.

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**Course Grade:** Designation of letter grades should be expected to be determined as follows:

\[ A = 90-100\%; B = 80-89\%; C = 70-79\%; D = 60-69\%; F \leq 59\% \]

The course percentage is 75% lecture and 25% laboratory.

\[
\text{(Lecture Percentage X 0.75)} + \text{(Lab Percentage X 0.25)} = \text{Final Course Grade}
\]

Lecture grade is determined by 3 exams (100 pts. each = 300 pts); 1 final exam (150 pts.); Bonus points (pts. vary)

\[
\frac{3 \text{ Exams} + \text{Final Exam} + \text{Bonus Points}}{450} \times 100 = \text{Lecture Percentage}
\]

\[
\frac{\text{Total Lab Points (Assignments + Quizzes + Participation Points + Extra Credit)}}{405} \times 100 = \text{Lab Percentage}
\]

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**Attendance Policy:** Regular attendance is expected and strongly encouraged for success in the course. Attendance will be recorded using the Top Hat Monocle online system in conjunction with a cell phone, smart phone, laptop computer, or iPod touch. Students with 4 or less absences may qualify for the next higher letter grade if their course average is borderline.

**Lecture Exams:** Lecture grades will be determined from three 100-point lecture exams and one 150-point final exam. Each 100-pt lecture exam consists of 45 multiple-choice. The final exam is cumulative and consists of 65 multiple-choice questions. Exams cover both lecture information and textbook assignments. For each exam, students are required to bring a #2 pencil and your TAMU student ID card. Only these items along with small purses (closed and fastened on the floor) are allowed at a desk. Cell phones, pagers, calculators, notebooks, backpacks, etc. are not allowed in the seating area. Scantrons will be provided for each exam. Students will not be admitted late to an exam after the first person has finished and left the class.

**Scantron Grade Checks:** Submit grade check requests at http://www.bio.tamu.edu/ldi. Students will be notified by e-mail when the results are ready and must bring a student ID to Held 315 to pick up the grade check.
EXAM SCHEDULE

<table>
<thead>
<tr>
<th>EXAM I (100 pts.)</th>
<th>Tuesday, Sept. 23</th>
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<tbody>
<tr>
<td>EXAM II (100 pts.)</td>
<td>Tuesday, Oct. 21</td>
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<td>EXAM III (100 pts.)</td>
<td>Thursday, Nov. 13</td>
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<tr>
<td>FINAL EXAM (150 pts.)</td>
<td>Wednesday, Dec.3, 8:00 - 10:00 AM</td>
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**BIPS:** Biology Interactive Points (BIPs) are BONUS point opportunities (short quizzes) administered to students during class using the Top Hat Monocle system in conjunction with a cell phone, smart phone, laptop computer, or iPod touch. Bonus points are added to each student's cumulative point total at the end of the semester (before averaging). BIP sessions are unannounced and can only be completed by students who are present in class. There are NO makeup opportunities for BIPs.

**Exam Challenges:** After the exam, the key will be posted at [http://elearning.tamu.edu](http://elearning.tamu.edu). If students think there is an error on the key, they may state your objections through a challenge. Challenges are submitted to the instructor via e-mail lesliew@mail.bio.tamu.edu and should include test form, question number, and referenced evidence to support your challenge. If a student’s written comments support the challenge, then the key will be revised. Note that this challenge period only lasts 24 hours from the time the exam key is posted. Final exams will not be returned or posted, and have no challenge period.

**Makeup Exams:** Will be given only in the event of an authorized university approved absence (see Attendance Policy). Upon approval of an excuse, a student must obtain a signed authorization form from the instructor and bring it to Heldenfels 315 to register for the makeup exam. You may not take a makeup exam to improve a test score. Makeup exams will consist of essay and short answer type questions.

MAKEUP EXAM SCHEDULE

<table>
<thead>
<tr>
<th>EXAM I</th>
<th>Thursday, Oct. 2, 5:30-6:30 PM, Held 200</th>
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<tbody>
<tr>
<td>EXAM II</td>
<td>Thursday, Oct. 30, 5:30-6:30 PM, Held 200</td>
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<tr>
<td>EXAM III</td>
<td>Thursday, Nov. 27, 5:30-6:30 PM, Held 200</td>
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LECTURE TOPICS

TOPIC

UNIT 1: What is Life Made of?
- Chemistry, Cells, Energy
  - Process of Science
  - Chemistry and Molecules of Life
  - Cell Function and Structure
  - Nutrition, Metabolism, Enzymes
  - Energy Flow and Photosynthesis
  - Dietary Energy and Respiration
  - Ch. 1; 1-18
  - Ch. 2; 19 - 37
  - Ch. 3; 39 - 58
  - Ch. 4; 59 - 79
  - Ch. 5; 81 - 99
  - Ch. 6; 101 - 119

UNIT 2: How Does Life Perpetuate?
- Cell Division and Inheritance
  - DNA Structure and Replication
  - Genes to Proteins
  - Cell Division and Mitosis
  - Genetic Mutations and Cancer
  - Single-Gene Inheritance and Meiosis
  - Complex Inheritance
  - Stem Cells and Differentiation
  - Ch. 7; 121 - 142
  - Ch. 8; 143 - 168
  - Ch. 9; 169 - 185
  - Ch. 10; 187 - 201
  - Ch. 11; 203 - 219
  - Ch. 12; 221 - 251
  - Ch. 13; 253 - 269

UNIT 3: How Does Life Change over Time?
- Evolution and Diversity
  - Natural Selection and Adaptation
  - Nonadaptive Evolution and Speciation
  - Evidence for Evolution
  - Life on Earth
  - Prokaryote Diversity
  - Eukaryote Diversity
  - Ch. 14; 271 - 298
  - Ch. 15; 299 - 319
  - Ch. 16; 321 - 338
  - Ch. 17; 339 - 357
  - Ch. 18; 359 - 376
  - Ch. 19; 377 - 394
**LAB INFORMATION:**

<table>
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<tr>
<th>SECTION:</th>
<th>DAY:</th>
<th>TIME:</th>
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**LAB INSTRUCTOR:** _______________  **OFFICE/OFFICE HOURS:** _______________

**PHONE:** ________________________  **E-MAIL:** ________________________

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**Lab Safety:** You will be required to sign a Safety Agreement indicating that you have read, understood, and agree to follow the safety regulations required for this course.

A. Logon to the Howdy Portal, select My record
B. Find the registration box link to LSA (lab safety acknowledgment)
C. Read the LSA and then agree to it

Eating, drinking, and use of tobacco products are prohibited in the laboratory. University safety regulations require closed-toe shoes in the laboratory. You will be refused admittance to the lab if you wear sandals or open-toed shoes. Safety goggles are required. Bring safety goggles to all labs.

**Quizzes:** There will be thirteen 20 point quizzes that will be a combination of written and practical questions. Quizzes will have a minimum of 30% practical questions and may cover the current topic as well as previously covered material.

**Assignments:** There will be 11 homework and in-class assignments worth a total of 140 points. Two points are automatically deducted for late assignments, and an additional point is deducted for each additional day overdue. Late homework may be logged in at HELD 317E or HELD 315.

**Extra Credit:** A total of 10 extra credit points may be earned by bringing live pill bugs to lab during the week of Feb. 25-28. Five points are awarded for 10 pill bugs and ten points for 20 pill bugs. No points for late pill bugs.

**Participation Points:** Each TA will award a maximum of 25 points based upon cooperation, class participation, attendance, and cleanup.

**Re-grading:** Is at the discretion of the lab instructor. Any re-grade will be for the entire exam or assignment, so the score may go up, go down, or remain unchanged. Requests for re-grading must be initiated within two weeks of the assignment being returned to the student and must be completed before the last official day of classes.

**Lab rescheduling:** A verifiable university approved excuse is required before a student may be rescheduled into another lab section during the same week, if space permits. To reschedule a missed lab during the same week lab is missed, bring written verifiable evidence of a university excused absence to 315 HELD as early as possible. There will be NO make up labs. If you miss a lab for a university approved reason and cannot be rescheduled, then you must contact your lab instructor within two working days after the lab to make arrangements for a make up quiz or assignment. Failing to contact your instructor in a timely manner will result in a zero for the missed assignment.

**Laboratory Assignments:**

**Work individually.** All laboratory assignments are individual projects. Do not work together on written assignments without the permission of your lab instructor. Please carefully check due dates for each assignment.

**Plagiarism and Proper Citation:** Copying from texts, lab manuals, internet sources, or other students is plagiarism and will be considered cheating. If you quote from another source, you must credit that source in your text and properly cite the reference in the literature cited section. The following is an example of a proper citation:

Assignment 1 - The Guiding Principles of Biology (10 pts.). Present a short, in-class presentation of the termite behavior experiment with special reference to how the experiment followed the scientific method.

Assignment 2 - The Cell Theory (10 pts.). Your T.A. will assign you a syndrome from the worksheet on page 31. Work individually to write a one page report on the syndrome. Do not plagiarize your sources, but present the report in your own words. Properly cite sources used, submit the text to Turn-it-in.com, print the receipt and attach it to the copy of the report you give to your instructor.

Assignment 3 - Cell Function - The Energy Cycle (15 pts.). Work individually! Graph the spinach action spectrum. Use the data from Table 5-2. Properly label the graph and note which wavelengths of light are primarily responsible for photosynthesis. Write a short summary describing the results and submit the text to Turn-it-in.com. Print the receipt or originality report and give to your instructor along with the graph and write up.

Assignment 4 - Theory of Heredity (15 pts.). Work independently to complete and turn in the worksheet on pages 89-90. Use complete sentences and/or show your work when answering questions. Answer questions and turn worksheet in to your lab instructor before you leave lab.

Assignment 5 - Forensic Biology (15 pts.). Work independently to complete and turn in the worksheet on pages 117-118. Use complete sentences and/or show your work when answering questions. Answer questions and turn worksheet in to your lab instructor before you leave lab.

Assignment 6 - Evidence of Evolution (10 pts.). Work independently to complete and turn in the worksheet on pages 137-138. Use complete sentences and/or show your work when answering questions. Answer questions and turn worksheet in to your lab instructor before you leave lab.

Assignment 7 - Plant Communities (10 pts.). Use class data to test the model correlating leaf morphology to climate data. Complete Table 10-1 and calculate MAT and MAP. Work individually to write a brief paragraph discussing the results. How accurate was the model for predicting mean annual temperature and precipitation for College Station? If it wasn't accurate, what factors might be affecting the predictive qualities of the model? Submit your report to Turn-it-in.com, print the receipt and attach to the report when you submit it to your instructor.

Assignment 8 - Animal Diversity (15 pts.). Describe the distinguishing characteristics of the major invertebrate phyla, molluscs, arthropods, echinoderms, and chordates as described in chapters 11 and 12. Also draw a phylogeny showing the evolutionary relationship of the coelomate animals. Note a key character state for each branch point on your phylogeny. Submit the text to Turn-it-in.com, print the receipt and attach to your drawing when you submit to your instructor.

Assignment 9 - Digestive and Excretory System (10 pts.). Your TA will assign 1 of 3 enzyme experiments. Write a brief method and results for the assigned experiment. Include Table appropriate data table from the lab manual. Work individually. Properly cite sources used, submit the text to Turn-it-in.com, print the receipt and attach it to the copy of the report you give to your instructor.

Assignment 10 - Cardiopulmonary Function (20 pts.). Write a lab report. Follow the guidelines in Appendix A. DO NOT COPY APPENDIX A. Graph the class data for the effect of exercise on respiratory rate, pulse rate and blood pressure. Compare the class data to the data set taken by your group. Properly title and label the graphs and write a lab report as presented in Appendix A. Submit your text to Turn-it-in.com. Print the receipt and attach it to your graphs and description when you submit it to your instructor.

Assignment 11 - Nervous System (10 pts.). Your instructor will ask you and your lab partner to present a class summary of one of the experiments - reflexes, taste, pupillary response, eye anatomy, photoreceptors, touch discrimination, proprioceptors, brain anatomy, or electroencephalography.
**Student Support:**

**Help desk:** Students needing individual assistance will find a Teaching Assistant in Heldenfels Room 317E - phone 845-4653. Check the schedule posted outside of Heldenfels 315.

**Biology Image Library:** Study and review images of lab slides, specimens etc may be available online via the TAMU Biology Images Library at [http://biologyimages.tamu.edu](http://biologyimages.tamu.edu). Refer to your instructor for username and password information.

**Problems:** Courtesy dictates that you first discuss any problem with your laboratory instructor. If the problem has not been resolved, please contact Mr. Chris Lee (Teaching Coordinator) at 458-3399 (or by email clee@mail.bio.tamu.edu) to make an appointment to discuss the situation.

---

**Record your lab grades:**

<table>
<thead>
<tr>
<th>Homework and In-Class Assignments (140 pt)</th>
<th>Quiz Grades (260 pt)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignment 1 (10 pt)</td>
<td>1. (20 pt)</td>
</tr>
<tr>
<td>Assignment 2 (10 pt)</td>
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<td>Assignment 3 (15 pt)</td>
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<td></td>
<td>12. (20 pt)</td>
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<tr>
<td></td>
<td>13. (20 pt)</td>
</tr>
</tbody>
</table>

**Extra credit (10 pt maximum)**

5 points for 10 live pillbags, 10 points for 20.

**Participation pt (25 pt).**

**Total Points (405 possible = 425 minus the lowest earned quiz score*)

*Low quiz score must be an earned score. A quiz grade of zero will not be dropped.

\[
\text{Lab Percentage} = \frac{\text{total points}}{405} \times 100 = \text{\%}
\]
# Laboratory Schedule - Fall 2014

Read the lab before coming to class.

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Chapter</th>
<th>Homework/In-Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 1</td>
<td>Guiding Principles of Biology</td>
<td>Chapter 1</td>
<td>Assignment 1 - in-class</td>
</tr>
<tr>
<td>Week 2</td>
<td>The Cell Theory Quiz 1</td>
<td>Chapter 2</td>
<td>Assignment 2 (turn-it-in.com)</td>
</tr>
<tr>
<td>Week 3</td>
<td>Cell function Quiz 2</td>
<td>Chapter 3</td>
<td>Assignment 3 (turn-it-in.com)</td>
</tr>
<tr>
<td>Week 4</td>
<td>Cell Division Quiz 3</td>
<td>Chapter 4</td>
<td>Assignment 4 (in-class)</td>
</tr>
<tr>
<td>Week 5</td>
<td>Theory of Heredity Gene Expression &amp; Protein Synthesis</td>
<td>Chapter 5</td>
<td>Assignment 5 (in-class)</td>
</tr>
<tr>
<td></td>
<td>Quiz 4</td>
<td>Chapter 6</td>
<td>Assignment 6 (in-class) optional extra credit pillbugs due</td>
</tr>
<tr>
<td>Week 6</td>
<td>Forensic Biology Quiz 5</td>
<td>Chapter 7</td>
<td>Assignment 7 (turn-it-in.com)</td>
</tr>
<tr>
<td>Week 7</td>
<td>Evidence for Evolution Quiz 6</td>
<td>Chapter 8</td>
<td>Assignment 8 (turn-it-in.com)</td>
</tr>
<tr>
<td>Week 8</td>
<td>Behavioral Ecology Quiz 7</td>
<td>Chapter 9</td>
<td>Assignment 9 (turn-it-in.com)</td>
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<tr>
<td>Week 9</td>
<td>Plant Communities Quiz 8</td>
<td>Chapter 10</td>
<td>Assignment 10 (turn-it-in.com)</td>
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<tr>
<td>Week 10</td>
<td>Animal Diversity I Quiz 9</td>
<td>Chapter 11</td>
<td>Assignment 11 (in-class)</td>
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<tr>
<td>Week 11</td>
<td>Animal Diversity II Quiz 10</td>
<td>Chapters 12</td>
<td></td>
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<tr>
<td>Week 12</td>
<td>Digestive &amp; Excretory System Quiz 11</td>
<td>Chapter 13</td>
<td></td>
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<tr>
<td>Week 13</td>
<td>Cardiopulmonary Function Quiz 12</td>
<td>Chapter 14</td>
<td></td>
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<tr>
<td>Week 14</td>
<td>Nervous System Quiz 13</td>
<td>Chapter 15</td>
<td></td>
</tr>
</tbody>
</table>

Goggles required every week. Do not wear opened-toe shoes to lab.
3. Change in Courses – Core Curriculum

**BIOL 113. Essentials in Biology**

Course description

From: One-semester survey of basic biological principles, including chemical basis of life, cell biology, bioenergetics, genetics, evolution, anatomy and physiology, reproduction and development, and interaction with the environment. Not suitable for students who plan to take additional courses in the Biology Department. BIOL 123 is the corresponding laboratory course.

To: One-semester in introductory biology for non-majors; chemical basis of life, cellular and molecular biology, genetics, evolution, biodiversity and interaction of organisms with their environment; includes a laboratory to supplement and reinforce lecture topics.

Lab and semester credit hours

From: (3-0). Credit 3.
To: (3-3). Credit 4.

**GEOG 203. Planet Earth.**

Course description

From: Overview of Earth's physical environment including climate, water, landforms, and ecosystems; processes that control these systems and their global distributions; human effects on these processes; topics illustrated through hands-on laboratory activities.

To: Earth's physical environment including climate, water, landforms, and ecosystems; processes that control these systems and their global distributions; human effects on these processes.

Lab and semester credit hours

From: (3-2). Credit 4.
To: (3-0). Credit 3.

**GEOS 210. Climate change.**

Lab and semester credit hours

From: (3-2). Credit 4.
To: (3-0). Credit 3.
Texas A&M University
Departmental Request for a Change in Course
Undergraduate • Graduate • Professional
• Submit original form and attachments •

Form Instructions

1. Request submitted by (Department or Program Name): BIOLOGY

2. Course prefix, number and complete title of course: BIOL 113 Essentials in Biology

3. Change requested
   a. Prerequisite(s): From: _____________________________ To: _____________________________
   b. Withdrawal (reason): _____________________________
   c. Cross-list with: _____________________________

   Cross-listed courses require the signature of both department heads.

   d. Change in course title and description. Enter complete current course title and current course description in item 5; enter proposed course title and proposed course description in item 6. Complete item 7 for change in title.

   e. Change in course number, contact hours (lab & lecture), and semester credit hours. Complete item 7. Attach a course syllabus.

4. For informational purposes only, please indicate course number if this course will be stacked:

5. Complete current course title and current catalog course description: One-semester survey of basic biological principles, including chemical basis of life, cell biology, bioenergetics, genetics, evolution, anatomy and physiology, reproduction and development, and interaction with the environment. Not suitable for students who plan to take additional courses in the Biology Department. BIOL 123 is the corresponding laboratory course.

6. Complete proposed course title and proposed catalog course description (not to exceed 50 words): One-semester in introductory biology for non-majors; chemical basis of life, cellular and molecular biology, genetics, evolution, biodiversity and interaction of organisms with their environment; includes a laboratory to supplement and reinforce lecture topics.

7. a. As currently in course inventory:

<table>
<thead>
<tr>
<th>Prefix</th>
<th>Course #</th>
<th>Title (excluding punctuation)</th>
</tr>
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<tbody>
<tr>
<td>BIOL</td>
<td>113</td>
<td>Essentials in Biology</td>
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</table>

<table>
<thead>
<tr>
<th>Lect.</th>
<th>Lab</th>
<th>SCH</th>
<th>CIP and Fund Code</th>
<th>Admin. Unit</th>
<th>FICE Code</th>
<th>Level</th>
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<tr>
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<td>0</td>
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<td>3</td>
<td>2</td>
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</table>

b. Change to:

<table>
<thead>
<tr>
<th>Prefix</th>
<th>Course #</th>
<th>Title (excluding punctuation)</th>
</tr>
</thead>
<tbody>
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<td>0</td>
<td>3</td>
<td>2</td>
<td>6</td>
<td>0</td>
</tr>
</tbody>
</table>

Approval recommended by: _____________________________
T.D. McKnight
Department Head or Program Chair (Type Name & Sign) Date 2/1/3

Department Head or Program Chair (Type Name & Sign) (if cross-listed course) Date 2/12/1

Submitted to Coordinating Board by: _____________________________
Chair, GC or UCC Date 2/12/1

Questions regarding this form should be directed to Sandra Williams at 845.8201 or sandra.williams@tamu.edu.
Curricular Services - 02/11

Effective Date

Date

Chair, GC or UCC

Date

Effective Date
Texas A&M University
Core Curriculum Cover Sheet
Initial Request for a course to be considered for the Fall 2014 Core Curriculum

1. This request is submitted by (department name): Chemistry

2. Course prefix and number: CHEM 102/112

3. Texas Common Course Number: 1312/1112, 1412

4. Complete course title: Fundamentals of Chemistry II

5. Semester credit hours: 3/1

6. This request is for consideration in the following Foundational Component Area:
   - [ ] Communication
   - [ ] Mathematics
   - X Life and Physical Sciences
   - [ ] Language, Philosophy and Culture
   - [ ] Creative Arts
   - [ ] American History
   - [ ] Government/Political Science
   - [ ] Social and Behavioral Sciences

7. This course should also be considered for International and Cultural Diversity (ICD) designation:
   - [ ] Yes
   - X No

8. How frequently will the class be offered? Every Semester

9. Number of class sections per semester: Fall 102/112; 2/19, Spring 102/112; 8/75, Sum. 102/112; 1/2

10. Number of students per semester: Fall 489/450, Spring1854/1745, Summer 68/42

11. Historic annual enrollment for the last three years: 2411/2237 2357/2212 2438/2269

This completed form must be attached to a course syllabus that sufficiently and specifically details the appropriate core objectives through multiple lectures, outside activities, assignments, etc. Representative from department submitting request should be in attendance when considered by the Core Curriculum Council.

13. Submitted by: [Signature]
    Course Instructor

   Approvals:
   [Signature]
   Department Head

   [Signature]
   College Dean/Designee

14. Date: 3/1/2013

15. Date: 3/1/13

For additional information regarding core curriculum, visit the Texas Higher Education Coordinating Board website at www.thecb.state.tx.us/corecurriculum2014

See form instructions for submission/approval process.
Texas A&M University
Core Curriculum
Initial Request for a Course Addition to the Fall 2014 Core Curriculum

Foundational Component Area: Life and Physical Sciences

In the box below, describe how this course meets the Foundational Component Area description for Life and Physical Sciences. Courses in this category focus on describing, explaining, and predicting natural phenomena using the scientific method. Courses involve the understanding of interactions among natural phenomena and the implications of scientific principles on the physical world and on human experiences.

The proposed course must contain all elements of the Foundational Component Area. How does the proposed course specifically address the Foundational Component Area definition above?

102/112, a lecture/laboratory pair of courses with a mandatory co-registration requirement, are the second in a two-semester sequence that present an introduction to chemistry for students who intend to pursue a degree programs in science or allied fields. These courses focus on intermolecular forces and the properties they engender, chemical thermodynamics and kinetics, equilibrium between phases and between species in solution, and electrochemistry. When time permits, the basics of nuclear chemistry are presented as well. Students achieve their learning objectives by their participation in lectures, lecture demonstrations, videos, individual and team-based problem solving sessions (in class and out), laboratory experiments.

Core Objectives

Describe how the proposed course develops the required core objectives below by indicating how each learning objective will be addressed, what specific strategies will be used for each objective and how student learning of each objective will be evaluated.

The proposed course is required to contain each element of the Core Objective.

Critical Thinking (to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information):

The scientific method is the fundamental basis of both lecture and lab. Lectures introduce knowledge derived from historical scientific experiments and how scientific theories have evolved with the need to accommodate new data that revealed the inadequacies of older theories. Lecture exams include questions to assess students' ability to retain fundamental facts of chemistry, for critical thinking, quantitative analysis, and their capacity for synthesizing and integrating information in problem solving. The Chem 112 laboratory course continues the use of pre-lab quizzes to enhance academic and safety preparation. These labs involve more sophisticated data acquisition and analysis than students have yet experienced; they gain experience with spectroscopic and electrochemical measurements in addition to 'wet chemical' techniques associated with study of acids, bases, and equilibrium. The laboratory culminates in a final exam that includes all concepts, calculations, and procedures learned during the semester.

Communication (to include effective development, interpretation and expression of ideas through written, oral and visual communication):

Students extend their knowledge chemical vocabulary, now involving description of thermodynamic terms and concepts, reaction rates expressions, terms describing electrochemical apparatus. Both lecture and lab utilize visual communication through the preparation and interpretation of graphs, tables, and figures. Students are required to express quantitative relationships verbally and mathematically. In the laboratory, several experiments are dedicated to the manipulation and graphical depiction of scientific data and in the communication of how the experiments' objectives have been met in the procedures and apparatus used in each experiment. Lab reports, homework, and exams require students to extend their use this new language.
Texas A&M University
Core Curriculum
Initial Request for a Course Addition to the Fall 2014 Core Curriculum

Empirical and Quantitative Skills (to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions):

Chem 102/112 students are required to manipulate and interpret numerical data in terms of chemical theory when covering most of the courses’ topics. Building on knowledge of bonding learned in Chem 101/111, they are first exposed to a descriptive treatent of intermolecular forces and their influence on the liquid and solid states of matter. The laws of thermodynamics are given their first overall exposition – both taxing and honing their ability to apply mathematics and physics. In addition to comfort with algebra and functions, students begin to see application of calculus on an occasional basis where pedagogically advantageous. We attempt to strike a balance between the concrete, physical nature of chemistry and the numerical and abstract mathematical tools needed to grasp the breadth of deeper material covered in the second semester of the two-semester sequence. We draw upon and extend students’ knowledge of basic physics (e.g., kinetic and potential energy, basic understanding of electrostatics, and heat). Both thermodynamic and chemical kinetic data are discussed in lectures and gathered in the laboratory and subjected to numerical fitting and comparison with expectations/predictions from theory.

Teamwork (to include the ability to consider different points of view and to work effectively with others to support a shared purpose or goal):

Teamwork is an essential part of all laboratory work, since students all work in pairs every week and share all data collected. In the conduct of some experiments, students will work in “pairs of pairs” in the use of shared instrumentation. Students write their own laboratory reports and quickly learn that effective teamwork and communication during the active observational/data-acquisition phase of the experiment is crucial when they must use the data on their own to generate their interpretations and conclusions. Several experiments utilize class data-sharing and collaboration. In a titration experiment, data obtained by each pair of students is collected and collected class data is used guide the class to a “big picture” model system. In a two-week course project the entire class works to prepare a stock supply of modified clay that is then used in adsorption experiments when smaller individual groups test their self-designed experiments.

Most instructors use ‘clickers’ during the lecture periods and collaboration in answering clicker questions is actively encouraged; learning is reinforced when students informally instruct other students (and lessons are learned by all when wrong answers are arrived at collaboratively)! On-line homework allows for meaningful, graded homework exercises – and in this process of active learning student collaboration is certainly allowed, so long as a balance of individual and group effort is maintained.

Please be aware that instructors should be prepared to submit samples/examples of student work as part of the future course recertification process.
Welcome to CHEM 102. As the science that describes matter, chemistry is central to our understanding of many fields from health to the environment to the evaluation of materials. Rapid new developments in very diverse areas virtually guarantee that chemistry will become even more important in the years to come. Knowledge of chemistry will surely be a vital ingredient in your liberal arts education and an essential foundation for your technical education. As educated citizens, it is likely that it will be important for you to be able to understand, interpret, and evaluate information that involves the molecular world. Check with your advisor if you have any doubts concerning the suitability of this course for your degree.

CHEM 101 and 102 are the first-year chemistry sequence in the core curriculum. These are 3-credit courses. This lecture is a part of a much larger program. Those of us in the First Year Chemistry Program and the Chemistry Department at Texas A&M University are committed to providing a meaningful and stimulating course. Each section of this course is independent of the other instructors’ sections, but we strive to cover common content, etc.

This handout outlines the course policies for my sections. Other instructors’ policies may differ slightly. You should read this material carefully to familiarize yourself with the various rules and procedures, especially those which govern examinations and grades. The objectives of this course are to develop your:

1. problem-solving skills and critical thinking abilities,
2. knowledge of general concepts in chemistry,
3. understanding of chemical terminology used in society,
4. ability to perform basic chemistry calculations,
5. appreciation of the importance of chemistry in society, and
6. positive attitudes towards chemistry.

Learning objectives (what you should be able to do) will be given at each lecture. I expect you to have the following prerequisites:

1. basic math and chemistry skills, which you demonstrated in CHEM 101
2. curiosity about the world around you
3. willingness to learn (even though your friends say chemistry is yucky)
4. commitment to attend each class (Chemistry "builds" on itself, thus you are lost if you miss earlier steps)
5. commitment for regular study (starting the first day!) 6-10 hours per week is average for reading and problem solving, preferably some time every day. NOTE: We will MOVE FAST!

You will be given a calendar, which contains exam dates, reading assignments, and a schedule for lecture. In order to get the most out of lectures in this course, it is beneficial that you come to class prepared. In the First Year Chemistry Program, we try to make ourselves approachable both in and outside the classroom. Feel free to call upon me whenever you have a question. Subsequent sections will give the details concerning the Exam Reviews and Web pages for this course. I look forward to a good semester.

Vickie M. Williamson 1/9/13
PHILOSOPHY BEHIND MY TEACHING
The philosophy of how students learn that is held by an instructor should directly impact his/her philosophy of teaching. As a teacher, my job is to facilitate student learning. I believe that learning is an active process in which the individual builds or constructs meaning from experiences and events, which must be integrated into their existing conceptual frameworks. This is constructivism to some, but I had rather explain my philosophy than to use a “buzz word” that might convey misconception. I believe that students learn best from direct experience, when they are active in the educational process. At primary grades, direct experience with concrete objects is required. As we mature, this direct experience can take more abstract forms. Methods to actively involve students can be incorporated even into a large lecture class. These include the use of questioning skills, ‘wait time’, analogy, visual aids, practice, the type of problems assigned, etc. Equally important to the process is drawing meaning from this direct experience through discussion and reflection. Last is the integration of the new idea or meaning with our existing understandings. These ideas are well-represented by a learning cycle approach, in which students gather data about a phenomenon, draw generalizations, and apply or extend the generalizations in other contexts.

REQUIRED MATERIALS:
(1) An approved calculator suitable to use on lecture exams. Calculators may not have alphabetic or extensive memory. (See later discussion under 'lecture exams'.)
(2) Electronic Textbook and OWL homework combined for Texas A & M (it must say for TAMU) is required. This can be purchased from https://owl.cengage.com/partners/tamu/
You can buy the combo (electronic book and OWL) for $75 for 6-months. If you also want an optional loose-leaf hardcopy of the textbook for the 102 part of the textbook, pull down 'chem 102' in the menu to see an option for $57 (LESS $$!!). The best deal is if last semester you bought the option for $99 that gives you 24 months of OWL, the e-book, and a loose-leaf hard copy version of the entire textbook for both chem 101 AND chem 102. If you did this, then you will not need to buy anything else.
(3) i>Clicker2 ISBN- 1429280476. You can purchase your iclicker at the Texas A&M Bookstore and other bookstores. It costs about $46.65 new, plus tax for the device, with no cost to register your iclicker into a course. Once you buy the iclicker, you can use it for all your courses that require iclickers for the remainder of your time at Texas A&M. You can also reseil it.

You will need to register your iclicker for the class. Be sure to use your TAMU ID number without any spaces or dashes. You can register at: http://www.iclicker.com/support/registeryouriclicker/ You will need to use it in class to complete your registration.

If you already own the CPS clickers, you can get a $10 rebate. Go to: http://iclicker.com/Customers/education/TexasAMUniversityRebate/ You will need
(1) your iclicker2 receipt (a copy will work)
(2) the actual UPC bar code cut out from the iclicker2 box
(3) the remote ids of your new iclicker2 and your old CPS clicker or old iclicker
(4) the filled out form (pdf found at the website).

LECTURE READING ASSIGNMENTS:
Lectures are designed to help you in developing an understanding of the material being emphasized. To get the most out of lecture, one should always keep up with the assigned reading. Specific reading assignments will be given in lecture. With some chapters, you will be asked to read ahead of lecture, with others behind lecture. Tentative chapters are shown in the Calendar.

LECTURE SCHEDULE:
There is a tentative schedule at the end of this syllabus. Topics and chapter references are subject to change. Special announcements and schedule changes will be announced at the beginning of the lectures and posted on our homepage (see the web address below).
LECTURE ATTENDANCE:
I will not be taking attendance as such throughout the semester. However, to encourage you to attend class, there will be clicker points and periodic in-class quizzes that will account for part of your lecture grade (See grades below). YOU SHOULD ATTEND ALL CLASSES.

CLICKER POLLING/PARTICIPATION:
During the semester, you have polling during lecture. These will be both individual and in groups during class. Some may be quiz-like, in that there is a 'correct' answer, others may be opinion based. There are NO makeup clicker assignments, as the lower percent required should take care of necessary absences, forgotten clickers (bring your clicker to each class), or bad batteries. Clicker points will be posted for each day. You only have 2 weeks to notify me if you believe there is an error in your points. Clicker points will be transformed into class points at the end of the semester.

<table>
<thead>
<tr>
<th>Percentage of Clicker Points possible</th>
<th>25-29%</th>
<th>30-34%</th>
<th>35-39%</th>
<th>40-44%</th>
<th>45-49%</th>
<th>50-54%</th>
<th>55-59%</th>
<th>60-64%</th>
<th>65-69%</th>
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<tbody>
<tr>
<td>Number added to your course points</td>
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<td>8</td>
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<td>10</td>
<td>11</td>
<td>12</td>
<td>13</td>
<td>14</td>
</tr>
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</table>

QUIZZES:
During the semester, you will have quizzes during the semester. Each quiz will be worth 4 points. The best 9 quizzes will count. There will be at least 12-14 quizzes totally, but in past semesters it has been more than 12. I prefer to quiz often; quizzes may be in various formats (written, clicker, on-line). Some quizzes may be UNANNOUNCED in class quizzes, others will be on-line. There are no make-up quizzes for in-class quizzes; if you miss one, it will be one you drop. On-line quizzes can have their due date extended for university-approved absences. Quizzes may be individual or group. Quiz problems may be taken from the assigned problems, demonstrations, material covered in lecture, etc. Quizzes have two purposes: 1) to set deadlines to encourage you to keep up, and 2) to give me an idea of your understanding of the concepts.

LECTURE HOMEWORK ASSIGNMENTS:
Homework problems will be assigned for each topic of study from On-line Web Learning (OWL). The textbook problems are for your practice. There will be 7 sets of homework assigned for credit from OWL. Each set of homework will be worth 10 points, for a total of 70 points for the semester. Homework MUST be turned in on time. The purpose of homework is to prepare you for exams. Additional details will be given in class.

<table>
<thead>
<tr>
<th>Percentage of instructional units correctly completed and turned in on time for each of the 7 sets</th>
<th>&lt;40%</th>
<th>40-49%</th>
<th>50-59%</th>
<th>60-69%</th>
<th>70-79%</th>
<th>80-89%</th>
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<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
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</tbody>
</table>

LECTURE EXAMS AND FINAL:
There will be 4 lecture exams (Exams 1, 2, 3 and 4) given on the days indicated on the Calendar. Additionally, there will be a Final Exam. These exams may be all multiple choice or include combination of multiple choice questions that will be machine graded and non-multiple choice questions that will be hand graded.

(1) Lecture Exams: These are 45-minute exams given during the regular lecture times. Each carries a value of 100 points with 15-25 questions. You MUST have a Photo I.D. in order to take exams.

*At the end of the semester, the lowest of the four regular exams will be dropped and will be replaced by the average of the remaining three exams.
(2) Final Lecture Exam: The Final Exam will be a 2-hour, 165-point exam covering all the chapters taught during the semester. The final may contain standardized and professor-written portions. The final will be COMPREHENSIVE. The final is scheduled for Tuesday, May 7, 2013 from 8:00-10:00 AM for the 502 section in 100 HELD, Monday, May 6, 2013 from 10:30 AM-12:30 PM for the 503 section in 100 HELD, and Tuesday, May 7, 2012 from 3:30 AM-5:30 PM for the 504 section in 100 HELD. Please do not expect to take the final exam at any time other than the scheduled time for your section, unless you have made arrangements with me. You must bring a PHOTO I.D. to the Final Exam. Do not be LATE; as soon as the first person has left the final, no one will be allowed to begin the final.

(3) Make-up Lecture Exam: For students who have university-excused absences (or very good ones) and who also notify me (the instructor) within 2 academic days (M, T, W, R, & F), a make-up exam will be arranged. I require a written statement about the excuse for the absence. The make-up exams will be at least as difficult as the regular exams. The time for the make-up exam will be set after the 2-day signup period, from student schedules. Make-up exams are scheduled within a week of the regular exam.

LECTURE EXAM ADMINISTRATION:

(1) Check the exam seating assignment on the bulletin board outside Room 100 Held one day in advance. Each exam has a different seating assignment.

(2) Arrive at the exam on time. Cheating or bringing in material with intent to cheat will result in a zero for the exam or a more severe penalty.

(3) Bring to the exam at least two sharpened #2 pencils, an eraser, and a PHOTO I.D. (your TAMU I.D. card or a driver's license will work). Pencil sharpeners and calculators (with certain restrictions) may also be brought. There must be NO "sharing" of calculators during an exam. Any other items must be "enclosed" out of sight in a briefcase, pack, purse, or sack, and stored under your assigned seat.

(4) Students cannot use calculators that are programmable or have alpha-numeric capabilities for the exams. Some of the acceptable and unacceptable calculators are listed on the bulletin board outside Room 100 Heldenfels. Any student attempting to use an unacceptable calculator will receive a zero for the exam plus other penalties.

(5) Follow the directions given to you as you enter the exam room. Do not write on the back of the scanner sheet. Failure to follow these directions may result in a withheld or zero grade. In addition, note that the answers have to be recorded on the standard gray scanning sheet to be graded.

(6) During the exam, keep all work covered as much as possible. Talking or looking around the room will result in a withheld grade for the exam.

(7) Work carefully, but you must finish in the allotted time; exams handed in late will not be graded. Please remain seated quietly until asked to leave. You will be able to see your grades on the World Wide Web. Details in the web are below.

(8) For special seating requests, such as a left-handed seat, a table, or an oversized seat, sign up at the beginning of the semester on forms I bring to class or go to room 412. You only need to turn in one request for the semester.

(9) If you believe that your exam is misgraded, you need to fill out a regrade form. These are available in room 412. Fill the form out and turn it in to room 412.

(10) If you wish to review your exam, you must do so prior to the next exam.

REVIEW SCHEDULE:
A Review Session will be posted online. You will have two sample exams for each of the 4 hourly exams, plus a few questions on the new material from the days of lecture after exam 4. These will be in the form of pdf files and screencasts that you can play over as needed with Quicktime, Windows Media Player or on an iPod. All links will be on Williamson's 102 Bulletin Board (see the section below). I will also hold additional office hours near the exams for extra questions.
ACADEMIC DISHONESTY:
Students are expected to be the sole source for any work submitted in their name. The utilization or submission of work of others is a violation of Texas A&M University scholastic dishonesty policies and disciplinary steps will be taken. Only authorized electronic or printed materials or equipment may be used in or near the classroom. As commonly defined, plagiarism consists of passing off as one's own the ideas, words, writings, etc., which belong to another. In accordance with this definition, you are committing plagiarism if you copy the work of another person and turn it in as your own, even if you should have the permission of that person. Plagiarism is one of the worst academic sins, for the plagiarist destroys the trust among colleagues without which research and knowledge cannot be safely communicated.

Study groups can be a valuable aid to learning. Within the group you should discuss your answers to homework problems. Your group can discuss questions with other groups.

Quizzes, exams and the final must be done on your own, unless otherwise specified by the instructor. Academic dishonesty will not be tolerated in any form and will be reported to the proper university officials. Expulsion for academic dishonesty does not look good on one's permanent record and is not worth the points you are trying to gain by cheating. If you have questions regarding plagiarism, please consult the latest issue of the Texas A&M University Student Rules, under the section "Scholastic Dishonesty."

The Aggie Honor Code is that:
"An Aggie does not lie, cheat, or steal or tolerate those who do."

Please review the Honor Council Rules and Procedures on the web: http://aggiehonor.tamu.edu
Reports of academic dishonesty will be filed for those who fail to follow the code.

GRADE CALCULATIONS: Grades will be calculated on a point basis.

<table>
<thead>
<tr>
<th>Points Possible:</th>
<th>% of course grade</th>
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<tbody>
<tr>
<td>Clicker Polling (only 70% of clicker pts required)</td>
<td>14</td>
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<tr>
<td>Homework (7 @ 10 pts each)</td>
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<tr>
<td>Quizzes (best 9@ 4 points each)</td>
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</tr>
<tr>
<td>Exams (4 @ 100 points each)*</td>
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<tr>
<td>Comprehensive Final</td>
<td>165</td>
</tr>
</tbody>
</table>

TOTAL POINTS FOR THE COURSE: 685 100.0%

Final Grade Cut-Off:
- A 685-616
- B 615-548
- C 547-479
- D 478-411
- F 410--0

You can be assured of the letter grade that is indicated if you fall in the above ranges. The final grade cut-off may be slightly lowered at the end of the semester. Each semester's ranges and each lecture sections' ranges are independent of each other.

Students missing a small portion of the course will receive a grade of "I" (Incomplete) if they request this grade and meet the University criteria for this temporary grade.

*At the end of the semester, the lowest of the four regular exams will be dropped and will be replaced by the average of the remaining three exams.

TEXAS A&M SERVICES FOR STUDENTS WITH DISABILITIES:
The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, either temporary (e.g. broken arm) or
permanent (including a learning disability), please contact the Department of Student Life, Services for Students with disabilities in Rm. B118 in Cain Hall or call 845-1637. (Hours: 8 AM to 5:30 PM). Also see http://disability.tamu.edu If you have any questions, see me.

COPYRIGHT:
The handouts used in this course are copyrighted. By "handouts," I mean all materials generated for this class, which include but are not limited to syllabi, quizzes, exams, lab problems or study sheets, in-class materials, review sheets, and additional problem sets, notes, etc. Because these materials are copyrighted, you do not have the right to copy the handouts, unless I expressly grant permission.

BULLETIN BOARDS:
Solutions to short answer quizzes and exam questions will be posted for this class in the glass bulletin board near room 122 and 124 Heldenfels. We also have an electronic bulletin board described below.

COURSE INFO VIA THE WEB AT WILLIAMSON'S BULLETIN BOARD:
You can find the latest news, objective list, frequently asked questions, etc. on my personal webpages (http://chemed.tamu.edu/chem102/). BOOKMARK AND CHECK THIS SITE FREQUENTLY. Special announcements and schedule changes will be announced at the beginning of the lectures and posted on our homepage.

GRADE INFORMATION VIA THE WEB:
You can check your grades confidentially on OWL. Details will be discussed in class.

YOUR GRADES:
PLEASE KEEP A RECORD OF YOUR POINTS ON THE TABLE BELOW.

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<tr>
<th>Quizzes: Points Received:</th>
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<td>Quiz best 9:</td>
<td>Homework #7 points:</td>
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HELP: You can do eight things to improve your grade:
(1) Attend all class periods.
(2) **Keep up** with your assigned reading and do the homework problems.
(3) Come to class prepared (ask questions if you don't understand).
(4) Take all tests and quizzes.
(5) See me during office hours or make an appointment with me to discuss anything you don't understand or can't work.
(6) Try a study group. Some will work, while others will not. Groups with students from your major or residence often work the best.
(7) As a last resort, engage a tutor for hire. Tutors who can give you individualized help are best.
(8) Follow Williamson's Study Rules

WILLIAMSON'S STUDY RULES:
(1) **The 15 minute rule**
   Don't spend over 15 minutes on any one problem unless you are making progress. Seek help, you are missing a point, and you don't want to become frustrated.

(2) **The 2 lecture rule**
   Don't let any more than 2 lectures pass when you don't understand something. Seek help. (This rule means that if you attend one lecture and a topic is fuzzy, go home, read about it, and try problems, remembering the 15-minute rule. Go to the 2nd lecture. If all is not clear by the second lecture, seek help.)

(3) **Order of Study Rule**
   • Hear the lecture
   • Read the text and try the assigned homework problems (remember the 2 rules above).
   • Consider: rewriting your notes to better organize the material. Write what is the important information from each slide in the ppt.
   • As an exam nears, do sample exams that are on-line. Take at least one of them under 'exam conditions' (set the timer, use only the tables and equations you will have on the exam).

(4) **After an Exam Rule**
   • Score your exam with the key
   • Ck the class average (compare your score to the average)
   • Go over the exam for 2 things. (You must review an exam before the next exam during office hours.)
   1) Can you work it now, easily getting the correct answer? Practice till you can.
   2) Why did you miss each question in the first place? Look for patterns so you can correct this error for the next exam (the same reason why you missed multiple questions). In the past students have told me that possible patterns are:
      • Misreading the problem. The problem asked for least electronegative, and the student answered it for most electronegative. In this case, marking the exam question with circles, boxes, etc. to help focus on the question BEFORE reading the possible answers will help.
      • Choosing the wrong equation or method to use. In this case you need practice planning your problem solving strategy. Go to homework or sample exam problems you have already done. Re-read the problem and make a plan for solving it. Then ck your plan by looking at your previous work. Do NOT simply re-calculate the problem. Don’t use a calculator to practice planning.
      • Missing a relationship between variables. This may be a conceptual type problem. You missed it because you didn't know the trends, etc. You can help this by using the objective list to write out every relationship. For example, if the objective says to ID the trend in electronegativity, you could write out an index card the relationship between position in the periodic table and electronegativity (electronegativity increases as you go up a family and across a period, with F being the most electronegative).
• **Miscalculation:** You read the problem correctly; you chose the correct equation, but you got the wrong answer. In this case you need practice with your calculator. Go to the sample problems in the textbook, find the place where all values have been substituted in, and use your calculator until you can get the same number solution as the text.

(5) **Study Group Rules**

- **Groups MUST**
  1) Have regular meetings
  2) Meet at a place conducive to study
  3) Have 3-5 members
- Use your meetings to go over:
  1) assigned problems
  2) old quizzes
  3) objectives
  4) sample exam questions
- Keep your meeting on task. Socialization is great, but remember the purpose is to improve your understanding of chemistry (your grade too).
- If you are the brightest in a group, you benefit by verbalizing and defending your answers to others.
- If you catch on more slowly than others in a group, you benefit hearing and seeing the concepts explained by someone other than me.
- You **DO NOT** have to stay in the first group you try. Please try a group for a couple of meetings.
- Every study group will not be successful for you. Feel free to try another group. Grouping with those in your major can be helpful.
# TENTATIVE LECTURE SCHEDULE

Chem 102 Spring 2013 Sections 502, 503, and 504 - Dr. V.M. Williamson

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Midterm grades due at noon
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Hwk #4, Part 1 due

Hwk #5 due

Last day to Q: drop Or to officially withdraw

Hwk #6 due

Hwk #7, Part 1 due
Dear Student,

We'll be using OWL (Online Web Learning) as our online homework system this semester. You will need to have an access code and register for OWL in order to get homework credit and to view the e-book and e-solution manual. Here are your directions to get access.

TRIAL ACCESS: You can register for OWL without an access code and instead use a 14-day free trial if you are having financial aid issues or other purchasing problems. See Step 5.

BUYING ACCESS CODE

1. First, get your OWL access code. You will have the option of purchasing the OWL/e-book combo or the combo with a loose-leaf hard copy of the text (same price or cheaper!). For chem 101, you can purchase the materials for only chem 101 or discounted for both chem 101/102.

To purchase online go to http://owl.cengage.com/partners/tamu/
Select Buy your access code and textbook HERE.
Select your course from the Select a course menu:

Choose your product and click the Add to Cart button.
Complete the purchase.
Your code will be emailed to you. If you don't receive your code you can retrieve it at http://www.cengagebrain.com

REGISTRATION

2. After you have your code, you can use it to register in OWL and then you can log in to your course. To register, open a web browser on your computer and go to http://owl.cengage.com/partners/tamu/

3. Choose your course under the "Instructor/Student Login and Student Registration" area.

4. Click on the blue arrow under Student Registration.

5. Choose the blue arrow next to the correct course and section you want to register for. Enter your information into the Self-Registration form. Type your access code into the Access Code space and press Continue.

*Check the "Use 14-day free trial" box if you don't have your access code yet. You will need to enter a valid access code within 14 days to continue using OWL. Then continue with the steps below. Be sure to re-register using the same login name and password when you buy your access code so your work transfers. DO NOT CREATE A NEW LOGIN OR YOU WILL LOSE ALL PREVIOUS WORK.

Once you reach the Student Registration: Successful Registration page, click on the Login Page link at the top. Bookmark this login page and use it whenever you visit OWL. Use the Login and Password you created during registering.

AFTER you register, get back to the login page anytime by going to http://owl.cengage.com/partners/tamu/ Choose your course type and choose Log in. Choose the blue arrow under "User Login Page" to get to your login page. Bookmark this page.
CHEMISTRY 112
Fundamentals of Chemistry Lab II
Spring 2013

Laboratory Coordinator: Dr. Tak Wai “Tom” Leung, HELD 412
tak.leung@chem.tamu.edu
CHEM 112 IA: chem112@chem.tamu.edu

TA Name: ___________________________  Section: ___________________________

TA Office Hours in 116 HELD: ________________  Laboratory Room: ________________

TA Email: ___________________________

Chemistry 112 builds upon the knowledge and experience gained in Chemistry 111.

**Prerequisites:** The prerequisite for CHEM 112 are credit for CHEM 111 and concurrent registration in or credit for CHEM 102. “Credit for” means credit recorded on the transcript for passing this course with a passing grade or passing appropriate tests to obtain credit. If you are registered for CHEM 112 and do not have the proper prerequisites you must drop this course. **If you drop the co-requisite lecture course, CHEM 102, during the semester, you no longer meet the requirements to be enrolled in this laboratory course. Therefore, CHEM 112 must be dropped at the same time.** Student Rule 1.16.4 includes the statement: “If lecture and companion labs are dropped at the same time, this will count as one Q-drop rather than two.” **Do not attempt this course without the proper prerequisites.**

**Required Materials:**
  - Lab notebook, 8.5” x 11”, perforated, numbered, with duplicate (carbonless) copy pages is included with the laboratory manual
- Nonprogrammable scientific calculator
- Approved eye protect on: Chemical splash goggles (fully enclosing goggles with four indirect vents) are required. These are the ONLY approved form of eye protection. **No other goggles will be allowed.**

**Learning Outcomes:** The initial experiments investigate topics such as Beer’s law, freezing point depression, solubility, kinetics, equilibrium, buffering, and transition metal chemistry, and are designed to complement the lecture material presented in CHEM 102 or highlight common analytical techniques, such as chromatography or spectrophotometry. In CHEM 112 the primary focus of the laboratory exercises is no longer solely the manipulation of laboratory equipment and data collection. Instead an emphasis is placed on data analysis and a broad-based understanding of the implications of the experimental results. After completing the initial experiments, with almost two semesters of general chemistry completed, students are adequately prepared to design and execute a two-week research project. This project requires that students combine general chemical knowledge, laboratory skills, analytical thinking and creativity into a short research project. The results of this project are reported formally in a scientific paper, which serves as the final assignment for the course.

**Safety:** Student safety is a top priority in the Texas A&M Department of Chemistry. Protective eyewear, appropriate clothing and shoes that completely cover your feet are required at all times in the laboratory. Appropriate clothing includes pants or long skirts which come all the way down to the ankles so that no parts of
the legs or feet are exposed. All Chemistry 112 students are required to accept the Lab Safety Acknowledgement (LSA) on Howdy and pass a safety quiz given at the conclusion of the first class meeting. Any student who does not view the safety video, pass the safety quiz and accept the lab safety acknowledgment on HOWDY will not be permitted to continue in Chemistry 112. The safety guidelines associated with individual experiments are highlighted at the beginning of each experiment. Prelab quiz questions regarding safety aspects specific to each experiment should be expected. Failure to adhere to any safety regulation while in the laboratory will result in a reduced performance score and/or expulsion from the laboratory.

Eating, drinking, and smoking are prohibited in the lab at all times. Chewing gum is also prohibited.

Long hair must be held in place to the back of your head. You are responsible for bringing the bands or clips to hold back your hair. Only full-length pants or skirts are allowed in the labs. If you do not comply with the attire rules, you will be asked to leave the lab to get appropriate clothing. If you do not make it back to complete the lab, you will receive a zero for that particular lab.

All personal belongings are to be placed in the back of the room and any food/drink should be inside a backpack.

Further details on appropriate lab attire and other safety regulations are provided in the lab manual and will be explained during the first class meeting.

**Personal Electronic Devices:** Cell phones and other personal electronic devices are **NOT** permitted in lab. If you continue to use them after being told not to, you will be asked to leave the lab and you will receive a zero for the missed lab.

**Questions:** If you have any questions regarding the laboratory course or specific experiments, e-mail your TA or go to the help desk in room 116 HELD. General questions regarding lost and found or other non-technical issues can be sent to chemfyp@chem.tamu.edu

**Electronic Communications:** All electronic communications with your TA, IA, the FYP office, and the Laboratory Coordinator must be conducted from a **tamu email account**. All emails should include the student’s first and last name, UIN, and the course and section number. Students are responsible for checking their **tamu email** on a regular basis to receive messages regarding the laboratory course. Students are responsible for verifying that their tamu email on record is correct.

**eLearning:** Your grades for this lab will be posted on the course eLearning page, which can be accessed via: elearning.tamu.edu. All supplemental information and/or handouts for experiments not included in your lab manual will be posted on eLearning. Furthermore, all prelab quizzes will be conducted as assessments on eLearning. For more information regarding these assessments, see the prelab quizzes section under Laboratory Assignments.

**Absences and Make-up Labs:** All students with absences due to University-approved excuses as defined by Student Rule 7 (see http://student-rules.tamu.edu/rule07.htm), will be allowed to make-up missed laboratory work provided the requirements outlined in the student rules are met. In cases where advanced notice of an approved absence cannot be given, students must contact the FYP office **by the end of the second working day after the end of the absence**. All excused absences from lab and make up lab requests must be reported to and processed by the First Year Program office in 412 HELD. Your TA does **not** have the authority to approve a request for a make-up lab or to schedule a make-up experiment. In accordance with student rules, in cases where advanced notice of an approved absence cannot be given, students must contact the FYP office or the laboratory coordinator **by the end of the second working day after the end of the absence**.
An absence for a non-acute medical service (*such as a doctor's appointment*) does not constitute an excused absence. **Missing lab for not having goggles or other required safety attire is not an excused absence.**

**Assignment Due Dates and Late Policy:** All assignments (DRA sheets or other written assignments) will be due at the beginning of each lab meeting. A three point deduction **per day beginning on the due date** will be applied to any late assignments. Assignments submitted more than one week after the due date will not be graded.

**Switching Sections:** Once you have registered for a laboratory section, you are **NOT** at any time allowed to switch sections later in the semester unless we have proof that there is a conflict with an exam or you need special accommodations. You have to notify the First Year Program office in 412 HELD before the conflict occurs so that we can make arrangements.

**Punctuality:** Arrive to lab on time. Lab sessions begin with important information concerning the procedures to be followed and safety considerations. If you arrive significantly late and if the TA perceives that time to be very late, he/she may decide not to let you in for that lab session as you will not be able to properly follow the procedures and the safety instructions discussed while doing your lab work.

**Academic Integrity:** The Aggie honor code states that "An Aggie does not lie, cheat, or steal or tolerate those who do." Upon accepting admission to Texas A&M University, a student immediately assumes a commitment to uphold the Honor Code, to accept responsibility for learning, and to follow the philosophy and rules of the Honor System. Students will be required to state their commitment on examinations, research papers, and other academic work. Ignorance of the rules does not exclude any member of the TAMU community from the requirements or processes of the Honor System. For additional information visit: [http://aggiehonor.tamu.edu/](http://aggiehonor.tamu.edu/)

Each student has to turn in his or her own pre-lab, post-lab and data sheets. **Even though laboratory data is collected in pairs, all submitted work must be completed individually.** Copying of the prelab, postlab and data sheets instead of turning in your own original work, written using your own words, is considered cheating. Changing experimental data after leaving lab, making up or borrowing data that you did not obtain in class is also a violation of the honor code. All students found to be in violation of the honor code will be given a grade of 0 for the assignment and a report of the violation will be filed with the Aggie Honor System Office. If any two reports are alike in their entirety or in part, it is considered cheating. Turning in a post-lab and data sheets for a lab you did not complete is also considered cheating.

**Disabilities:** The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, Cain Hall, Room B-118 or call 845-1637. For additional information, visit [http://disability.tamu.edu/](http://disability.tamu.edu/)

Students wishing to receive accommodations for disabilities for CHEM 112 must submit the appropriate paperwork to the FYP office in HELD 412. Note that we are not responsible for providing any accommodations until the paperwork has been submitted to the office.

**Laboratory Assignments:** Assignments associated with 10 laboratory experiments comprise the majority of the Chemistry 112 course grade. The points for each experiment are divided into as many as four categories, including: quizzes, performance and safety, data reduction and analysis and technical abstract. Other assignments included in Chemistry 112 are one final exam, a project report and required attendance at and a written summary of one evening lecture. A brief description of each of the course components is given below. A schedule of experiments and a point breakdown for all assignments is listed in the schedule found on the last page of this syllabus.
1. **Pre-lab Quizzes:** A prelab quiz will be administered for each experiment, or portion of an experiment for multi-week projects, in the course. All quizzes are administered as a BlackBoard Vista assessment. (Available through elearning.tamu.edu) Each prelab quiz is due prior to the beginning of the class meeting in which the experiment is scheduled to be performed. Although use of the laboratory manual cannot be restricted you are required to complete the quizzes individually. Successful completion of the quizzes will require adequate preparation. The quizzes have a strict 30 minute time limit, and must be submitted prior to the expiration of this allotted time. Each new quiz will be made available after 6:00 PM on the day your lab section meets. Since each quiz is available for approximately one week and can be completed at any time, *make up quizzes will not be allowed* even if a student has a university approved excuse for the day the assessment is due. As this is graded course work, all rules and policies regarding the Aggie Honor Code apply to prelab quizzes. Students are responsible for taking and submitting each quiz. *Neither your TA nor the FYP office will submit a quiz for you if you fail to do so.* **Quizzes that are not submitted by the student will earn a grade of 0.**

The prelab quizzes are designed to test a student’s preparedness for the upcoming experiment. Quiz questions are derived from the reading materials found in the lab manual and may cover but are not limited to the following topics: basic calculations; experimental aim; ecological/environmental issues; analytical techniques; basic chemical concepts; experimental procedure; and equipment and reagents. A comprehensive reading of the lab materials should sufficiently prepare students to answer all quiz questions. At least one general safety question will be included in each quiz. Answer keys to individual quizzes will be available through the list of assessments on elearning, however the keys will not be released until the end of the week each quiz is due.

2. **Performance and Safety:** The safety and performance grade includes adhering to safety guidelines (goggles and attire), maintaining a clean workspace, and being organized and prepared for the day’s activities. Safety violations will result in lost points and can lead to dismissal from the laboratory. The performance form asks whether each student a) wore goggles throughout the entire exercise; b) was appropriately dressed; c) maintained a clean environment; d) was prepared; and e) followed directions. *Each violation costs the student 3 points (making negative scores possible). Recognize that the TAs must strictly follow the rules and are not allowed to exercise discretion in any of these criteria.* If the TA is found to be failing these issues during inspections, the TA can lose their job. Students will be allowed to borrow goggles from the stockroom (room 402 HELD), but it will cost 5 points on the safety and performance grade for that experiment. **Students must bring their TAMU ID to the stockroom to be able to check out goggles.** Goggles are the only component of safety attire that can be borrowed from the stockroom.

3. **Data Reduction and Analysis:** The laboratory manual provides a series of directions, calculations and questions after each experiment. These exercises are designed to guide students through the analysis of their experimental data. The data reduction and analysis assignment is due at the beginning of the following lab period. All calculations and questions will be completed on a worksheet found in the lab manual. Any plots or data tables should be completed using an electronic software package such as Microsoft Excel. Paper copies of all tables and plots should be attached to the data analysis and reduction worksheet. A hand-written sample calculation must accompany any calculations performed with electronic spreadsheets.

4. **Technical Abstract:** Most scientific findings are communicated through scientific research articles published in scientific journals. An abbreviated form of a research article, a technical abstract, will be written for one experiment in Chemistry 112. The format of the 2-3 page abstract is described in the lab manual. Specific guidelines for this assignment will be provided on elearning. Technical abstracts are due at the beginning of the following lab period.

Chemistry 112, Spring 2013
5. **Exams**: One 90 minute multiple-choice final exam is given in Chemistry 112. The exam may include multiple-choice, true/false and free-response questions. This exam will be administered in lab *during your regular lab time the week of April 22.*

6. **Final Report**: A full report must be submitted for the research project. The report must be typed and should be approximately 3-5 pages in length. Specific guidelines will be provided on elearning.

7. **Lecture Series**: The first year program Lecture Series introduces students to individuals who use general chemistry in their daily occupations. Speakers have included an award winning science fiction novelist, faculty from departments across campus, government regulators, and world-renowned chemists. Attendance at one of the lectures is required. A typed one page summary of the lecture with a ticket stub attached is due at the beginning of lab the week following the lecture. Tickets are available at the MSC box offices on a first come first served basis. **Students are only allowed one ticket to attend one lecture, not both. Inability to acquire a ticket is not a valid excuse. You will receive zero for this assignment. There is no make-up for the lecture series.**

   **Lecture Series Dates for this semester are to be announced:**
   In the event that the lecture series does not take place, either an alternate assignment will be announced or the points will be added on to the final exam for the course.

**There are no opportunities to earn “extra credit” in CHEM 112.**

**Determination of Final Grades**: Student scores from the assignments described above will be summed and grades will be determined using grade dividing lines (cutoffs) that will vary to some extent from section to section. The grade cutoffs will be determined after consultation between your Teaching Assistant and the Laboratory Coordinator. In each laboratory section then, grading will be ‘on the curve’, and while ‘the curves’ will be similar in different sections, they will not be identical. Overall section grade averages will be allowed to vary somewhat since every group of students is different, but the Laboratory Coordinator’s policy will attempt to compensate as much as possible for differences in the grading habits of TAs. Grade cutoffs are not determined by any adherence to a 90/80/70/60 rule – students need to be aware that *such a rule is not applied.* In many cases, the cutoffs will be lower than these numbers, but it is also possible that they will be higher than these numbers. **Please refrain from contacting your TA, IA, the FYP office or the lab coordinator with specific questions regarding the final curve in this course; these questions cannot and WILL NOT be answered.**

Final grade assignments will be not be released to students by the TAs or the FYP office. Students will learn their final grades in the course after they are released by the University.

**Disclaimer**: Any communications or handouts from your IA, the FYP office or Lab Coordinator take precedence over the contents of this syllabus.
<table>
<thead>
<tr>
<th>Week of</th>
<th>Assignment</th>
<th>*Last Day for Make-up Lab</th>
<th>Total Points Possible</th>
<th>Quiz</th>
<th>Safety and Performance</th>
<th>Data Reduction and Analysis</th>
<th>Technical Abstract</th>
<th>Total</th>
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<tbody>
<tr>
<td>1/14</td>
<td>Safety</td>
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<td>1/28</td>
<td>Exp. 9: Precipitation Titrations</td>
<td>2/7</td>
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<td>2/4</td>
<td>Exp. 10: Colligative Properties</td>
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<td>2/11</td>
<td>Exp. 8: Spectrophotometry</td>
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<td>2/18</td>
<td>Exp. 12: Kinetics II (Dry Lab)</td>
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<td>Worksheet (45)</td>
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<td>Exp. 19: Transition Metal Chemistry</td>
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<td>3/11</td>
<td>Spring Break</td>
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<td>Exp. 15: Buffers</td>
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<td>Exp. 16: Electrochemistry I</td>
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<td>Research Project, Week 1</td>
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<td>4/15</td>
<td>Research Project, Week 2</td>
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<td>TBA</td>
<td>Lecture Series Summary</td>
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<td>Due at the start of lab meeting the week after the lecture is given</td>
<td>Due at the start of lab meeting the week after the lecture is given</td>
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<td>4/22</td>
<td>Final Report</td>
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<td>Due at the start of final exam. Due before the start of final exam. Late reports will not be accepted.</td>
<td>Due at the start of final exam. Due before the start of final exam. Late reports will not be accepted.</td>
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<td>4/22</td>
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* Students must report to the FYP office in HELD 412 within two days after the end of an absence to schedule a make-up lab. Requests may not be accepted after 3:00 pm on the date indicated.
** Students who miss the safety orientation must make this up BEFORE their next lab meeting.
*** No formal make-up time is scheduled for this week, however, you must schedule a make-up lab with the FYP office within two days after the end of an absence to turn in the assignment for this experiment.
Texas A&M University

Core Curriculum Cover Sheet

Initial Request for a course to be considered for the Fall 2014 Core Curriculum

1. This request is submitted by (department name): Chemistry

2. Course prefix and number: CHEM 103/113

3. Texas Common Course Number:

4. Complete course title: Structure and Bonding

5. Semester credit hours: 3/1

6. This request is for consideration in the following Foundational Component Area:

☐ Communication  ☐ Creative Arts
☐ Mathematics  ☐ American History
☒ Life and Physical Sciences  ☐ Government/Political Science
☐ Language, Philosophy and Culture  ☐ Social and Behavioral Sciences

7. This course should also be considered for International and Cultural Diversity (ICD) designation:

☐ Yes  ☒ No

8. How frequently will the class be offered? Fall

9. Number of class sections per semester: Fall 1/3

10. Number of students per semester: 34/34

11. Historic annual enrollment for the last three years: 34/34 27/27 20/20

This completed form must be attached to a course syllabus that sufficiently and specifically details the appropriate core objectives through multiple lectures, outside activities, assignments, etc. Representative from department submitting request should be in attendance when considered by the Core Curriculum Council.

12. Submitted by:

☐ Course instructor

☐ Department Head

☐ College Dean/Designee

Date

3/1/17

Date

3/1/17

Date

3/13/13

For additional information regarding core curriculum, visit the Texas Higher Education Coordinating Board website at www.thecb.state.tx.us/corecurriculum2014

See form instructions for submission/approval process.
Core Objectives

Describe how the proposed course develops the required core objectives below by indicating how each learning objective will be addressed, what specific strategies will be used for each objective and how student learning of each objective will be evaluated.

The proposed course is required to contain each element of the Core Objective.

Critical Thinking (to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information):

The scientific method is the fundamental basis of both lecture and lab. Lectures introduce knowledge derived from scientific experiments and show how scientific theories have evolved with the need to accommodate new data that revealed the inadequacies of older theories. Lecture exams include questions to assess students’ ability for critical thinking, quantitative analysis, and their capacity for synthesizing and integrating information in solving problems. The laboratory component of the course includes pre-lab presentations to aid students in understanding the concepts and activities they will be performing in the upcoming lab and to be fully briefed on any safety precautions they will be expected to take. Chem 113 labs include a blend of synthesis/preparative work, instrumental measurements, qualitative observation, and some assembly of simple instrumentation and chemical apparatus. Students are required to submit a written report one week after completion of each experiment. These graded reports introduce students to the importance of being able to communicate their experimental results and conclusions.

Communication (to include effective development, interpretation and expression of ideas through written, oral and visual communication):

The course requires that students become comfortable and proficient with the language of chemistry, with the ultimate goal being that the students communicate effectively with their peers, as well as others knowledgeable in chemistry. Both lecture and lab utilize visual communication through the preparation and interpretation of graphs, tables, and figures. Students are required to draw and interpret chemical reactions and structures. In the laboratory, several experiments are dedicated to the manipulation and graphical depiction of scientific data and
Texas A&M University

Core Curriculum

_initial Request for a Course Addition to the Fall 2014 Core Curriculum_

in the communication of how the experiments' objectives have been met in the procedures and apparatus used in each experiment. Lab reports, homework, and exams require students to use this new language to describe and solve problems involving the phenomena they've investigated.

Empirical and Quantitative Skills (to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions):

Chem 103/113 students are required to manipulate and interpret numerical data in terms of chemical theory throughout the course. Although the demanding applications of calculus and physics are introduced early in the course, where quantum mechanics and the nature of chemical bonding are discussed, students are initially provided with the essential information to comprehend these subjects. For most of the chemical applications covered in the course, the ability to use high-school algebra and geometry is mandatory. Graphing techniques and their interpretation are employed in several aspects of the course, e.g., the study of reaction mechanisms and chemical kinetics. Chemical data are gathered in the laboratory and subjected to numerical fitting and comparison with expectations/predictions from chemical theory. A balance is struck between the concrete observational nature of chemistry and the numerical and abstract mathematical tools needed to fully comprehend observations.

Teamwork (to include the ability to consider different points of view and to work effectively with others to support a shared purpose or goal):

Teamwork is an essential part of all laboratory work. As a result, students work in pairs for certain of the laboratory experiments and share all data collected. Several experiments require the use of shared instrumentation. Students write their own laboratory reports and quickly learn that effective teamwork and communication during the active observational/data-acquisition phase of the experiment is crucial when they must use the data on their own to generate their interpretations and conclusions. Students are sometimes required to compare their experimental data with those obtained by other groups to identify potential experimental errors, as well as accuracy and reproducibility of results. Routine in-class exercises involving all aspects of the subjects covered in the course are carried out as a team effort. This requires students to interact with each other and with the instructor in a constructive manner. These exercises also lead to enthusiastic competition among groups of students for solutions to assigned problems. Homework assignments allow for meaningful interactions as well. In this process of active learning, student collaboration is certainly allowed, so long as a balance of individual and group effort is maintained.

Please be aware that instructors should be prepared to submit samples/examples of student work as part of the future course recertification process.
CHEM 103: STRUCTURE AND BONDING
FALL 2012
MWF 12:40-1:30 PM 2122 CHEMISTRY

INSTRUCTOR: Dr. Donald J. Daresbourg 406 Chemistry Bldg. 845-5417 or -2983
Office Hours: 2:00-3:00 (Monday and Friday) or by appointment
Email: djdarens@mail.chem.tamu.edu
Chemistry 103 Homepage: http://www.chem.tamu.edu/rgrp/djd/chem103
DJD Research Homepage: http://www.chem.tamu.edu/rgrp/djd

TEACHING ASSISTANT: STEPHANIE WILSON
Office: 426 Chemistry Bldg. 845-4837
Office Hours: by appointment
Email: Stephanie.wilson@chem.tamu.edu


GRADING:

<table>
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<th>Component</th>
<th>Points</th>
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</thead>
<tbody>
<tr>
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<tr>
<td>Short Quizzes and homework assignments</td>
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<tr>
<td>Final Exam</td>
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EXAM SCHEDULE:

<table>
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<th>Exam Type</th>
<th>Date</th>
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<tbody>
<tr>
<td>Hour Exams</td>
<td>September 28, October 26, November 19</td>
</tr>
<tr>
<td>Final Exam</td>
<td>Monday, December 10, 10:30 am - 12:30 pm</td>
</tr>
</tbody>
</table>

COURSE DESCRIPTION: Rigorous treatment of chemical principles and their applications.

PREREQUISITES: For entering students with satisfactory scores on math and chemistry placement exams.

ADA POLICY: The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact the Department of Student Life, Services for Students with Disabilities, in Room 126 of the Koldus Building or call 845-1637.

CELL PHONES, TABLETS AND OTHER ELECTRONIC DEVICES: Use of cell phones and other electronic devices in class is strictly limited to course-related activities (e.g., taking notes). Students violating this policy will be required to leave immediately. If you have an emergency, please be courteous and step out so as not to disrupt the class.

AGGIE HONOR CODE: “An Aggie does not lie, cheat, or steal or tolerate those who do.”
Upon accepting admission to Texas A&M University, a student immediately assumes a commitment to uphold the Honor Code, to accept responsibility for learning, and to follow the philosophy and rules of the Honor System. Students will be required to state their commitment on examinations, research papers, and other academic work. Ignorance of the rules does not exclude any member of the TAMU community from the requirements or the processes of the Honor System.
For additional information please visit: www.tamu.edu/aggiehonor/

**Reading Assignments and Lecture Schedule:**

<table>
<thead>
<tr>
<th>Period</th>
<th>Chapter</th>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>August 27 – September 14</td>
<td>1</td>
<td>ATOMS: The Quantum World</td>
<td>1</td>
</tr>
<tr>
<td>September 17 – September 26</td>
<td>2</td>
<td>Chemical Bonds</td>
<td>55</td>
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<tr>
<td><em>EXAM I: September 28</em></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>October 01 – October 05</td>
<td>3</td>
<td>Molecular Shape and Structure</td>
<td>93</td>
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<tr>
<td>October 08 – October 17</td>
<td>4</td>
<td>The Properties of Gases</td>
<td>133</td>
</tr>
<tr>
<td>October 19 – October 26</td>
<td>5-6</td>
<td>Liquids and Solids</td>
<td>171</td>
</tr>
<tr>
<td><em>EXAM II: October 26</em></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>October 29 – November 09</td>
<td>15</td>
<td>The Elements: The Main Group Elements</td>
<td>611</td>
</tr>
<tr>
<td>November 12 – November 16</td>
<td>16</td>
<td>The Elements: The d Blocks</td>
<td>667</td>
</tr>
<tr>
<td><em>EXAM III: November 19</em></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>November 30 – December 04</td>
<td>14</td>
<td>Chemical Kinetics</td>
<td>561</td>
</tr>
</tbody>
</table>

**Final Exam: Monday, December 10th**
10:30 a.m – 12:30 p.m.
Chemistry 111H/113 Laboratories - Fall 2012

COURSE COORDINATOR:
Dr. Michael P. Rosynek
Chemistry Bldg. Room 1331
845-3552

MATERIALS NEEDED:

Laboratory Textbooks:


Laboratory Notebook:
"The Official Laboratory Research Notebook, Jones and Bartlett Publishers, Inc. (1998). (or equivalent)

Safety Goggles:
Ventilated, close-fitting goggles, not merely plastic "safety glasses".

LABORATORY SAFETY:

- Safety goggles of an approved type must be worn at all times while in the laboratory. If you forget to bring your goggles to a class meeting, you will not be allowed to work in the laboratory.
- Closed-toe shoes must be worn while working in the laboratory. Legs must be covered down to at least knee level. Shorts are not permitted unless they reach to at least knee level or are covered by a laboratory apron or coat that reaches to at least knee level.
- Unauthorized experiments are not allowed; chemicals and apparatus may never be removed from the laboratory.
- Additional safety considerations specific to individual experiments will be presented by your instructor, as required.

More detailed descriptions of required laboratory safety regulations are provided on the linked sheet, Laboratory Safety Regulations (Teaching Laboratories), and in Chapter 1, "Safety Precautions in the Laboratory" (pp. 1-12) of your laboratory textbook. This material should be studied prior to your first laboratory class meeting. You will be
expected by your instructor at the first class meeting to be thoroughly familiar and in compliance with the safety practices described in these materials.

Chem 111H

CHEM 101H LECTURE INSTRUCTORS:

Section 201:
Dr. Michael P. Rosynek  
email: mpr101h@mail.chem.tamu.edu

Section 203:
Dr. Joseph B. Natowitz  
email: natowitz@comp.tamu.edu

LABORATORY TA's:

Section 201:  T 11:10 - 2:00 PM  
Scott Dempsey: sdempsey@mail.chem.tamu.edu

Section 202:  T 2:20 - 5:10 PM  
Scott Dempsey: sdempsey@mail.chem.tamu.edu

Section 203:  R 11:10 - 2:00 PM  
: @mail.chem.tamu.edu

Section 204:  R 2:20 - 5:10 PM  
: @mail.chem.tamu.edu

Chem 113

CHEM 103 LECTURE INSTRUCTOR:

Section 500:  
Dr. Donald J. Darenbourg  
didaren@malch.chem.tamu.edu

LABORATORY TA:

Section 501:  W 3:00 - 5:50 PM  
: @chem.tamu.edu

Section 502:  M 3:00 - 5:50 PM  
: @chem.tamu.edu

Section 503:  W 8:00 - 10:50 AM  
: @chem.tamu.edu
Last Updated: July 30, 2012 by Michael P. Rosynek
# Chemistry 111H and 113 Experiment Schedule

**Fall, 2012**

Solutions to the following 20 pre-laboratory homework problems from the "Fundamentals" chapter of the Atkins/Jones lecture text are due at the beginning of the *first* laboratory meeting: D2, D12, E18, E20, F4, F12, F18, G8, G12, G16, H6, I4, I14, I18, J4, J6, L6, L14, M6, M8

<table>
<thead>
<tr>
<th>Week Beginning</th>
<th>Experiment Title</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Safety Practices, Laboratory Procedures, Data Manipulation, and Report Writing</td>
</tr>
<tr>
<td>Sept. 3</td>
<td>Preparation and Percent Composition of a Metal Oxide and Iodide: Determination of the Empirical Formula of a Compound</td>
</tr>
</tbody>
</table>
| Sept. 10       | Part A: Formula of a Metal Oxide by Ignition  
Part B: Determination of the Empirical Formula of a Metal Iodide (zinc reaction only)  |
| Sept. 17       | The Visible Atomic Spectrum of Hydrogen |
| Sept. 24       | Complexometric Titration: Determination of Water Hardness or Calcium in a Calcium Supplement |
| Oct. 1         | Preparation and Analysis of Lead (II) Iodide |
| Oct. 8         | Preparation of Lead Iodide  
Gravimetric Determination of Lead |
| Oct. 15        | Identification of Chemical Compounds in Solution |
| Oct. 22        | Computational Chemistry |
|                | Determination of Iron in Natural Water or in a Vitamin Tablet |

http://www.chem.tamu.edu/class/majors/syllabusmaterials/Fall_Syllabus.html  
3/26/2013
<table>
<thead>
<tr>
<th>Oct. 29</th>
<th></th>
</tr>
</thead>
</table>
| Nov. 5 | Properties of Gases and Derivation of Gas Laws  
         (Parts B, C, and D only) |
| Nov. 12| Determination of the Molar Volume of a Gas and Atomic Weight of a Metal |
| Nov. 26| Models and the Crystalline State |

* When alternative methods are described in the Experimental Section of the laboratory text, the microscale method will be used, unless otherwise indicated.

Last Updated July 30, 2012 by Michael P. Rosynek
Texas A&M University

Core Curriculum Cover Sheet

Initial Request for a course to be considered for the Fall 2014 Core Curriculum

1. This request is submitted by (department name): Chemistry

2. Course prefix and number: CHEM 104/114

3. Texas Common Course Number:

4. Complete course title: Chemistry of the Elements

5. Semester credit hours. 3/1

6. This request is for consideration in the following Foundational Component Area:
   □ Communication
   □ Mathematics
   ☑ Life and Physical Sciences
   □ Language, Philosophy and Culture
   □ Creative Arts
   □ American History
   □ Government/Political Science
   □ Social and Behavioral Sciences

7. This course should also be considered for International and Cultural Diversity (ICD) designation:
   □ Yes   ☑ No

8. How frequently will the class be offered? Spring

9. Number of class sections per semester: 1/2

10. Number of students per semester: 28/26

11. Historic annual enrollment for the last three years: 28/26 18/17 17/16

This completed form must be attached to a course syllabus that sufficiently and specifically details the appropriate core objectives through multiple lectures, outside activities, assignments, etc. Representative from department submitting request should be in attendance when considered by the Core Curriculum Council.

13. Submitted by:
   [Signature]
   Course Instructor

   [Signature]
   Date 3/1/12

   [Signature]
   Approvals:
   Date 3/1/12

14. Department Head
   [Signature]
   Date 3/1/13

15. College Dean/Designee
   [Signature]
   Date

For additional information regarding core curriculum, visit the Texas Higher Education Coordinating Board website at: www.thecb.state.tx.us/corecurriculum2014

See form instructions for submission/approval process.
Texas A&M University

Core Curriculum

Initial Request for a Course Addition to the Fall 2014 Core Curriculum

Foundational Component Area: Life and Physical Sciences

In the box below, describe how this course meets the Foundational Component Area description for Life and Physical Sciences. Courses in this category focus on describing, explaining, and predicting natural phenomena using the scientific method. Courses involve the understanding of interactions among natural phenomena and the implications of scientific principles on the physical world and on human experiences.

The proposed course must contain all elements of the Foundational Component Area. How does the proposed course specifically address the Foundational Component Area definition above?

CHEM104/114, a pair of lecture and laboratory courses with mandatory co-registration, provide the second half of introductory courses to chemistry for students interested in pursuing a degree in chemistry or a closely related field. It consists of a rigorous treatment of chemical principles and their applications. Topics included are thermodynamics and chemical equilibrium, and a comprehensive treatment of the chemistry of the elements. Students achieve their learning objectives by their participation in lectures, lecture demonstrations, videos, individual and team-based problem solving sessions (in class and out), and laboratory experiments. The course prepares students for taking more advanced courses in chemistry, as well as providing a chemical basis for phenomena experienced in their daily lives.

Core Objectives

Describe how the proposed course develops the required core objectives below by indicating how each learning objective will be addressed, what specific strategies will be used for each objective and how student learning of each objective will be evaluated.

The proposed course is required to contain each element of the Core Objective.

Critical Thinking (to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information):

The scientific method is the fundamental basis of both lecture and lab. Lectures introduce knowledge derived from scientific experiments and show how scientific theories have evolved with the need to accommodate new data that revealed the inadequacies of older theories. Lecture exams include questions to assess students' ability for critical thinking, quantitative analysis, and their capacity for synthesizing and integrating information in solving problems. The laboratory component of the course includes pre-lab presentations to aid students in understanding the concepts and activities they will be performing in the upcoming lab and to be fully briefed on any safety precautions they will be expected to take. Chem 114 labs include a blend of synthesis/preparative work, instrumental measurements, qualitative observation, and some assembly of simple instrumentation and chemical apparatus. Students are required to submit a written report one week after completion of each experiment. These graded reports introduce students to the importance of being able to communicate their experimental results and conclusions.

Communication (to include effective development, interpretation and expression of ideas through written, oral and visual communication):

The course requires that students become comfortable and proficient with the language of chemistry, with the ultimate goal being that the students communicate effectively with their peers, as well as others knowledgeable in chemistry. Both lecture and lab utilize visual communication through the preparation and interpretation of graphs, tables, and figures. Students are required to draw and interpret chemical reactions and structures. In the laboratory, several experiments are dedicated to the manipulation and graphical depiction of scientific data and in the communication of how the experiments' objectives have been met in the procedures and apparatus used.
Texas A&M University

Core Curriculum

*Initial Request for a Course Addition to the Fall 2014 Core Curriculum*

in each experiment. Lab reports, homework, and exams require students to use this new language to describe and solve problems involving the phenomena they’ve investigated.

Empirical and Quantitative Skills (to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions):

Chem 104/114 students are required to manipulate and interpret numerical data in terms of chemical theory throughout the course. At this point, the students are well-versed in calculus and are able to understand the rigorous development of the thermodynamic basis for numerous physical and chemical phenomena. The extensive study of chemical equilibria in this course provides ample opportunity for students to hone their skills in algebra and graphing (e.g., acid-base titration curves). As in the earlier laboratory course, students collect data which must be analyzed by mathematical manipulations and graphical techniques for comparisons with predictions based on chemical theory. A balance is struck between the concrete observational nature of chemistry and the numerical and abstract mathematical tools needed to fully comprehend observations.

Teamwork (to include the ability to consider different points of view and to work effectively with others to support a shared purpose or goal):

Teamwork is an essential part of all laboratory work. As a result, students work in pairs for certain of the laboratory experiments and share all data collected. Several experiments require the use of shared instrumentation. Students write their own laboratory reports and quickly learn that effective teamwork and communication during the active observational/data-acquisition phase of the experiment is crucial when they must use the data on their own to generate their interpretations and conclusions. Students are sometimes required to compare their experimental data with those obtained by other groups to identify potential experimental errors, as well as accuracy and reproducibility of results. Routine in-class exercises involving all aspects of the subjects covered in the course are carried out as a team effort. This requires students to interact with each other and with the instructor in a constructive manner. These exercises also lead to enthusiastic competition among groups of students for solutions to assigned problems. Homework assignments allow for meaningful interactions as well. In this process of active learning, student collaboration is certainly allowed, so long as a balance of individual and group effort is maintained.

Please be aware that instructors should be prepared to submit samples/examples of student work as part of the future course recertification process.
CHEM 104: MAJORS CHEMISTRY II
FUNDAMENTAL PRINCIPLES OF CHEMISTRY
SPRING 2013
MWF 10:20 - 11:10 a.m.  △ 2121 Chemistry

INSTRUCTOR:  Prof. Donald Daresbourg  406 Chemistry Bldg.  845-5417 or 5-2983
Email: djdares@chem.tamu.edu
MYD Research website: http://www.chem.tamu.edu/rgroup/djd/
Office hours: Tuesday & Thursday 3 - 4 p.m.; or by appointment

TEACHING ASSISTANT:  Stephanie Wilson
Email: stephanie.wilson@chem.tamu.edu
Office: 426 Chemistry Bldg.  845-4837
Office Hours: MW 11:10 AM – 12:10 PM or by appointment

WEBSITE:  http://www.chem.tamu.edu/rgroup/djd/chem104


COMPANION WEBSITES:
http://www.coursesmart.com/9781429257473?_professorview=false&_instructor=2937478
(to purchase an e-version of the book)
http://www.whfreeman.com/ichem5e (for student resources)

GRADING:
Hour Exams (3 at 100 pts each)  300
Short Quizzes and homework assignments  100
Final Exam  200
Total:  600

EXAM SCHEDULE:  Hour Exams: February 8, March 8, April 8
Final Exam: Friday, May 7, 8:00 – 10:00 AM

COURSE DESCRIPTION:  Fundamentals of chemistry, particularly introductions to thermodynamics, equilibria, electrochemistry, and various applications. Special topics may be offered as time allows. Quizzes may be announced at various class periods. Homework will be assigned throughout the semester. This course will prepare students for further study of chemistry, and for technical and life sciences.

PREREQUISITES:  For entering students with satisfactory scores on math and chemistry placement exams; Chemistry 103.

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ADA POLICY: The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact the Department of Student Life, Services for Students with Disabilities, in Room 126 of the Koldus Building or call 845-1637.

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<table>
<thead>
<tr>
<th>Week</th>
<th>Chapter</th>
<th>Topic</th>
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<tbody>
<tr>
<td>January 14 – January 18</td>
<td>7</td>
<td>Kinetics vs Thermodynamics</td>
</tr>
<tr>
<td>January 23 – January 25</td>
<td>7</td>
<td>Thermodynamics – First law</td>
</tr>
<tr>
<td>January 28 – February 1</td>
<td>7 – 8</td>
<td>Second and Third laws</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>Entropy/Gibbs Free Energy</td>
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<tr>
<td>February 8</td>
<td></td>
<td>EXAM I</td>
</tr>
<tr>
<td>February 11 – February 15</td>
<td>9 – 10</td>
<td>Chemical Equilibria/Phase Transitions</td>
</tr>
<tr>
<td>February 18 – February 22</td>
<td>11</td>
<td>Acids and Bases</td>
</tr>
<tr>
<td>February 25 – March 1</td>
<td>12</td>
<td>Titrations, Buffers</td>
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<tr>
<td>March 4 – March 6</td>
<td>12</td>
<td>Titrations, Buffers</td>
</tr>
<tr>
<td>March 8</td>
<td></td>
<td>EXAM II</td>
</tr>
<tr>
<td>March 18 – March 22</td>
<td>12</td>
<td>Solubility Products</td>
</tr>
<tr>
<td>March 25 – March 29</td>
<td>13</td>
<td>Electrochemistry</td>
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<tr>
<td>April 1 – April 5</td>
<td>13 – 17</td>
<td>Electrochemistry/Nuclear Chemistry</td>
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<tr>
<td>April 8</td>
<td></td>
<td>EXAM III</td>
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<tr>
<td>April 10 – April 12</td>
<td>18</td>
<td>Organic Chemistry</td>
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<tr>
<td>April 15 – April 19</td>
<td>18</td>
<td>Organic Chemistry/Polymers</td>
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<tr>
<td>April 22 – April 26</td>
<td>19</td>
<td>Polymers</td>
</tr>
<tr>
<td>April 29</td>
<td></td>
<td>Last Class Day – Review</td>
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Final Exam: Tuesday, May 7th, 2013
8:00 – 10:00 AM
Chemistry 112H/114 Laboratories - Spring 2013

COURSE COORDINATOR:
Dr. Michael P. Rosynk

Chemistry Bldg. Room 1331
845-3552

MATERIALS NEEDED:

Laboratory Textbooks:

Laboratory Notebook:
"The Official Laboratory Research Notebook, Jones and Bartlett Publishers, Inc. (1998). (or equivalent)

Safety Goggles:
Ventilated, close-fitting goggles, not merely plastic "safety glasses".

LABORATORY SAFETY:

- Safety goggles of an approved type must be worn at all times while in the laboratory. If you forget to bring your goggles to a class meeting, you will not be allowed to work in the laboratory.
- Closed-toe shoes must be worn while working in the laboratory. Legs must be covered down to at least knee level. Shorts are not permitted unless they reach to at least knee level or are covered by a laboratory apron or coat that reaches to at least knee level.
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<table>
<thead>
<tr>
<th>Chem 112H</th>
<th>Chem 114</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CHEM 102H LECTURE INSTRUCTORS:</strong></td>
<td><strong>CHEM 104 LECTURE INSTRUCTOR:</strong></td>
</tr>
<tr>
<td>Section 201:</td>
<td>Section 500:</td>
</tr>
<tr>
<td>Dr. Michael P. Rosynek</td>
<td>Dr. Donald J. Darenbourg</td>
</tr>
<tr>
<td>email: <a href="mailto:mpr101t@mail.chem.tamu.edu">mpr101t@mail.chem.tamu.edu</a></td>
<td><a href="mailto:didarens@mail.chem.tamu.edu">didarens@mail.chem.tamu.edu</a></td>
</tr>
<tr>
<td>Section 203:</td>
<td></td>
</tr>
<tr>
<td>Dr. Joseph B. Natowitz</td>
<td></td>
</tr>
<tr>
<td>email: <a href="mailto:natowitz@comp.tamu.edu">natowitz@comp.tamu.edu</a></td>
<td></td>
</tr>
<tr>
<td><strong>LABORATORY TA:</strong></td>
<td><strong>LABORATORY TA:</strong></td>
</tr>
<tr>
<td>Section 201: T 11:10 - 2:00 PM</td>
<td>Section 501: M 3:00 - 5:50 PM</td>
</tr>
<tr>
<td>Scott Dempsey: <a href="mailto:sdempsey@mail.chem.tamu.edu">sdempsey@mail.chem.tamu.edu</a></td>
<td>Carrie Carpenter: <a href="mailto:carrie.carpenter@mail.chem.tamu.edu">carrie.carpenter@mail.chem.tamu.edu</a></td>
</tr>
<tr>
<td>Section 203: R 11:10 - 2:00 PM</td>
<td>Section 502: W 3:00 - 5:50 PM</td>
</tr>
<tr>
<td>Scott Dempsey: <a href="mailto:sdempsey@mail.chem.tamu.edu">sdempsey@mail.chem.tamu.edu</a></td>
<td>Carrie</td>
</tr>
<tr>
<td>Carrie Carpenter: <a href="mailto:carrie.carpenter@mail.chem.tamu.edu">carrie.carpenter@mail.chem.tamu.edu</a></td>
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Last Updated: January 10, 2013 by Michael P. Rosynek
# Chemistry 112H and 114 Experiment Schedule

## Spring, 2013

<table>
<thead>
<tr>
<th>Week Beginning</th>
<th>Experiment Title*</th>
<th>Expt. No.</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Safety Practices, Laboratory Procedures, Data Manipulation, and Report Writing</td>
<td></td>
<td>Study pages 1 - 72 of the laboratory text prior to the first laboratory meeting.</td>
</tr>
<tr>
<td>Jan. 28</td>
<td>Thermochemistry and Calorimetric Measurements</td>
<td>5</td>
<td>127 - 150</td>
</tr>
<tr>
<td></td>
<td>Part A: Specific Heat and Atomic Weight of a Metal</td>
<td></td>
<td>Experiment Procedural Notes and Links to Supplement Tutorials on Related Chemistry</td>
</tr>
<tr>
<td></td>
<td>Part C: Determination of ΔH by Hess’s Law</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Part B: Determination of the Heat of Solution</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feb. 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feb. 11</td>
<td>Copper: Its Chemical Transformations</td>
<td>19</td>
<td>413 - 422</td>
</tr>
<tr>
<td></td>
<td>Part A: Conversion of Metallic Copper to Copper (II) Acetate</td>
<td></td>
<td>Experiment Procedural Notes and Links to Supplement Tutorials on Related Chemistry</td>
</tr>
<tr>
<td></td>
<td>Part B: Preparation of cis-bis(glycinate)copper (II) monohydrate and its trans isomer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feb. 18</td>
<td>Chromatographic Methods: Part A: Solvent Extraction and Column Chromatography of Caffeine</td>
<td>25</td>
<td>489 - 520</td>
</tr>
<tr>
<td>Feb. 25</td>
<td>Extraction of Caffeine from Tea Leaves</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Separation and Characterization of Caffeine by Column Chromatography</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mar. 4</td>
<td>Acid-Base Titration</td>
<td>10</td>
<td>211 - 236</td>
</tr>
<tr>
<td></td>
<td>Part A: Analysis of Vinegar</td>
<td></td>
<td>Experiment Procedural Notes and Links to Supplement Tutorials on Related Chemistry</td>
</tr>
<tr>
<td>Mar. 18</td>
<td>Part B: Analysis of a Carbonate/Bicarbonate Mixture</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mar. 25</td>
<td>Preparation of Buffers and Potentiometric Titrations:</td>
<td>28</td>
<td>553 - 567</td>
</tr>
<tr>
<td></td>
<td>Part C: Determination of Equivalent Weight (EW) and $K_a$ of a Weak Acid</td>
<td>576 - 578</td>
<td>Experiment Procedural Notes and Links to Supplement Tutorials on Related Chemistry</td>
</tr>
<tr>
<td></td>
<td>(Also study Part B during pre-lab preparation) (Microscale)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apr. 1</td>
<td>Determination of the Solubility Product Constant $K_{sp}$ and Common Ion Effect</td>
<td>13</td>
<td>263 - 274</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Experiment Procedural Notes and Links to Supplement Tutorials on Related Chemistry</td>
</tr>
<tr>
<td>Date</td>
<td>Experiment</td>
<td>Page Range</td>
<td>Notes</td>
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</tr>
<tr>
<td>Apr. 8</td>
<td>Redox Titrations: Titration of Sodium Hypochlorite in Bleach</td>
<td>12</td>
<td>249 - 261</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Experiment Procedural Notes and Links to Supplement</td>
</tr>
<tr>
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<td>Tutorials on Related Chemistry</td>
</tr>
<tr>
<td>Apr. 15</td>
<td>Electrolysis of an Aqueous KI solution: Determination of</td>
<td>9</td>
<td>195 - 207</td>
</tr>
<tr>
<td></td>
<td>Faraday's Constant and Avogadro's Number</td>
<td></td>
<td>Experiment Procedural Notes and Links to Supplement</td>
</tr>
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<td></td>
<td>Tutorials on Related Chemistry</td>
</tr>
<tr>
<td>Apr. 22</td>
<td>Chemical Kinetics</td>
<td>29</td>
<td>585 - 603</td>
</tr>
<tr>
<td></td>
<td>Part A: Rate of Reaction of Iodine with Acetone</td>
<td></td>
<td>Experiment Procedural Notes and Links to Supplement</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Tutorials on Related Chemistry</td>
</tr>
</tbody>
</table>

* When alternative methods are described in the Experimental Section of the laboratory text, the microscale method will be used, unless otherwise indicated.

Last Updated January 8, 2013 by Michael P. Rosynek
Chemistry 114 Laboratory Reports

Chemistry is a "discovery" science. The laboratory component of an introductory chemistry course provides students with the opportunity not only to reinforce and demonstrate the theoretical concepts that are presented in the lecture component, but also to experience personally the "discovery" of chemical principles. It should be noted that the Chem 114 laboratory syllabus is only partially coordinated with the accompanying Chem 104 lecture syllabus, and is designed to be a largely independent stand-alone course. As a result, some of the experiments performed in the laboratory may require an understanding of principles and theory that are not formally covered in lecture. In such cases, the laboratory text (as well as relevant sections of the lecture text) must be studied to obtain the necessary background information.

Among the essential features of working in a laboratory are the accurate recording of experimental observations in a properly maintained laboratory notebook and the preparation of written reports that describe the experimental observations and the conclusions derived from them. Details regarding notebook maintenance and of the format and content of the required reports are provided in Chapter 4 (pp. 67-72) of your laboratory textbook. The latter chapter, as well as Chapter 2, "Mathematical Methods and Manipulation of Data" (pp. 13-27) should be studied carefully prior to preparing your first report. The "Prelaboratory Report" and "Prelaboratory Problems" for each experiment must be completed prior to the class meeting in which the experiment is performed and will be checked by your instructor at the beginning of each class period. These pages should be submitted as part of the final report. Each report should contain the components described in Section 4.4 of your laboratory text (p. 70), including all "Postlaboratory Problems."

You will submit a written report for each of the nine experiments performed. Three of the experiments (Nos. 5, 10, and 25) require two laboratory periods in consecutive weeks for completion. In these cases, only a single report describing both parts of the experiment will be submitted. The maximum grade on each of the reports for the six one-period experiments is 15 points, while the reports for experiments 5, 10 and 25 are worth 25 points each. All nine report grades (maximum total = 165 points) will be summed to determine your final grade for the course. [NOTE: A grade of zero will be assigned for any experiment which you miss due to an unexcused absence, or for which you do not submit a report.]

Final course letter grades will correspond to the following percentages of the 165
point maximum:

\[
\begin{array}{c|c}
\geq 85\% & A \\
75 - 84\% & B \\
60 - 74\% & C \\
50 - 59\% & D \\
<50\% & F \\
\end{array}
\]

Laboratory reports are due no later than the beginning of the laboratory period one week after completion of the experiment. Reports for Experiment No. 29, which will be completed on Apr. 22nd or 24th are due by 5:00 P.M. on April 29th or May 1st, respectively. Reports submitted after the due date will be considered late, and will be graded as follows:

\[
\text{Grade} = G \times (0.75)^n
\]

where \(G\) is the grade that the report would have received had it been submitted on time, and \(n\) is the number of class days that the report is late.

---

**TA's Laboratory Report Addenda**

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Last Updated January 9, 2013 by Michael P. Rosynek
Texas A&M University
Core Curriculum Cover Sheet
Initial Request for a course to be considered for the Fall 2014 Core Curriculum

1. This request is submitted by (department name): Department of Chemistry

2. Course prefix and number: CHEM106/116

3. Texas Common Course Number: 1305/1105; 1405

4. Complete course title: Molecular Science for Citizens/Laboratory

5. Semester credit hours: 3/1

6. This request is for consideration in the following Foundational Component Area:
   - Communication
   - Mathematics
   - Life and Physical Sciences
   - Language, Philosophy and Culture
   - Creative Arts
   - American History
   - Government/Political Science
   - Social and Behavioral Sciences

7. This course should also be considered for International and Cultural Diversity (ICD) designation:
   - Yes
   - No

8. How frequently will the class be offered? every fall and spring semester

9. Number of class sections per semester: 1 CHEM106; 3 CHEM116

10. Number of students per semester: 50

11. Historic annual enrollment for the last three years: 142/126 101/95 88/77

   This completed form must be attached to a course syllabus that sufficiently and specifically details the appropriate core objectives through multiple lectures, outside activities, assignments, etc. Representative from department:

12. Submitting request should be in attendance when considered by the Core Curriculum Council.

13. Submitted by:
   - Course Instructor
   - Date 3-1-13

   Approvals:
   - Date 3/1/13

14. Department Head
   - Date 3/3/13

15. College Dean/Designee
   - Date

For additional information regarding core curriculum, visit the Texas Higher Education Coordinating Board website at www.thecb.state.tx.us/corecurriculum2014

See form instructions for submission/approval process.
Texas A&M University
Core Curriculum
Initial Request for a Course Addition to the Fall 2014 Core Curriculum

Foundational Component Area: Life and Physical Sciences

In the box below, describe how this course meets the Foundational Component Area description for Life and Physical Sciences. Courses in this category focus on describing, explaining, and predicting natural phenomena using the scientific method. Courses involve the understanding of interactions among natural phenomena and the implications of scientific principles on the physical world and on human experiences.

The proposed course must contain all elements of the Foundational Component Area. How does the proposed course specifically address the Foundational Component Area definition above?

CHEM106/116 is an introduction to the importance of molecular science in daily life. The properties, synthesis, and transformation of important molecules in fuels, foods, materials, and pollution are considered in discussion and in experiments, demonstrations, and videos. Risk-benefit analysis is considered in the context of current events.

Core Objectives

Describe how the proposed course develops the required core objectives below by indicating how each learning objective will be addressed, what specific strategies will be used for each objective and how student learning of each objective will be evaluated.

The proposed course is required to contain each element of the Core Objective.

Critical Thinking (to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information):

The scientific method is the fundamental basis of both lecture and lab. Lectures introduce knowledge derived from historical scientific experiments and how scientific theories have evolved with the addition of new information. Daily quizzes and lecture exams include questions to assess students’ ability for critical thinking and analysis and their capacity for synthesizing and integrating information. The laboratory component of the course includes daily quizzes to encourage students to (1) understand the concepts and calculations from the activities they performed in lab the week before as well as (2) read and prepare for the laboratory activities they will be performing that day. Our labs are primarily guided inquiry modules with one that is open inquiry. The laboratory final culminates in an exam that includes all concepts and calculations learned during the semester.

Communication (to include effective development, interpretation and expression of ideas through written, oral and visual communication):

The course requires that students learn the language of chemistry, which involves a new alphabet (chemical symbols), words (chemical ‘formulas), and sentences (chemical reactions). Both lecture and lab utilize visual communication through the preparation and interpretation of graphs, tables, and figures. Students are required to draw and interpret chemical reactions and structures. In the laboratory, one experiment is dedicated to the manipulation and graphical depiction of scientific data. Lab reports, quizzes, and exams require students to use this new language to describe the phenomena they investigated. Our final lab is a student group project where groups of 3-4 work on developing a lesson plan for a class in grades K-8 and present to the class. In the fall semester, the students in groups of 2 or 3 learn a chemical demonstration, prepare a poster with handouts and communicate their demonstration to K-12 students for 3 hours at the annual Chemistry Open House and Science Exploration Gallery as a service learning project.
Texas A&M University

Core Curriculum

Initial Request for a Course Addition to the Fall 2014 Core Curriculum

Empirical and Quantitative Skills (to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions):

Students are required to manipulate and interpret numerical data in nearly every topic of the course. For example, balancing equations requires simple arithmetic; determining average atomic mass requires algebra; and determining pH requires the use of logarithms. Students practice these skills in on-line homework exercises and demonstrate their mastery in lecture exams. Students practice these same skills in every laboratory, including calculation of atomic weights from isotopes, working with Excel, determining and using Avogadro’s number, converting between concentration units, and solution stoichiometry. Students also become proficient at using laboratory equipment: balances, glassware and pH meters

Teamwork (to include the ability to consider different points of view and to work effectively with others to support a shared purpose or goal):

In the laboratory, teamwork is an integral part since students all work in pairs every week. In addition, as stated earlier, there are more opportunities. The class is divided into groups for (1) participation at the Chemistry Open House, (2) final lab where each group of 4-5 present a lesson plan for a 1st – 4th grade science classroom and (3) during their final exam. For the final, students work alone on the final exam for 70% of their final grade. The exams are collected. The students are then divided into formal groups of 3-4 students and are giving a single exam to complete. This is exactly the same exam as before. They can use all resources to complete the exam. This part is worth 30%.

Please be aware that instructors should be prepared to submit samples/examples of student work as part of the future course recertification process.
CHEM 106 Molecular Science for Citizens Spring 2013

Instructor
Dr. Holly C. Gaede, Undergraduate Advisor and Instructional Assistant Professor
Office: 104 CHEM; Telephone: (979) 845-0520; Email: hgaede@chem.tamu.edu (email preferred)
Office Hours: Tuesdays 11 a.m. – 12 p.m., by appointment, or walk-in

Supplemental Instruction
Mark Ahlenius (ahlenius@neo.tamu.edu); 6-7 p.m. on Sunday HECC 108, Tuesday HECC 105, and Thursday HECC 105.

Course Meetings
Tuesdays and Thursday 9:35-10:50 a.m., 2102 CHEM

Catalog Course Description
106. (CHEM 1305, 1405*) Molecular Science for Citizens. (3-0). Credit 3. I, II
Molecules that control daily life explored via a conceptual approach to molecular science; properties, synthesis, transformations and utility of important molecules and fuels, fibers, metals, pharmaceuticals, foods, biomolecules and structural materials; pollution, consumerism, energy production, disease, biotechnology and risk-benefit analysis considered.

Concurrent enrollment in the laboratory (Chemistry 116) is recommended, but it is not mandatory. Separate enrollments are required for the lecture and laboratory course and you get two different grades.

Prerequisites: none

Learning Outcomes
This course is designed primarily for non-science majors seeking to fulfill part of their core science requirement.

By the end of the course you should be able to
- Understand chemicals and chemical reactivity, as applied to everyday life
- Recognize the role that chemistry plays in your life and society in general
- Understand the scientific process
- Evaluate scientific claims

Textbook

Other required materials
- OWL: On-line Web-based Learning System (access code comes with book)
- i>clicker2 student remote ("clicker") (ISBN #1429280476). This is a small electronic device, similar to a remote control. You will need to use your UIN and remote number to register your clicker for this class online; a link is available on elearning. You will need to bring your clicker to class each day. You are also urged to carry a spare set of batteries for the clicker.
- Calculator

Website
http://elearning.tamu.edu
Links to OWL and Clicker registration can be found here.
Lectures will be posted here. Lectures are copyrighted and are for your personal use only.
Grades will be posted here.
Important Dates
Monday, January 18, 5 p.m.
Monday, March 11 — Friday, March 15
Tuesday, April 2, 5 p.m
Tuesday, April 30 — May 3, Friday, 12:30 — 2:30 p.m.

Last day for adding/dropping courses for the spring semester
Spring break
Last day for all students to drop courses with no penalty (Q-drop)
Last day of classed. Redefined day, students attend their Friday classes
Final Exam

Grading Cutoffs

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>855-950</td>
</tr>
<tr>
<td>B</td>
<td>760-854</td>
</tr>
<tr>
<td>C</td>
<td>665-759</td>
</tr>
<tr>
<td>D</td>
<td>570-664</td>
</tr>
<tr>
<td>F</td>
<td>0-569</td>
</tr>
</tbody>
</table>

These cut-offs may be lowered, but they will not be raised.

Grades

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Points</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clicker Assignments</td>
<td>100</td>
<td>10%</td>
</tr>
<tr>
<td>On-line Homework</td>
<td>150</td>
<td>16%</td>
</tr>
<tr>
<td>Exam 1</td>
<td>150</td>
<td>16%</td>
</tr>
<tr>
<td>Exam 2</td>
<td>150</td>
<td>16%</td>
</tr>
<tr>
<td>Exam 3</td>
<td>150</td>
<td>16%</td>
</tr>
<tr>
<td>Final</td>
<td>250</td>
<td>26%</td>
</tr>
<tr>
<td>Total</td>
<td>950</td>
<td>100%</td>
</tr>
</tbody>
</table>

Assignment Descriptions

- **Clicker Assignments.** Clicker assignments or quizzes will be given during most lectures. Some of these quizzes will be given all at once at the beginning or end of the class period, and some may consist of question spaced throughout the class period. Clicker assessments will be based on the material we have covered, both in readings and in the lecture. In all cases, you will receive some credit just for attendance. If you receive 80% on these clicker assignments, you will earn all 100 points. The scores will be determined as follows:

  \[
  \text{Clicker points} = \frac{\# \text{ clicker questions answered correctly}}{0.8 \times \text{total clicker questions}} \times 100 \text{ pts} \ (\text{up to 100 points})
  \]

  This will allow for absences, technical glitches, etc. **Makeup opportunities for clicker questions will not be provided.** The clicker may also be used for additional, ungraded assessments.

- **On-line Homework.** On line homework will be due most Wednesdays at 11:59 p.m. Each assignment will be worth 15 points. There will be 11 collected throughout the semester, and I will drop the lowest grade. You should work ahead on these assignments. Extensions will not be granted.

- **Exams.** A photo ID must be presented at all examinations. Three midterm exams will be given. Some of these problems will be graphical/pictorial, some will be word problems, and others will be numerical. Some of the questions will be taken directly from the clicker assignments and OWL homework. Make-up exams will be given only for documented, excused absences, according to Student Rule 7.

- **Final.** A comprehensive final will be given that follows the format of the midterm exams. About 2/3 of it will be cumulative and 1/3 will focus on the material covered since Exam 3.

Succeeding in this Course

- Attend class. It is not possible to discuss everything you need to know in two 75-minute lectures per week, but the lecture will emphasize important material, raise questions, and expand on the text. Attendance at the lectures is a small but important part of the learning process. To minimize distractions, all cell phones must be silenced and put away during lecture.

- Read the text book.

- Practice the *Try It* and the *Applying Your Knowledge* questions in the book.

- Don't wait until the last minute to start the OWL assignments. The assignments are designed to be part of the learning process, not busy work. You are given 20 attempts per problem with feedback on errors.

- Seek help if you are having difficulty. Attend the SI help sessions regularly. Visit me during office hours. Form study groups.

- Don't get behind!
Absences
I expect you to come to class. You are responsible for all material presented in class, even if you happen to be absent. If you miss an exam, you will be required to provide suitable documentation that your absence should be excused according to Student Rule 7. [http://student-rules.tamu.edu/rule07] Make-up opportunities will not be provided for unexcused absences. To be excused the student must notify his or her instructor in writing (acknowledged e-mail message is acceptable) prior to the date of absence if such notification is feasible. In cases where advance notification is not feasible (e.g. accident, or emergency) the student must provide notification by the end of the second working day after the absence. This notification should include an explanation of why notice could not be sent prior to the class. You must provide documentation substantiating the reason for the absence, that is satisfactory to the instructor, within one week of the last date of the absence. If you miss an exam with an excused absence, it is your responsibility to contact me to arrange a make-up. Simply leaving me a message or sending me an email is not sufficient.

Americans with Disabilities Act (ADA) Policy Statement
The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information visit http://disability.tamu.edu.

Academic Integrity Statement and Policy
"An Aggie does not lie, cheat, or steal or tolerate those who do."
Upon accepting admission to Texas A&M University, a student immediately assumes a commitment to uphold the Honor Code, to accept responsibility for learning, and to follow the philosophy and rules of the Honor System. Students will be required to state their commitment on examinations, research papers, and other academic work. Ignorance of the rules does not exclude any member of the TAMU community from the requirements or the processes of the Honor System.

For additional information please visit: http://aggiehonor.tamu.edu/

Using another student's clicker in an attempt to earn points for that student or allowing another student to use your clicker in an attempt to earn points for you is considered cheating. Having or helping another person complete your OWL assignments is also cheating. Keep in mind, that technology may provide additional methods for you to cheat, but it also provides additional means for the cheating to be detected.

Academic dishonesty will not be tolerated, and will result at a minimum, in a score of zero on the assignment in question.

Course Materials and Copyright Issues
The handouts and other materials used in this course are copyrighted. Here "handouts" means all materials generated for this class, including but not limited to syllabi, quizzes, exams, class slide files, learning objectives, problem sets, and assorted materials appearing on the class website. Because these materials are copyrighted, you do not have the right to copy them for any purpose other than your own personal academic use unless I expressly grant permission. In particular, course materials are not to be given or sold to any profit-seeking enterprise.
### Schedule of Events

Listed below is the tentative outline of events, subject to change. Any changes to exam dates will be announced in advance. I expect you to read the assigned pages before class. Clicker quizzes will include material covered in the reading.

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Reading</th>
<th>OWL DUE Wednesday at 11:59 p.m.</th>
</tr>
</thead>
<tbody>
<tr>
<td>JAN</td>
<td>Syllabus and Course Overview; Chemistry in Our World</td>
<td>1.1-1.6</td>
<td></td>
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<tr>
<td></td>
<td>Elements, Compounds, Mixtures, Symbols</td>
<td>2.1-2.8</td>
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<tr>
<td></td>
<td>Atoms</td>
<td>3.1-3.4</td>
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<tr>
<td></td>
<td>Periodic Table and Trends</td>
<td>3.5-3.8</td>
<td>OWL 1</td>
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<tr>
<td></td>
<td>Electronegativity &amp; Bonding</td>
<td>5.1-5.3</td>
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<tr>
<td></td>
<td>Molecular Shapes &amp; Molecular and Ionic Compounds</td>
<td>5.4-5.7</td>
<td>OWL 2</td>
</tr>
<tr>
<td></td>
<td>States of Matter</td>
<td>5.8-5.13</td>
<td></td>
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<tr>
<td></td>
<td>EXAM 1</td>
<td>Chapters 1-3, 5</td>
<td>OWL 3</td>
</tr>
<tr>
<td></td>
<td>Air and Air Pollution</td>
<td>4.1-4.9</td>
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<td></td>
<td>Carbon Dioxide</td>
<td>4.10-4.11, 6.1-6.5</td>
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<td></td>
<td>Responses to Global Warming</td>
<td>6.6-6.9</td>
<td></td>
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<td></td>
<td>Ozone</td>
<td>7.1-7.4</td>
<td>OWL 4</td>
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<tr>
<td></td>
<td>Ozone Hcle and CFCs</td>
<td>7.5-7.7</td>
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<td></td>
<td>Water and Water Pollution</td>
<td>11.1-11.8</td>
<td>OWL 5</td>
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<td></td>
<td>Water Treatment and Purification</td>
<td>11.9-11.14</td>
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<td></td>
<td>EXAM 2</td>
<td>Chapters 4, 6, 7, 11</td>
<td>OWL 6</td>
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<tr>
<td></td>
<td>spring break</td>
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<td></td>
<td>spring break</td>
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<td></td>
<td>Moles, Chemical Reactions, Rates of Reaction</td>
<td>8.1-8.3</td>
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<td></td>
<td>Chemical Equilibrium</td>
<td>8.4-8.6</td>
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<tr>
<td></td>
<td>Acids and Bases, pH and Molarity, Buffers</td>
<td>9.1-9.6</td>
<td></td>
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<td></td>
<td>Oxidation and Reduction</td>
<td>10.1-10.4</td>
<td>OWL 7</td>
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<tr>
<td></td>
<td>Batteries &amp; Electrochemistry</td>
<td>10.4-10.6</td>
<td></td>
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<tr>
<td></td>
<td>Nuclear Radioactivity and Decay</td>
<td>13.1-13.5</td>
<td>OWL 8</td>
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<tr>
<td></td>
<td>Applications of Radioactivity</td>
<td>13.6-13.10</td>
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<tr>
<td></td>
<td>EXAM 3</td>
<td>Chapters 8-10; 13</td>
<td>OWL 9</td>
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<tr>
<td></td>
<td>Energy from fuels</td>
<td>12.1-12.5</td>
<td></td>
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<tr>
<td></td>
<td>Organic Chemistry</td>
<td>12.6-12.9; 14.1-14.3</td>
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<tr>
<td></td>
<td>Polymer Chemistry</td>
<td>14.4 14.6</td>
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<tr>
<td></td>
<td>Biological polymers, vitamins and additives</td>
<td>15.2-15.8; (not 15.4-15.5); 16.6-16.10</td>
<td>OWL 10</td>
</tr>
<tr>
<td></td>
<td>No class. (Attend Friday classes.)</td>
<td></td>
<td>OWL 11</td>
</tr>
<tr>
<td></td>
<td>Final Exam.</td>
<td>12:30 – 2:30 p.m.</td>
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</tr>
<tr>
<td>MAY</td>
<td>Cumulative, with extra emphasis on Ch. 12, 14,15, 16</td>
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</tbody>
</table>
Chemistry 116: Molecular Science for Citizens Lab

Laboratory Coordinator: Dr. Wendy Keeney-Kennicutt, Rm 116 HELD, k-keeney@tamu.edu

TA: ___________________________ Section: ___________________________

TA Office Hours: ___________________________ Room: ___________________________

TA E-mail: ___________________________

IA: Jose Delgado  IA email: jdelgado@chem.tamu.edu

Required Materials:

- Chem 116 Laboratory Manual will be available on Blackboard Vista (elearning.tamu.edu)
- Lab notebook, 8.5" x 11", perforated, numbered, alternating white and yellow pages
- Scientific calculator
- Approved eye protection: splash proof goggles

Safety: Student safety is a top priority in the Texas A&M Department of Chemistry. Protective eyewear, appropriate clothing and shoes that completely cover your feet are required at all times in the laboratory. Long hair must be held in place at the back of your head. You are responsible for bringing the bands and clips to hold back your hair. The TAs do not have extra rubber bands for this effect. Further safety regulations are listed within the Chemistry 116 laboratory manual. These regulations will be discussed and a safety video will be viewed during the first class meeting. All Chemistry 116 students are required to pass a safety quiz and sign a safety contract given at the conclusion of the first class meeting. *Any student who does not view the safety video, pass the safety quiz or sign the safety contract will not be permitted to continue in Chemistry 116.* The safety guidelines associated with individual experiments are highlighted at the beginning of each experiment. Weekly quiz questions regarding safety should be expected.

Eating, drinking, and smoking are prohibited in the lab. If you have food or drink in your belongings, they should be safely tucked away inside a bag in closed containers that are not brought out or opened during lab. Chewing gum is also prohibited.

All belongings should be stored in the back of the room in the designated area.

If you do not comply with the attire rules, you will be asked to leave the lab to get appropriate clothing. If you do not make it back to complete the lab, you will receive a zero for that particular lab. Safety and Performance points are awarded or deducted based on safe attire and actions—wearing goggles and appropriate clothing; maintaining a clean workspace, being organized and prepared for the day’s activities; and following directions.

TAs are not allowed to exercise discretion in any of these areas. Faculty members will periodically circulate through the lab sections to ensure that both students and TAs are following these instructions. Failure to adhere to any safety regulation while in the laboratory will result in a reduced performance score and/or expulsion from the laboratory.
**Cell Phones and Pagers:** Cell phones, pagers, and other similar devices are NOT permitted. If you insist on using them after being told to turn them off, you will be asked to leave the lab and receive a zero for the missed lab.

**Absences:** Lab make-up will only be granted to those students who have a university excused absence. Two make-up labs will be held throughout the semester, 10/19/12 and 11/16/12. The first make-up will be for any missed experiments 1-5. The second make-up will cover experiments 6-8.

Missed quizzes will be made up the week following the absence and during the scheduled make-up. As an example:

If a Lauren is absent and misses Quiz #2, then she will make it up the following week. Lauren will take Quiz #2 while the rest of the class takes Quiz #3. Lauren will take Quiz #3 during the scheduled make-up.

**Late Policy:** Laboratory assignments will be accepted up to a week late with a 20% reduction in grade. No assignments will be accepted past that period without a university approved excuse. Late assignments should be turned into your TA's mailbox located near the elevators on the 4th floor of Heldenfels.

**Laboratory Assignments:** Assignments associated with experiments comprise the majority of the Chemistry 116 course grade. The points for each grade are subdivided into as many as 4 categories including quizzes, prelabs, safety and performance, and postlabs. There will be one comprehensive final exam which will cover these experiments. A brief description of each component is given below. The point breakdown for all assignments is listed in the schedule found at the end of this syllabus.

**Prelabs:** Pre-Lab exercises are meant to help prepare you for the content of the upcoming experiment. Frequently they will require you to do a reading and answer some questions about that reading. Quiz material will frequently come from these introductory readings and exercises as well as the previous week's experiment. Pre-Lab exercises are located at the end of each experiment.

**Quizzes:** Quizzes occur at the beginning of the laboratory period and will last approximately 15 minutes. The purpose of the quiz is to test both your understanding of the lab you completed and your preparedness for the upcoming experiment. These 20 point quizzes will include approximately 15 points from the previous lab and 5 points from the lab you will be performing that week. Quiz questions are derived from the assigned reading materials found in the lab manual and/or the parts of your Chem 106 textbook assigned to you to read and may cover the following topics: basic calculations, experiment purpose, ecological/environmental issues, and basic chemical concepts. Safety questions may also appear on quizzes.

**Postlabs:** You will be asked to report experimental results in a couple of different formats: a Datasheet or a Technical Abstract. Post lab assignments vary according to the experiment. The required post lab assignments are outlined at the end of each experiment.

**Datasheets:** The calculations and questions included in the datasheets will lead you through the process of analyzing and reporting experimental results. Discussion questions included in each worksheet serve to highlight the significance of the experimental results in a broader context.
Technical Abstracts: A Technical Abstract, an abbreviated form of a scientific research paper, is a 1-2 page summary of an experiment. In Chemistry 116, this more formal type of report follows the format described below.

Title: The title describes the major findings of the experiment.

Author Information: The experiment number, section number, student name, and the names of all lab partners are written below the title.

Introduction: A statement of general interest, the purpose of the experiment, and the scientific principles are given.

Materials and Methods: The major experimental steps are briefly summarized. Experimental variables when significant are mentioned. Experimental variables are included but are not limited to masses, volumes, concentrations, times, and temperatures.

Results: Experimental results are discussed. A chart or table that best represents the data/results is also included in this section.

Conclusions: Conclusions are drawn and major results are restated. Possible sources of error are discussed. At times, you will be asked to discuss additional questions in this section as well which will be outlined at the end of your experiment in a technical abstract section.

All technical abstracts are typed and are roughly two pages in length. A well-written Technical Abstract is clearly written with few to no grammatical errors. A sample Technical Abstract and grading rubric can be found in the foreword of the Chemistry 116 laboratory manual.

Group Presentation: Groups of 3-4 will select a scientific principle to create a presentation aimed at teaching the principle to a class and providing a lesson plan. These presentations should be 10-15 minutes in length.

Final Exam: A final exam will cover all experiments, and safety, will be comprehensive, and will contain both an individual and a group portion. The individual part will be closed book/notes, but you and your group will be allowed to use notes, reports, procedures, quizzes, and books in the group section. The exam typically contains multiple choice, fill-in-the-blank, crossword, and free response questions.

Chemistry Open House: Every year, the chemistry department reaches out to the community to create a day devoted to sparking student’s interests in science. Chemistry 116 students play a special role in this event. Groups of Chem. 116 students will learn about a specific science phenomenon and help explain this phenomenon during Open House. One lab period is set aside to practice demonstrations before the open house. The groups will also create posters to introduce their demonstration.

Open House occurs on Saturday October 27th from 9 A.M. to 4 P.M. (one hour of set up and clean up is included in this timing). If you are unable to attend this event, please obtain permission from the IA. You will be required to complete the following lecture series assignment instead.
Lecture Series: Chemistry 116 students who cannot attend Open House because of a university excused absence are required to attend one of the chemistry lecture series and submit a one page, double-spaced reflection paper describing your reaction to the lecture and how it could be applied to your own life. The speakers and topics will be announced later. These reflections will be due following the lecture (see next page):

<table>
<thead>
<tr>
<th>Lecture Date</th>
<th>Location</th>
<th>Due Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>TBA</td>
<td>Rudder Auditorium</td>
<td>(2 weeks later)</td>
</tr>
<tr>
<td>TBA</td>
<td>Rudder Auditorium</td>
<td>(2 weeks later)</td>
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</tbody>
</table>

Tickets for the lectures can be picked up at the Rudder box office in Rudder Tower free of charge.

Academic Integrity: The Aggie honor code states that “An Aggie does not lie, cheat, or steal or tolerate those who do.” Upon accepting admission to Texas A&M University, a student immediately assumes a commitment to uphold the Honor Code, to accept responsibility for learning, and to follow the philosophy and rules of the Honor System. Students will be required to state their commitment on examinations, research papers, and other academic work. Even though laboratory data is collected in pairs all submitted work must be individual. This means that your lab report must be in your words and your lab partner’s report must be in her/his words. Ignorance of the rules does not exclude any member of the TAMU community from the requirements or the processes of the Honor System. For additional information please visit: [http://www.tamu.edu/aggiehonor](http://www.tamu.edu/aggiehonor).

Disabilities: The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, Cain Hall, Room B-118 or call 845-1637. The Disability Services office is very busy, so please make an appointment with them immediately if you feel you require assistance.
<table>
<thead>
<tr>
<th>Day</th>
<th>Assignment</th>
<th>Points</th>
<th>Quiz</th>
<th>Pre-lab</th>
<th>Safety and Performance</th>
<th>Post-lab</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Friday</td>
<td></td>
<td></td>
<td>20</td>
<td>15</td>
<td></td>
<td></td>
<td>40</td>
</tr>
<tr>
<td>09/07/12</td>
<td>Meet &amp; Greet</td>
<td>20</td>
<td></td>
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<tr>
<td>09/14/12</td>
<td>Exp 1 - Models of the Atom</td>
<td>80</td>
<td></td>
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<tr>
<td>09/21/12</td>
<td>Exp 2 – Graphing</td>
<td>80</td>
<td></td>
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<tr>
<td>09/28/12</td>
<td>Exp 3 – Concepts</td>
<td>80</td>
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<tr>
<td>10/05/12</td>
<td>Exp 4 – Bevo</td>
<td>80</td>
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<tr>
<td>10/12/12</td>
<td>Exp 5 – Copper Cycle</td>
<td>80</td>
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<tr>
<td>10/19/12</td>
<td>Open House Practice / Make-up</td>
<td>25</td>
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<tr>
<td>10/26/12</td>
<td>Exp 6 – Acid/Base</td>
<td>80</td>
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<tr>
<td>10/27/12</td>
<td>Open House</td>
<td>110</td>
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<tr>
<td>11/02/12</td>
<td>Exp 7 – Heat</td>
<td>80</td>
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<tr>
<td>11/09/12</td>
<td>Exp 8 – Chromatography</td>
<td>80</td>
<td></td>
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<tr>
<td>11/16/12</td>
<td>Group Project</td>
<td>45</td>
<td></td>
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<tr>
<td>11/30/12</td>
<td><strong>Final Exam</strong></td>
<td>160</td>
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<tr>
<td><strong>Total</strong></td>
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</tbody>
</table>

It is recommended that you keep track of your grades. Make sure that the grade that appears on your papers are the grades that appear on the e-learning website.

**The final exam will cover all experiments.
Laboratory assignments will not be accepted after 4:00 P.M. Monday December 3rd.
Core Curriculum Cover Sheet

Initial Request for a course to be considered for the Fall 2014 Core Curriculum

1. This request is submitted by (department name): Chemistry

2. Course prefix and number: CHEM 107/117

3. Texas Common Course Number: Click here to enter text.

4. Complete course title: General Chemistry for Engineers

5. Semester credit hours: 3/1

6. This request is for consideration in the following Foundational Component Area:
   - ☐ Communication
   - ☐ Mathematics
   - ☑ Life and Physical Sciences
   - ☐ Language, Philosophy and Culture
   - ☐ Creative Arts
   - ☐ American History
   - ☐ Government/Political Science
   - ☐ Social and Behavioral Sciences

7. This course should also be considered for International and Cultural Diversity (ICD) designation:
   - ☐ Yes
   - ☑ No

8. How frequently will the class be offered? Fall and Spring

9. Number of class sections per semester: Fall 4/42, Spring 3/39

10. Number of students per semester: Fall 1030/993, Spring 931/932


This completed form must be attached to a course syllabus that sufficiently and specifically details the appropriate core objectives through multiple lectures, outside activities, assignments, etc. Representative of department submitting request should be in attendance when considered by the Core Curriculum Council.

13. Submitted by:
   - Course Instructor
   - Date: 3/1/2013

14. Department Head
   - Date: 3/1/13

15. College Dean/Designee
   - Date: 3/13/13

For additional information regarding core curriculum, visit the Texas Higher Education Coordinating Board website at www.thecb.state.tx.us/corecurriculum2014

See form instructions for submission/approval process.
Texas A&M University

Core Curriculum

Initial Request for a Course Addition to the Fall 2014 Core Curriculum

Foundational Component Area: Life and Physical Sciences

In the box below, describe how this course meets the Foundational Component Area description for Life and Physical Sciences. Courses in this category focus on describing, explaining, and predicting natural phenomena using the scientific method. Courses involve the understanding of interactions among natural phenomena and the implications of scientific principles on the physical world and on human experiences.

The proposed course must contain all elements of the Foundational Component Area. How does the proposed course specifically address the Foundational Component Area definition above?

CHEM107/117, a pair of lab and lecture courses with mandatory co-registration, provide an introduction to chemistry for students who intend to pursue a degree program in an Engineering field outside of chemical engineering. The composition, structures, chemical transformations, and properties of molecules and materials form the focus of the course. Students achieve their learning objectives by their participation in lectures, lecture demonstrations, videos, individual and team-based problem solving sessions (in class and out), and laboratory experiments. The implications of a chemical perspective are considered in the context of engineers' interests and needs.

Core Objectives

Describe how the proposed course develops the required core objectives below by indicating how each learning objective will be addressed, what specific strategies will be used for each objective and how student learning of each objective will be evaluated.

The proposed course is required to contain each element of the Core Objective.

Critical Thinking (to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information):

The scientific method is the fundamental basis of both lecture and lab. Lectures introduce knowledge derived from scientific experiments and show how scientific theories have evolved with the need to accommodate new data that revealed the inadequacies of older theories. Lecture exams include questions to assess students' ability for critical thinking, quantitative analysis, and their capacity for synthesizing and integrating information in solving problems. The laboratory component of the course includes pre-lab quizzes to encourage students to understand the concepts and activities they will be performing in the upcoming lab and be fully briefed on any safety precautions they will be expected to take. Chem 117 labs include a blend of synthesis/preparative work, instrumental measurements, qualitative observation, and some assembly of simple instrumentation and chemical apparatus. The laboratory culminates in a final exam that includes all concepts, calculations, and procedures learned during the semester.

Communication (to include effective development, interpretation and expression of ideas through written, oral and visual communication):

The course requires that students learn some of the necessary vocabulary of chemistry, which involves an unfamiliar chemical symbols, chemical formulas, and sentences (chemical reactions expressed in chemical equations). Both lecture and lab utilize visual communication through the preparation and interpretation of graphs, tables, and figures. Students are required to draw and interpret chemical reactions and structures. In the laboratory, several experiments are dedicated to the manipulation and graphical depiction of scientific data and in the communication of how the experiments' objectives have been met in the procedures and apparatus used in each experiment. Lab reports, homework, and exams require students to use this new language to describe and solve problems involving the phenomena they've investigated.
Empirical and Quantitative Skills (to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions):

In consonance with their engineering career path, Chem 107/117 students are required to manipulate and interpret numerical data in terms of chemical theory in every topic of the course. After a quick survey/review of high-school level stoichiometry, they move through a succession of more demanding applications of math and physics to chemical problems. A facility with the use of high-school algebra is assumed and demanded in most exercises. A basic congnisance of error propagation and significant figures is taught and practiced. Ideas from and application of calculus occurs on an occasional basis where pedagogically advantageous – largely to prepare these students for what they will face in their later training. A balance is struck between the concrete observational nature of chemistry and the numerical and abstract mathematical tools needed to fully comprehend observations. We demand and extend students’ knowledge of basic physics (e.g., kinetic and potential energy, momentum, behavior of waves, basic understanding of electrostatics, heat, and quantization of energy) in application to atoms and molecules. Both thermodynamic and chemical kinetic data are discussed in lectures and gathered in the laboratory and subjected to numerical fitting and comparison with expectations/predictions from theory.

Teamwork (to include the ability to consider different points of view and to work effectively with others to support a shared purpose or goal):

Teamwork is an essential part of all laboratory work, since students all work in pairs every week and share all data collected. In the conduct of some experiments, students will work in “pairs of pairs” in the use of shared instrumentation. Students write their own laboratory reports and quickly learn that effective teamwork and communication during the active observational/data-acquisition phase of the experiment is crucial when they must use the data on their own to generate their interpretations and conclusions. Most instructors use ‘clickers’ during the lecture periods and collaboration in answering clicker questions is actively encouraged; learning is reinforced when students informally instruct other students (and lessons are learned by all when wrong answers are arrived at collaboratively)! On-line homework allows for meaningful, graded homework exercises – and in this process of active learning student collaboration is certainly allowed, so long as a balance of individual and group effort is maintained.

Please be aware that instructors should be prepared to submit samples/examples of student work as part of the future course recertification process.
CHEMISTRY 107
General Chemistry for Engineering Students
Fall 2012 — Sections 501 & 502

Instructor: Dr. Larry Brown
Office: 104B Heldenfels (Enter through door marked 104, next to the elevator.)
Office Hours: Monday, Wednesday, Friday, ~10:15—11:15 AM (between my 2 lectures)
Monday, 1:00—2:30 PM
Tuesday, 2:30—4:00 PM
Phone: 845-5755
E-mail: lsbrown@tamu.edu
Website: http://chem107.chem.tamu.edu/brown

Course Objectives

This course is intended to provide engineering students with a background in important concepts and principles of chemistry. (A few non-engineering majors, including physics and geophysics, also require this course.) Emphasis will be placed on those areas considered most relevant in an engineering context, and practical applications in engineering and technology will be examined.

In designing this course, we considered carefully the various reasons why engineering students should learn chemistry, and tried to express them as specific learning objectives. Many of these objectives deal with particular topics or skills, and a detailed listing can be found online at http://chem107.chem.tamu.edu/brown/reading.htm. Some of the most important objectives, though, are more “global” in nature. These goals deal with the overall relationship between chemistry (or science in general) and engineering rather than with the details of any particular chemical principle. The list below summarizes my general aims for the course. I will try to keep these overall objectives in mind throughout the course, and you should, too.

Students successfully completing CHEM 107 should be able to:

- use your knowledge of molecular structure and properties in describing and solving real technological problems.
- explain and appreciate the relationship between experiment and theory in science in general and chemistry in particular.
- demonstrate quantitative problem solving skills in many aspects of chemistry, including stoichiometry, thermochemistry, chemical equilibrium, and reaction kinetics.
- describe the modern theoretical basis for understanding important areas of chemistry, including atomic structure, chemical bonding, and molecular structure.

Relationship to CHEM 117 Lab

Since Fall 2009, CHEM 107 has been a 3-credit lecture only course. The lab component is CHEM 117, a separate 1-credit course. Most of you will be required to take both classes, and my advice is that you try to take them during the same semester. If you have questions about whether or not you are required to take CHEM 117 lab, please check with me or with your advisor.
Required Textbook & Supplies

- Chemistry for Engineering Students, 2nd edition, Lawrence Brown and Thomas Holme (Brooks/Cole-Cengage Learning) The book is available in a number of formats:
  - Traditional hardcover textbook (ISBN 9781439047910, available from bookstores in town, Amazon, etc.)
  - Looseleaf textbook, including e-book access and OWL access code (ISBN 9781133644224, available online at http://www.cengagebrain.com/micro/tamuchem Priced at $80 on the CengageBrain site. May also be available in local bookstores.)
  - E-book only (no paper copy) with OWL access code (Priced at $75, and available only online at http://www.cengagebrain.com/micro/tamuchem)

The last two options both include an OWL access code, which you will NOT need for my class. But those options are both much less expensive than a new hardcover book, and maybe less expensive than a used copy of the hardcover book. You should choose whichever format you believe will work best for you. You will have an option of using OWL to do additional practice problems, but those will not count for course credit.

- iClicker2 classroom responder, usually called a “clicker” (ISBN #1429280476). This is a small electronic device, similar to a remote control. These should be available at the various bookstores in town, or you can also find them online. You will need to bring your clicker to class each day. You are also urged to carry a spare set of batteries for the clicker.

Class Information and Announcements

Announcements regarding schedule changes or other developments will be made in class at the earliest possible time. Information will also be available electronically via e-mail and the web.

Website: http://chem107.chem.tamu.edu/brown
The class website can be found at the above URL. This site offers a broad array of class information, including copies of the slide files used in class, old exams, and announcements.

Electronic Mail
I will often distribute class announcements by e-mail. The only simple way to do this is through the TAMUDirect system, which lets me send mail to the entire class roster. So any message I send out concerning class announcements will always go to your TAMU address. Please be sure to check that account regularly, or to set up a forwarding instruction if you prefer to read a different account.

Grading

Grades will be determined based on the following criteria.

<table>
<thead>
<tr>
<th>Component</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 Hour exams @ 100 pts. each</td>
<td>300 pts.</td>
</tr>
<tr>
<td>1 Final exam @ 150 pts.</td>
<td>150 pts.</td>
</tr>
<tr>
<td>In-class “clicker” questions</td>
<td>30 pts.</td>
</tr>
<tr>
<td>Homework</td>
<td>60 pts.</td>
</tr>
<tr>
<td>total</td>
<td>540 pts.</td>
</tr>
</tbody>
</table>

Please notice that things other than exams (i.e., homework and clicker questions) account for nearly 20% of your grade. Failure to do homework assignments or to attend class and respond to
the clicker questions can drastically lower your course grade! Conversely, good scores on homework and clicker questions can also raise your course grade substantially.

Letter grades will be assigned based on the percentage of the total course points earned, using the following scale. Note that your grade depends only on your scores, and not on class averages.

\[
\begin{align*}
\geq 86 &= A \\
62 - 73 &= C \\
74 - 85 &= B \\
50 - 61 &= D \\
< 50 &= F
\end{align*}
\]

**Hour Exams**
Exams will be given on Fridays, September 21, October 19, and November 16 in our regularly scheduled lecture time. Each exam will focus primarily on material from the 4-week period since the previous exam. All exams may include questions or problems in any format: multiple choice, short answer, numerical problems, etc.

**Missed Exams**
There will be no regularly scheduled make-up exams. In the event that you miss an exam *due to a university-approved absence*, you should consult with me as soon as possible to discuss your situation. If possible, you should discuss your absence with me *before* the exam is given.

**Final Exam**
The Final Exam will be a two-hour, 150-point test covering all material taught during the semester. Final exams are scheduled at the following times.

- **Section 501:**
  - Monday, December 10, 8:00 AM — 10:00 AM
- **Section 502:**
  - Wednesday, December 12, 10:30 AM — 12:30 PM

**Homework**
Homework assignments will be given approximately weekly throughout the semester, and will be handled by the LON-CAPA electronic homework system. (LON-CAPA will be demonstrated in class during the first week.) The homework points to be added to your grade will be determined by calculating the percentage of the assigned problems for which you have received credit. If you have done all the problems, you will receive 60 homework points. Doing half of the problems will get you 30 points, and so on. Please note that the homework counts for slightly more than 10% of your grade, so if you don’t do any of the problems, it will probably cost you a letter grade! More importantly, if you are not working problems regularly you are unlikely to be prepared to do well on exams.

**Clicker Questions**
Starting the week of September 3, most classes will include one or more clicker questions. Most of these questions will be designed to start our discussion of a topic or check to see how well the class understands something we have been working on. Credit for such questions will be awarded to everyone who registers a response. Some clicker questions may act as mini-quizzes, for which credit will be awarded to all those registering a correct response.

The number of points added to your final grade will be based on the fraction of the clicker questions for which you receive credit. In order to allow for a reasonable number of class absences, you will receive the full 40 points if you receive credit for at least 80% of the clicker
questions over the course of the semester. Those who receive credit for less than 80% of the questions will earn points as determined by the following formula:

\[
\text{pts. awarded} = \frac{\text{# clicker questions for which you have credit}}{(0.8) \times \text{total # of clicker questions}} \times 30 \text{ pts}
\]

**Reading Assignments and Class Coverage**

A detailed calendar showing reading assignments associated with each day’s class is posted on the class website, and can be accessed directly at [http://chem107.chem.tamu.edu/brown/reading.htm](http://chem107.chem.tamu.edu/brown/reading.htm).

**Absences**

You are responsible for all material presented in class, even if you should happen to be absent. The slide files from the website and/or notes from a classmate can help you to be sure you know what you might have missed.

If you miss an exam, you will be required to provide suitable documentation that your absence should be excused according to University rules and regulations (Student Rule 7). Whenever possible, you should discuss any upcoming absences with me in advance.

**Course Materials and Copyright Issues**

The handouts and other materials used in this course are copyrighted. Here “handouts” means all materials generated for this class, including but not limited to syllabi, quizzes, exams, lab material, class slide files, learning objectives, problem sets, and assorted materials appearing on the class website. Because these materials are copyrighted, you do not have the right to copy them for any purpose other than your own personal academic use unless I expressly grant permission. In particular, course materials are not to be given or sold to any profit-seeking enterprise.

**Academic Honesty**

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CHEMISTRY 117
General Chemistry for Engineering Students Lab
Fall 2012

Laboratory Coordinator: Dr. Amber Schaefer, HELD 412
aschaefer@chem.tamu.edu

TA: __________________________

TA Office Hours in #116 HELD: __________

TA Email: __________________________

Section: __________________________

Laboratory Room: _________________

Chemistry 117 is a one-credit laboratory course designed for students who are now or have already been enrolled in Chemistry 107.

Prerequisite: The prerequisite for CHEM 117 is concurrent registration in or credit for CHEM 107. “Credit for” means credit recorded on the transcript for passing this course with a passing grade or passing appropriate tests to obtain credit. If you are registered for CHEM 117 and do not have the proper prerequisites you must drop this course. If you drop the co-requisite lecture course, CHEM 107, during the semester, you no longer meet the requirements to be enrolled in this laboratory course. Therefore, CHEM 117 must be dropped at the same time. Student Rule 1.16.4 includes the statement: “If lecture and companion labs are dropped at the same time, this will count as one Q-drop rather than two.” Do not attempt this course without the proper prerequisites.

Required Materials:
- Lab notebook, 8.5" x 11", perforated, numbered, with duplicate (carbonless) copy pages is included with the laboratory manual
- Approved eye protection: Chemical splash goggles (the full face goggles with four indirect vents). These are the ONLY approved eye protection. No other goggles will be allowed.

Learning Outcomes: Experiments in the course will demonstrate fundamental chemical principles taught in the CHEM 107 lecture course and to introduce students to modern topics in chemistry. This laboratory course is also designed to emphasize data analysis and comparisons between observed data and theoretical models.

Safety: Student safety is a top priority in the Texas A&M Department of Chemistry. Protective eyewear, appropriate clothing and shoes that completely cover your feet are required at all times in the laboratory. Appropriate clothing includes pants or long skirts which come all the way down to the ankles so that no parts of the legs or feet are exposed. All Chemistry 111 students are required to accept the Lab Safety Acknowledgement (LSA) on Howdy, pass a safety quiz and sign a safety contract given at the conclusion of the first class meeting. Any student who does not view the safety video, pass the safety quiz and accept the lab safety acknowledgment on HOWDY will not be permitted to continue in Chemistry 111. The safety guidelines associated with individual experiments are highlighted at the beginning of each experiment. Prelab quiz questions regarding safety aspects specific to each experiment should be expected. Failure to adhere to any safety regulation while in the laboratory will result in a reduced performance score and/or expulsion from the laboratory.

Eating, drinking, and smoking are prohibited in the lab at all times. Chewing gum is also prohibited.

Long hair must be held in place to the back of your head. You are responsible for bringing the bands or clips to hold back your hair. Only full-length pants or skirts are allowed in the labs. If you do not comply with the attire
rules, you will be asked to leave the lab to get appropriate clothing. If you do not make it back to complete the lab, you will receive a zero for that particular lab.

All personal belongings are to be placed in the back of the room and any food/drink should be inside a backpack.

Further details on appropriate lab attire and other safety regulations are provided in the lab manual and will be explained during the first class meeting.

**Personal Electronic Devices:** Cell phones, pagers and other personal electronic devices are **NOT** permitted in lab. If you continue to use them after being told not to, you will be asked to leave the lab and you will receive a zero for the missed lab.

**Questions:** If you have any questions regarding the laboratory course or specific experiments, e-mail your TA or go to the help desk in room: 116 HELD. General questions regarding lost and found or other non-technical issues can be sent to chemfyp@chem.tamu.edu.

**Electronic Communications:** All electronic communications with your TA, IA, the FYP office, and the Laboratory Coordinator must be conducted from a tamu email account. All emails should include the student's first and last name, UIN, and the course and section number. Students are responsible for checking their tamu email on a regular basis to receive messages regarding the laboratory course. Students are responsible for verifying that their tamu email on record is correct.

elearning: Your grades for this lab will be posted on the course elearning page, which can be accessed via: elearning.tamu.edu. All supplemental information and/or handouts for experiments not included in your lab manual will be posted on elearning. Furthermore, all prelab quizzes will be conducted as assessments on elearning. For more information regarding these assessments, see the prelab quizzes section under Laboratory Assignments.

**Absences and Make-up Labs:** All students with absences due to University-approved excuses as defined by Student Rule 7 (see http://student-rules.tamu.edu/rule07.htm), will be allowed to make-up missed laboratory work provided the requirements outlined in the student rules are met. In cases where advanced notice of an approved absence cannot be given, students must contact the FYP office **by the end of the second working day after the end of the absence.** All excused absences from lab and make up lab requests must be reported to and processed by the First Year Program office in 412 HELD. Your TA **does not** have the authority to approve a request for a make-up lab or to schedule a make-up experiment. In accordance with student rules, in cases where advanced notice of an approved absence cannot be given, students must contact the FYP office or the laboratory coordinator **by the end of the second working day after the end of the absence.**

An absence for a non-acute medical service (**such as a doctor’s appointment**) does not constitute an excused absence. **Missing lab for not having goggles or other required safety attire is not an excused absence.**

**Assignment Due Dates and Late Policy:** All assignments (DRA sheets or other written assignments) will be due at the beginning of each lab meeting. A three point deduction per day beginning on the due date will be applied to any late assignments. Assignments submitted more than one week after the due date will not be graded.

**Switching Sections:** Once you have registered for a laboratory section, you are **NOT** at any time allowed to switch sections later in the semester unless we have proof that there is a conflict with an exam or you need special accommodations. You have to notify the First Year Program office in 412 HELD **before** the conflict occurs so that we can make arrangements.

**Punctuality:** Arrive to lab on time. Lab sessions begin with important information concerning the procedures to be followed and safety considerations. If you arrive significantly late and if the TA perceives that time to be very
late, he/she may decide not to let you in for that lab session as you will not be able to properly follow the procedures and the safety instructions discussed while doing your lab work.

**Academic Integrity:** The Aggie honor code states that “An Aggie does not lie, cheat, or steal or tolerate those who do.” Upon accepting admission to Texas A&M University, a student immediately assumes a commitment to uphold the Honor Code, to accept responsibility for learning, and to follow the philosophy and rules of the Honor System. Students will be required to state their commitment on examinations, research papers, and other academic work. Ignorance of the rules does not exclude any member of the TAMU community from the requirements or processes of the Honor System. For additional information visit: [http://aggiehonor.tamu.edu/](http://aggiehonor.tamu.edu/)

Each student has to turn in his or her own pre-lab, post-lab and data sheets. **Even though laboratory data is collected in pairs all submitted work must be completed individually.** Copying of the prelab, postlab and data sheets instead of turning in your own original work, written using your own words, is considered cheating. Changing experimental data after leaving lab, making up or borrowing data that you did not obtain in class is also a violation of the honor code. All students found to be in violation of the honor code will be given a grade of 0 for the assignment and a report of the violation will be filed with the Aggie Honor System Office. If any two reports are alike in their entirety or in part, it is considered cheating. Turning in a post-lab and data sheets for a lab you did not complete is also considered cheating.

**Disabilities:** The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, Cain Hall, Room B-118 or call 845-1637. For additional information, visit [http://disability.tamu.edu](http://disability.tamu.edu).

Students wishing to receive accommodations for disabilities for CHEM 111 must submit the appropriate paperwork to the FYP office in HEED 412. Note that we are not responsible for providing any accommodations until the paperwork has been submitted to the office.

**Laboratory Assignments:** Assignments associated with 10 laboratory experiments comprise the majority of the Chemistry 117 course grade. The points for each experiment are divided into as many as four categories, including quizzes, performance and safety, and data reduction and analysis and reports. The other grade component in Chemistry 117 is the final exam. A brief description of each of the course components is given below. A schedule of experiments and a point breakdown for all assignments is listed in the schedule found on the last page of this syllabus.

1. **Pre-lab Quizzes:** A prelab quiz will be administered for each experiment, or portion of an experiment for multi-week projects, in the course. All quizzes are administered as a BlackBoard Vista assessment. (Available through: elearning.tamu.edu) Each prelab quiz is due prior to the beginning of the class meeting in which the experiment is scheduled to be performed. Although use of the laboratory manual cannot be restricted you are required to complete the quizzes individually. Successful completion of the quizzes will require adequate preparation. The quizzes have a strict 30 minute time limit, and must be submitted prior to the expiration of this allotted time. Each new quiz will be made available after 6:00 PM on the day your lab section meets. Since each quiz is available for approximately one week and can be completed at any time, **make up quizzes will not be allowed** even if a student has a university approved excuse for the day the assessment is due. As this is graded course work, all rules and policies regarding the Aggie Honor Code apply to prelab quizzes. Students are responsible for taking and submitting each quiz. **Neither your TA nor the FYP office will submit a quiz for you if you fail to do so.**

The prelab quizzes are designed to test a student’s preparedness for the upcoming experiment. Quiz questions are derived from the reading materials found in the lab manual and may cover but are not limited to the following topics: basic calculations; experimental aim; ecological/environmental issues; analytical
techniques; basic chemical concepts; experimental procedure; and equipment and reagents. A comprehensive reading of the lab materials should sufficiently prepare students to answer all quiz questions. At least one general safety question will be included in each quiz. Answer keys to individual quizzes will be available through list of assessments on elearning, however the keys will not be released until the end of the week each quiz is due.

2. Performance and Safety: The safety and performance grade includes adhering to safety guidelines (goggles and attire), maintaining a clean workspace, and being organized and prepared for the day’s activities. Safety violations will result in lost points and can lead to dismissal from the laboratory. The performance form asks whether each student a) wore goggles throughout the entire exercise; b) was appropriately dressed; c) maintained a clean environment; d) was prepared; and e) followed directions. Each violation costs the student 3 points (making negative scores possible). Recognize that the TAs must strictly follow the rules and are not allowed to exercise discretion in any of these criteria. If the TA is found to be failing these issues during inspections, the TA can lose their job. Students will be allowed to borrow goggles from the stockroom (room 402 HELD), but it will cost 5 points on the safety and performance grade for that experiment. Students must bring their TAMU ID to the stockroom to be able to check out goggles. Goggles are the only component of safety attire that can be borrowed from the stockroom.

3. Data Reduction and Analysis: The laboratory manual provides a series of directions, calculations and questions after each experiment. These exercises are designed to guide students through the analysis of their experimental data. For the experiments, data reduction and analysis assignments will be posted on elearning and are due at the beginning of the following lab period. Any plots or data tables should be completed using an electronic software package such as Microsoft Excel. Paper copies of all tables and plots should be attached to the data reduction and analysis worksheet. A hand-written sample calculation must accompany any calculations performed with electronic spreadsheet.

4. Reports: A full (typed) report will be required for two of the experiments in this course. These experiments are indicated in the syllabus, and the topics to include are provided in the lab manual. Other specific guidelines for lab reports will be provided on elearning. As with other assignments, lab reports will be due at the beginning of the next lab meeting.

5. Exams: One 90 minute final exam is given in CHEM 117. The exam may include multiple-choice, true/false and free-response questions. This exam will be administered in lab during your regular lab time the week of November 26.

There are no opportunities to earn “extra credit” in CHEM 117.

Determination of Final Grades: Student scores from the assignments described above will be summed and grades will be determined using grade dividing lines (cutoffs) that will vary to some extent from section to section. The grade cutoffs will be determined after consultation between your Teaching Assistant and the Laboratory Coordinator. In each laboratory section then, grading will be ‘on the curve’, and while ‘the curves’ will be similar in different sections, they will not be identical. Overall section grade averages will be allowed to vary somewhat since every group of students is different, but the Laboratory Coordinator’s policy will attempt to compensate as much as possible for differences in the grading habits of TAs. Grade cutoffs are not determined by any adherence to a 90/80/70/60 rule – students need to be aware that such a rule is not applied. In many cases, the cutoffs will be lower than these numbers, but it is also possible that they will be higher than these numbers. Please refrain from contacting your TA, IA, the FYP office or the lab coordinator with specific questions regarding the final curve in this course; these questions cannot and WILL NOT be answered.

Final grade assignments will be not be released to students by the TAs or the FYP office. Students will learn their final grades in the course after they are released by the University.

Disclaimer: Any communications or handouts from your IA, the FYP office or Lab Coordinator take precedence over the contents of this syllabus.

Chemistry 117, Fall 2012
### Schedule for Chemistry 117 Spring 2012

<table>
<thead>
<tr>
<th>Week of</th>
<th>Assignment</th>
<th>*Last Day for Make-up Lab</th>
<th>Points</th>
<th>Quiz</th>
<th>Safety and Performance</th>
<th>Data</th>
<th>Reduction and Analysis</th>
<th>Report</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>9/3</td>
<td>Safety (dry lab)</td>
<td>**</td>
<td>20</td>
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<tr>
<td>9/10</td>
<td>Exp. 1: Conservation Laws</td>
<td>9/20</td>
<td>65</td>
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<tr>
<td>9/17</td>
<td>Exp. 2: Aqueous Solutions</td>
<td>9/27</td>
<td>65</td>
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<tr>
<td>9/24</td>
<td>Exp. 3: Gas Laws</td>
<td>10/4</td>
<td>80</td>
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<tr>
<td>10/1</td>
<td>Exp. 5: Nanoparticles</td>
<td>10/11</td>
<td>65</td>
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<tr>
<td>10/8</td>
<td>Exp. 7: Frorn Atoms to Molecules* (Dry Lab)</td>
<td>***</td>
<td>65</td>
<td></td>
<td><strong>Worksheet (45)</strong></td>
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<tr>
<td>10/15</td>
<td>Exp. 9: Intermolecular Forces</td>
<td>10/25</td>
<td>65</td>
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<tr>
<td>10/22</td>
<td>Exp. 15: Conducting Polymers</td>
<td>11/1</td>
<td>65</td>
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<tr>
<td>10/29</td>
<td>Exp. 12: Kinetics of the Iodine Clock</td>
<td>11/8</td>
<td>65</td>
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<tr>
<td>11/5</td>
<td>Exp. 10: Calorimetry</td>
<td>11/15</td>
<td>80</td>
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<tr>
<td>11/12</td>
<td>Exp. 13: Chemical Equilibrium</td>
<td>11/19</td>
<td>65</td>
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<tr>
<td>11/19</td>
<td><strong>Thanksgiving Week</strong></td>
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<td><strong>No labs this week</strong></td>
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<td>11/26</td>
<td>Final Lab Exam</td>
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<td><strong>Total</strong></td>
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<td><strong>800</strong></td>
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</table>

* Students must report to the FYP office in HELD 412 within two days after the end of an absence to schedule a make-up lab. Requests may not be accepted after 3:00 pm on the date indicated.

** Students who miss the safety orientation must make this up BEFORE their next lab meeting.

*** No formal make-up time is scheduled for this week, however, you must schedule a make-up lab with the FYP office within two days after the end of an absence to turn in the assignments for this experiment.
Texas A&M University

Core Curriculum

Initial Request for a lower division course included in the current Core Curriculum
to be considered for the Fall 2014 Core Curriculum

1. This request is submitted by (department name): Geography

2. Course prefix and number: GEOG 203

3. Texas Common Course Number: GEOG 1301

4. Complete course title: Planet Earth

5. Semester credit hours: 3

6. This request is for consideration in the following Foundational Component Area:
   □ Communication
   □ Mathematics
   □ Life and Physical Sciences
   □ Language, Philosophy and Culture
   □ Creative Arts
   □ American History
   □ Government/Psychological Science
   □ Social and Behavioral Sciences

7. This course should also be considered for International and Cultural Diversity (ICD) designation:
   □ Yes  □ No

8. How frequently will the class be offered? Every semester

9. Number of class sections per semester: 5

10. Number of students per semester: 650


   This completed form must be attached to a course syllabus that sufficiently and specifically details the appropriate
   core objectives through multiple lectures, outside activities, assignments, etc. Representative from department
   submitting request should be in attendance when considered by the Core Curriculum Council.

12. Submitted by: Charley Lee
    Course Instructor
    Date: 12/21/12

13. Approvals:
    □ Katie Ruder
    □ Department Head
    Date: January 14, 2013

14. College Dean/Designee
    Date: 1-17-13

For additional information regarding core curriculum, visit the Texas Higher Education Coordinating Board website at
www.thecb.state.tx.us/corecurriculum2014

See form instructions for submission/approval process.
Texas A&M University

Core Curriculum

Initial Request for a Course Addition to the Fall 2014 Core Curriculum

Foundational Component Area: Life and Physical Sciences

In the box below, describe how this course meets the Foundational Component Area description for Life and Physical Sciences. Courses in this category focus on describing, explaining, and predicting natural phenomena using the scientific method. Courses involve the understanding of interactions among natural phenomena and the implications of scientific principles on the physical world and on human experiences.

How does the proposed course specifically address the Foundational Component Area definition above?

GEOG 203 focuses on describing and explaining the earth's surface. We group the surface features into three broad categories (climates, ecosystems, and landforms) that correspond with the three major subdisciplines of contemporary physical geography, namely, climatology, biogeography, and geomorphology. In this course we describe the earth's surface and seek a conceptual understanding of how surface features develop. We use a problem-based approach, as science is at its core a problem-centered endeavor. Students use graphs, maps, quantitative expressions, and conceptual models to understand and predict how earth surface systems operate. Students also gain an understanding of how earth systems (atmosphere, hydrosphere, biosphere, lithosphere) interact to form the landscapes we observe, and how human societies interact with these natural systems. Human interactions with their environments is a fundamental theme in geography.

Core Objectives

Describe how the proposed course develops the required core objectives below by indicating how each learning objective will be addressed, what specific strategies will be used for each objective and how student learning of each objective will be evaluated.

Critical Thinking (to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information):

Students complete problem-based homework assignments that entail learning fundamental concepts and applying those concepts to various hypothetical and actual scenarios. Problem-solving lies at the heart of scientific inquiry; by using a problem-based approach students gain general insights about how science is conducted, in addition to specific insights about concepts in physical geography. Class lectures emphasize problem-solving and the development of a general conceptual framework for understanding topics. The quizzes, tests, and in-class activities reinforce problem-solving creative thinking, analysis, synthesis, concepts, etc.

Communication (to include effective development, interpretation and expression of ideas through written, oral and visual communication):

Physical geography is a visual discipline, as it deals with maps and other representations of the earth’s surface (e.g., satellite images, photographs). It also entails graphical characterizations of processes and patterns. Students learn to interpret and synthesize the information contained in these characterizations via lecture material, homework assignments, in-class activities, and tests. They also conduct their own mapping and graphing, and communicate their interpretations in writing, particularly in the context of in-class and homework assignments.

Empirical and Quantitative Skills (to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions):

Students encounter observable facts about the earth’s surface in every component of the course, whether lectures or reading assignments or tests. They grapple with linking conceptual models to empirical facts. Quantification is an inherent part of characterizing and mapping surface features (e.g., global temperature patterns, biodiversity gradients, stream
Teamwork (to include the ability to consider different points of view and to work effectively with others to support a shared purpose or goal):

Teamwork is integrated into the in-class problem-solving exercises and some of the homework assignments through group exercises, wherein team members collaborate to identify solutions to problems they are given. Each team member contributes insights and information, which are synthesized by the members and summarized in a short report. Students learn the role and limitations of abstract concepts and empirical observations as they relate to problem-solving and to reconciling different points of view about physical geography topics. They also identify and report areas of uncertainty that prevent consensus. The contributions of each student to the process will be assessed by the observations of the instructor, by peer review, and by the student's own reflections.

Please be aware that instructors should be prepared to submit samples/examples of student work as part of the future course recertification process.
Course Description: Rain, wind, heat, and cold; forests; grasslands, and deserts; mountains, rivers, plains, and canyons: these are some of the features that cover the surface of the earth. Geography 203 is a course about the earth’s surface. We’ll group the surface features into three broad categories—climates, ecosystems, and landforms—which correspond with the three major subdisciplines of contemporary physical geography, namely, climatology, biogeography, and geomorphology. Such categories are for our convenience, of course. A glance at any actual landscape shows that even within a small area the earth’s surface contains many different features related to all three categories. In this course, we will explore the earth’s surface and the interconnected processes that operate to bring about its features.

Learning Outcomes: Students will be able to (1) interpret the arrangement of climates, ecosystems, and landforms over the earth’s surface; (2) predict patterns that emerge from the interplay of multiple earth system processes and human actions; (3) explain the manner in which knowledge of the earth’s surface has been gained; (4) analyze some types of data and maps that physical geographers commonly use to study the earth; (5) describe geographic patterns through maps, graphs, and quantitative and written expressions; and (6) solve problems through teamwork.

Instructor: Dr. Charles Lafon
Office: 706B Eiler O&M Building
Office Hours: TR 1:30–3:00 pm; or by appointment
Phone: 862-3677; Geography Dept. phone: 845-7141
E-mail: clafon@geog.tamu.edu
Class Meeting Time and Place: TR 11:10 am–12:25 pm; ZACH 102

Supplemental Instruction (SI): Melissa Taylor (taylor.melissa1@tamu.edu) will lead the SI sessions for this class.


Other Reading Assignments: The daily schedule below lists other reading assignments by the author’s name. PDFs of these essays will be available through the Course Reserves link (under Class Resources) on the University Libraries homepage (http://library.tamu.edu).

Grading: The course grade comprises the following parts:

<table>
<thead>
<tr>
<th>Component</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exam 1</td>
<td>28</td>
</tr>
<tr>
<td>Exam 2</td>
<td>28</td>
</tr>
<tr>
<td>Exam 3</td>
<td>28</td>
</tr>
<tr>
<td>Homework exercises</td>
<td>6</td>
</tr>
<tr>
<td>Quizzes</td>
<td>6</td>
</tr>
<tr>
<td>In-class problem-solving exercises</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
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</tbody>
</table>

I use the standard ten-point grading scale (90-100 = A, 80-89 = B, 70-79 = C, 60-69 = D, ≤ 59 = F), but may adjust the grades upward, if necessary, at the end of the semester.

Students seeking an excused absence on an exam day must notify the professor or the Department of Geography by the end of the next working day following the absence, as described in Texas A&M University Student Rules (http://student-rules.tamu.edu/rule07). Please see the instructor in advance if you know you will not be able to take an exam on the scheduled date.
Course Outline and Daily Schedule (Tentative):
Chapters & page numbers refer to the Christopherson text; the other reading assignments are listed below.

I. INTRODUCTION

<table>
<thead>
<tr>
<th>Week/Day</th>
<th>Date</th>
<th>Topic</th>
<th>Reading assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/T</td>
<td>Aug 28</td>
<td>Introduction</td>
<td>Ch 1</td>
</tr>
<tr>
<td>R</td>
<td>Aug 30</td>
<td>Latitude, longitude, &amp; maps</td>
<td></td>
</tr>
</tbody>
</table>

II. CLIMATES

A) How the earth receives the energy that makes the climate system work

<table>
<thead>
<tr>
<th>Week/Day</th>
<th>Date</th>
<th>Topic</th>
<th>Reading assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>2/T</td>
<td>Sept 4</td>
<td>Earth-sun relationships</td>
<td>Ch 2</td>
</tr>
<tr>
<td>R</td>
<td>Sept 6</td>
<td>Solar radiation &amp; its interaction with the atmosphere</td>
<td>Ch 3 (pp. 60-66), Ch 7 (168-171)</td>
</tr>
<tr>
<td>3/T</td>
<td>Sept 11</td>
<td>Earth's radiation balance</td>
<td>Ch 4 (84-93, 101-103)</td>
</tr>
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</table>

B) How temperature differs between places and changes over time

<table>
<thead>
<tr>
<th>Week/Day</th>
<th>Date</th>
<th>Topic</th>
<th>Reading assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>R</td>
<td>Sept 13</td>
<td>Temperature patterns</td>
<td>Ch 5</td>
</tr>
<tr>
<td>4/T</td>
<td>Sept 18</td>
<td>Past temperatures: reconstructing climate change</td>
<td>Ch 17 (509-521), Flannery ch 11, Alley ch 6</td>
</tr>
<tr>
<td>R</td>
<td>Sept 20</td>
<td>Climate change: causes &amp; effects</td>
<td>Ch 10 (282-289)</td>
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</table>

C) How—and where—the wind blows, and implications for climate patterns

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<thead>
<tr>
<th>Week/Day</th>
<th>Date</th>
<th>Topic</th>
<th>Reading assignment</th>
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</thead>
<tbody>
<tr>
<td>5/T</td>
<td>Sept 25</td>
<td>Atmospheric circulation: processes</td>
<td>Ch 6</td>
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<tr>
<td>R</td>
<td>Sept 27</td>
<td>EXAM 1</td>
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<tr>
<td>6/T</td>
<td>Oct 2</td>
<td>Atmospheric circulation: patterns</td>
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<tr>
<td>R</td>
<td>Oct 4</td>
<td>Atmospheric circulation: patterns</td>
<td></td>
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<tr>
<td>7/T</td>
<td>Oct 9</td>
<td>Oceanic circulation &amp; El Niño-Southern Oscillation</td>
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</tbody>
</table>

D) Moisture in the climate system: humidity and precipitation

<table>
<thead>
<tr>
<th>Week/Day</th>
<th>Date</th>
<th>Topic</th>
<th>Reading assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>R</td>
<td>Oct 11</td>
<td>Atmospheric moisture</td>
<td>Ch 7 (164-174), Ch 9 (224-233)</td>
</tr>
<tr>
<td>8/T</td>
<td>Oct 16</td>
<td>Moisture &amp; atmospheric stability</td>
<td>Ch 7 (175-178)</td>
</tr>
<tr>
<td>R</td>
<td>Oct 18</td>
<td>Precipitation</td>
<td>Ch 7 (178-187), Ch 8 (195-201)</td>
</tr>
</tbody>
</table>

E) The weather and climate of air masses, fronts, and storms

<table>
<thead>
<tr>
<th>Week/Day</th>
<th>Date</th>
<th>Topic</th>
<th>Reading assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>9/T</td>
<td>Oct 23</td>
<td>Air masses &amp; fronts</td>
<td>Ch 8</td>
</tr>
<tr>
<td>R</td>
<td>Oct 25</td>
<td>Midlatitude and tropical cyclones</td>
<td></td>
</tr>
<tr>
<td>10/T</td>
<td>Oct 30</td>
<td>EXAM 2</td>
<td></td>
</tr>
</tbody>
</table>

F) Tying it together: how climates are distributed over the earth's surface

<table>
<thead>
<tr>
<th>Week/Day</th>
<th>Date</th>
<th>Topic</th>
<th>Reading assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>R</td>
<td>Nov 1</td>
<td>Global climates</td>
<td>Skim Ch 10 (251-281)</td>
</tr>
</tbody>
</table>

III. ECOSYSTEMS

A) How organisms are distributed over the earth's surface

<table>
<thead>
<tr>
<th>Week/Day</th>
<th>Date</th>
<th>Topic</th>
<th>Reading assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>11/T</td>
<td>Nov 6</td>
<td>Geographic distributions &amp; factors that control them</td>
<td>Ch 19 (556-565)</td>
</tr>
<tr>
<td>R</td>
<td>Nov 8</td>
<td>Biomes and biodiversity</td>
<td>Skim Ch 20</td>
</tr>
</tbody>
</table>
B) How vegetation responds to storms, fires, and environmental change

12/T  Nov 13  Disturbances & succession

IV. LANDFORMS

A) How landforms come about

R  Nov 15  Denudation, weathering, & karst

B) How gravity molds landforms

13/T  Nov 20  Landslides and other mass movements
R  Nov 22  THANKSGIVING

C) How running water molds landforms

T  Nov 27  Stream systems and streams as geomorphic agents
14/R  Nov 29  Fluvial landforms
T  Dec 4  Fluvial landforms

Final Exam Date and Time: Friday, December 7, 3:00-5:00 pm in our regular classroom

Other Reading Assignments Listed on the Daily Schedule (available from the Library's e-reserves)


- Greene, S.W. 1931. The forest that fire made. *American Forests* 37, pp. 583–584, 618.


ADA Statement: The Americans with Disabilities Act (ADA) is a federal anti discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact the Department of Student Life, Services for Students with Disabilities in Room B118 of Cain Hall. The phone number is 845-1637.

Academic Integrity Statement: An Aggie does not lie, cheat, or steal, or tolerate those who do.

Aggie Honor System Office website: http://aggiehonor.tamu.edu
Texas A&M University

Core Curriculum

Initial Request for a Course Addition to the Fall 2014 Core Curriculum

Foundational Component Area: Life and Physical Sciences

In the box below, describe how this course meets the Foundational Component Area description for Life and Physical Sciences. Courses in this category focus on describing, explaining, and predicting natural phenomena using the scientific method. Courses involve the understanding of interactions among natural phenomena and the implications of scientific principles on the physical world and on human experiences.

How does the proposed course specifically address the Foundational Component Area definition above?

GEOG 203 focuses on describing and explaining the earth's surface. We group the surface features into three broad categories (climates, ecosystems, and landforms) that correspond with the three major subdisciplines of contemporary physical geography, namely, climatology, biogeography, and geomorphology. In this course we describe the earth's surface and seek a conceptual understanding of how surface features develop. We use a problem-based approach, as science is at its core a problem-centered endeavor. Students use graphs, maps, quantitative expressions, and conceptual models to understand and predict how earth surface systems operate. Students also gain an understanding of how earth systems (atmosphere, hydrosphere, biosphere, lithosphere) interact to form the landscapes we observe, and how human societies interact with these natural systems. Human interactions with their environments is a fundamental theme in geography.

Core Objectives

Describe how the proposed course develops the required core objectives below by indicating how each learning objective will be addressed, what specific strategies will be used for each objective and how student learning of each objective will be evaluated.

Critical Thinking (to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information):

Students complete problem-based homework assignments that entail learning fundamental concepts and applying those concepts to various hypothetical and actual scenarios. Problem-solving lies at the heart of scientific inquiry; by using a problem-based approach the students gain general insights about how science is conducted, in addition to specific insights about concepts in physical geography. Class lectures emphasize problem-solving and the development of a general conceptual framework for understanding topics. The quizzes, tests, and in-class activities reinforce problem-solving, creative thinking, analysis, synthesis, concepts, etc.

Communication (to include effective development, interpretation and expression of ideas through written, oral and visual communication):

Physical geography is a visual discipline, as it deals with maps and other representations of the earth's surface (e.g., satellite images, photographs). It also entails graphical characterizations of processes and patterns. Students learn to interpret and synthesize the information contained in these characterizations via lecture material, homework assignments, in-class activities, and tests. They also conduct their own mapping and graphing, and communicate their interpretations in writing, particularly in the context of in-class and homework assignments.

Empirical and Quantitative Skills (to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions):

Students encounter observable facts about the earth's surface in every component of the course, whether lectures or reading assignments or tests. They grapple with linking conceptual models to empirical facts. Quantification is an inherent part of characterizing and mapping surface features (e.g., global temperature patterns, biodiversity gradients, stream
Texas A&M University

Core Curriculum

*Initial Request for a Course Addition to the Fall 2014 Core Curriculum*

discharge) and of describing concepts (e.g., through equations describing relationships between variables).

Teamwork (to include the ability to consider different points of view and to work effectively with others to support a shared purpose or goal):

Students learn the role and limitations of empirical observations as they relate to different points of view about issues such as resource management and climate change. They collaborate through in-class problem-solving activities that require them to apply concepts, communicate with one another, and find answers to the problems.

Please be aware that instructors should be prepared to submit samples/examples of student work as part of the future course recertification process.
3. Change in Courses – Core Curriculum

**BIOL 113. Essentials in Biology**

Course description

From: One-semester survey of basic biological principles, including chemical basis of life, cell biology, bioenergetics, genetics, evolution, anatomy and physiology, reproduction and development, and interaction with the environment. Not suitable for students who plan to take additional courses in the Biology Department. BIOL 123 is the corresponding laboratory course.

To: One-semester in introductory biology for non-majors; chemical basis of life, cellular and molecular biology, genetics, evolution, biodiversity and interaction of organisms with their environment; includes a laboratory to supplement and reinforce lecture topics.

Lab and semester credit hours

From: (3-0). Credit 3.
To: (3-3). Credit 4.

**GEOG 203. Planet Earth.**

Course description

From: Overview of Earth's physical environment including climate, water, landforms, and ecosystems; processes that control these systems and their global distributions; human effects on these processes; topics illustrated through hands-on laboratory activities.

To: Earth’s physical environment including climate, water, landforms, and ecosystems; processes that control these systems and their global distributions; human effects on these processes.

Lab and semester credit hours

From: (3-2). Credit 4.
To: (3-0). Credit 3.

**GEOS 210. Climate change.**

Lab and semester credit hours

From: (3-2). Credit 4.
To: (3-0). Credit 3.
Texas A&M University
Departmental Request for a Change in Course
Undergraduate • Graduate • Professional
Submit original form and attachments •

1. Request submitted by (Department or Program Name): Department of Geography
2. Course prefix, number and complete title of course: GEOG 203, Planet Earth

3. Change requested
   a. Prerequisite(s): From: ______________________________ To: ______________________________
   b. Withdrawal (reason): ______________________________
   c. Cross-list with: _____________________________________________________________________
   d. Change in course title and description. Enter complete current course title and current course description in item 5; enter proposed course title and proposed course description in item 6. Complete item 7 for change in title.
   e. Change in course number, contact hours (lab & lecture), and semester credit hours. Complete item 7. Attach a course syllabus.

4. For informational purposes only, please indicate course number if this course will be stacked: ______________________________

5. Complete current course title and current catalog course description:
   Planet Earth. Overview of Earth's physical environment including climate, water, landforms, and ecosystems; processes that control these systems and their global distributions; human effects on these processes; topics illustrated through hands-on laboratory activities.

6. Complete proposed course title and proposed catalog course description (not to exceed 50 words):
   Planet Earth. Overview of Earth's physical environment including climate, water, landforms, and ecosystems; processes that control these systems and their global distributions; human effects on these processes

7. a. As currently in course inventory:
   
   Prefix  Course #  Title (excluding punctuation)
   GEOG 203  PLANET EARTH
   Lect.  Lab  SCI  CLP and Fund Code  Admin. Unit  HICE Code  Level
   03 02 04 80 60 10 00 0 1 2 5 0 0 3 6 3 2 2

   b. Change to:
   
   Prefix  Course #  Title (excluding punctuation)
   GEOG 203  PLANET EARTH
   Lect.  Lab  SCI  CLP and Fund Code  Admin. Unit  Acad. Year  HICE Code  Level
   03 00 03 80 60 10 00 2 1 2 5 0 1 4 1 5 0 0 3 6 3 2

   Approval recommended by:
   
   [Signature]
   [Name]
   [Title]
   [Date]

   Chair, College Review Committee
   [Signature]
   [Name]
   [Title]
   [Date]

   Dean of College
   [Signature]
   [Name]
   [Title]
   [Date]

   Chair, GC or UCC
   [Signature]
   [Name]
   [Title]
   [Date]

   [Signature]
   [Name]
   [Title]
   [Date]

   [Signature]
   [Name]
   [Title]
   [Date]

   Questions regarding this form should be directed to Sandra Williams at 845.8203 or sandra.williams@tamu.edu
   Curricular Services – 02/11
GEOG 203: Supporting Statement for Change in Item 6

We are removing the text, "topics illustrated through hands-on laboratory activities" from the catalog description. This change reflects the decoupling of GEOG 203 from its lab, which will be available separately as GEOG 213.
Texas A&M University
Core Curriculum

Initial Request for a lower division course included in the current Core Curriculum
to be considered for the Fall 2014 Core Curriculum

1. This request is submitted by (department name): ATMO

2. Course prefix and number: GEOS 210

3. Texas Common Course Number: N/A

4. Complete course title: Climate Change

5. Semester credit hours: 3

6. This request is for consideration in the following Foundational Component Area:
   - [ ] Communication
   - [ ] Mathematics
   - [x] Life and Physical Sciences
   - [ ] Language, Philosophy and Culture
   - [ ] Creative Arts
   - [ ] American History
   - [ ] Government/Political Science
   - [ ] Social and Behavioral Sciences

7. This course should also be considered for International and Cultural Diversity (ICD) designation:
   - [ ] Yes
   - [x] No

8. How frequently will the class be offered? every semester

9. Number of class sections per semester: 3

10. Number of students per semester: 50-60

11. Historic annual enrollment for the last three years: 68 106 N/A

This completed form must be attached to a course syllabus that sufficiently and specifically details the appropriate core objectives through multiple lectures, outside activities, assignments, etc. Representative from department submitting request should be in attendance when considered by the Core Curriculum Council.

13. Submitted by:

   [Signature]

   Course Instructor

   [Signature]

   Approvals:

   [Signature] 2/11/2013

   Date

14. Department Head

   [Signature] 2/11/2013

   Date

15. College Dean/Designee

   [Signature] 2/11/13

   Date

For additional information regarding core curriculum, visit the Texas Higher Education Coordinating Board website at www.thecb.state.tx.us/corecurriculum2014

See form instructions for submission/approval process.
Texas A&M University
Core Curriculum
Initial Request for a Course Addition to the Fall 2014 Core Curriculum

Foundational Component Area: Life and Physical Sciences

In the box below, describe how this course meets the Foundational Component Area description for Life and Physical Sciences. Courses in this category focus on describing, explaining, and predicting natural phenomena using the scientific method. Courses involve the understanding of interactions among natural phenomena and the implications of scientific principles on the physical world and on human experiences.

How does the proposed course specifically address the Foundational Component Area definition above?

Climate change is one of the most important problems presently facing our society. As a result, it is imperative that students understand and be able to evaluate the competing claims made in the public debate over climate change. Specific objectives of the class include: develop an understanding of the physics of climate change, understand how the scientific method has been used to construct our current understanding of the problem, evaluate the ethical, economic, and environmental implications of climate change to our society, and understand the major policy options available to us.

Core Objectives

Describe how the proposed course develops the required core objectives below by indicating how each learning objective will be addressed, what specific strategies will be used for each objective and how student learning of each objective will be evaluated.

Critical Thinking (to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information):

Climate change fundamentally requires critical thinking. The climate problem involves physics, biology, economics, philosophy, and other fields. Understanding climate therefore requires integrating, evaluating, and synthesizing ideas and concepts from diverse intellectual areas. These skills will be tested by the exams, which feature short answer questions that require students to demonstrate these skills.

Communication (to include effective development, interpretation and expression of ideas through written, oral and visual communication):

At the end of every class, I select a random group of 3-4 students to summarize the important messages from that day’s lecture. This requires the students to understand, synthesize, and summarize a huge body of complex information. Using a rubric that I have provided, the rest of the class will then grade that group’s summary (and transmit the grades to me via clickers).

Empirical and Quantitative Skills (to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions):

Mathematical calculations are an important component of the class. The first half of the class focuses on understanding how the greenhouse effect works and other aspects of the climate system. In studying this, the students learn and apply fundamental physical laws such as the Stefan-Boltzmann equation and work problems using it requiring algebra. During the discussions of policy options, the students learn about exponential discounting and use algebra to do simple cost-benefit analysis.

Teamwork (to include the ability to consider different points of view and to work effectively with others to support a shared purpose or goal):
Texas A&M University

Core Curriculum

Initial Request for a Course Addition to the Fall 2014 Core Curriculum

Role-playing exercises are an important component of the instruction about the policy options. For example, when studying the “tragedy of the commons”, the students engage in an exercise in which they must work together to manage a hypothetical resource. In this exercise, the students learn that their individual incentives may not always align with society’s best interests.

Please be aware that instructors should be prepared to submit samples/examples of student work as part of the future course recertification process.
GEOS 210 – Climate change
Tu-Th 11:10-12:25 O&M 110
Fall 2012 (will be changed to appropriate semester)

Course Description: Climate change is one of the most important problems presently facing our society. As a result, it is imperative that students understand the basics of the climate change problem and be able to evaluate the competing claims made in the public debate over climate change. By the end of the semester, it is my goal that the student will be the most informed person on climate change in any room he or she happens to be in.

Lecturer:
Prof. Andrew Dessler
O&M 1210b
adessler@tamu.edu, 862-1427
Office hours: M 1-2 pm, Th 12:30-1:30 pm
(after lecture), or by appointment


Learning Outcomes
Upon successful completion of this course, students will be able to:
* Articulate why scientists think the present warming of the climate system is unequivocal.
* Describe how the greenhouse effect works and how humans are modifying the natural greenhouse effect.
* Articulate why scientists are confident that humans have become the dominant influence on the long-term evolution of climate.
* Explain how climate forecasts are produced and what scientists predict for the next century and millennium.
* Explain how climate changes will impact humans; give specific examples.
* Appraise, compare, and distinguish our policy options.
* Describe how a cap and trade and a carbon tax work.
* Appreciate what level of effort and what specific actions would be required to stabilize the climate.

Core objectives
Critical thinking: The climate problem involves physics, biology, economics, philosophy, and other fields. Understanding climate therefore requires integrating, evaluating, and synthesizing ideas and concepts from diverse intellectual areas.
Communication: During every class, a randomly selected (small) group of students will be required to summarize that day’s lecture and report to the entire class their results.
This requires the students to understand, synthesize, and summarize a huge body of complex information.

Empirical and quantitative skills: Mathematical calculations are an important component of the class. Understanding how the greenhouse effect works and other aspects of the climate system requires the students learn and apply fundamental physical laws such as the Stefan-Boltzmann equation. During the discussions of policy options, the students learn about exponential discounting and use algebra to do simple cost-benefit analysis.

Teamwork: Role-playing exercises will be used to demonstrate the pitfalls that policy discussions can fall into. For example, when studying the “tragedy of the commons”, the students engage in an exercise in which they must work together to manage a hypothetical resource. In this exercise, the students learn that their individual incentives may not always align with society’s best interests.

Studying Tips: With the amount of material to cover during one semester, it is easy to get behind in an introductory course. In this course, we will constantly be building on what has been done before. Therefore, it is particularly important to attend class and to keep up with the reading. A little bit each day is much more effective than five hours in one session of study. You should be spending about 2 hours, outside class for every hour you spend in class. Since this is an introductory course, it is important to learn the terminology to understand what is being asked on exam questions. After each class, I strongly recommend you review your lecture notes, supplementing them with readings from the text.

Exam scores, additional readings, announcements, and other information (such as this syllabus) will be posted on TAMU eLearning, which is accessed by going to http://elearning.tamu.edu. Go to the “TAMU (NetID)” link. You will need your NetID and password.

Class evaluation:

<table>
<thead>
<tr>
<th>Points</th>
<th>Fraction of grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 exams 100 points each (200 points total)</td>
<td>25% each (50% total)</td>
</tr>
<tr>
<td>Clicker questions 40 points total (120 clicker questions during the semester @ 1/3 point per question)</td>
<td>10%</td>
</tr>
<tr>
<td>Class round-up 40 points total over the semester</td>
<td>10%</td>
</tr>
<tr>
<td>Final exam 120 points</td>
<td>30%</td>
</tr>
<tr>
<td>Total 400 points</td>
<td>100%</td>
</tr>
</tbody>
</table>

Grade Scale
A: 350-400 points (88-100%)
B: 310-349 (78-88%)
C: 270-309 (68-78%)
D: 230-269 (58-68%)
Exams are multiple choice, short-answer, and numeric questions. You need to bring a calculator to your exams.

Clickers: We will use a classroom response system (aka “clickers”) in this class. We will be using the i>clicker2 in this class. Here are some helpful links:
Register your clicker: http://www.iclicker.com/support/registeryourclicker/
Rebate for CPS clicker owners: http://www.iclicker.com/Customers/education/TexasAMUniversityRebate/
i>clicker support: http://www.iclicker.com/support/overview/

Clicker questions will be given at the beginning of each class. There will be ~120 questions during the semester (4-5 per class) and these will be on the reading assigned for that day or important concepts from a previous lecture.

Class round-up: At the end of every class, I select 2-3 random groups of 3-4 students each and ask them to summarize the important messages from that day’s lecture. This requires the students to understand, synthesize, and summarize a huge body of complex information. Using a rubric that I have provided, the rest of the class will then grade that group’s summary (and transmit the grades to me via clickers). This constitutes 10% of the students’ grade.

Extra credit for participation: participation is measured by the acquisition of “Schrute bucks” when you say something smart in class — they are worth 2 points each on the final exam. You can, in general, only get one per day, and you can get a maximum of 10 points of E.C. or the final.

Facebook group: http://www.facebook.com/groups/266153916758531/
I will post news articles, etc. The material posted will not be covered on exams, but it will help connect what we’re learning in class to the actual world. Thus, while optional, I recommend you join the group and read the posted articles.

Attendance Policy: Attendance will not be taken and will not count toward your grade.

Absence Policy: This class will follow the University’s policy for excused absences. For more information, please see Section 7 of the student rules:
http://student-rules.tamu.edu/rule07

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact the Department of Student Life. Services for Students with Disabilities in Room B118 of Cain Hall. The phone number is 845-1637. For additional information visit http://disability.tamu.edu.
Copyright and Plagiarism Policy
All materials used in this class are copyrighted. These materials include but are not limited to syllabi, quizzes, exams, lab problems, in-class materials, review sheets, and additional problem sets. Because these materials are copyrighted, you do not have the right to copy the handouts, unless permission is expressly granted.

As commonly defined, plagiarism consists of passing off as one's own the ideas, words, writings, etc., which belong to another. In accordance with this definition, you are committing plagiarism if you copy the work of another person and turn it in as your own, even if you should have the permission of that person. Plagiarism is one of the worst academic sins, for the plagiarist destroys the trust among colleagues without which research cannot be safely communicated.

If you have any questions regarding academic dishonesty, please consult the Aggie Honor web site: http://aggiehonor.tamu.edu/

Know the Code
Aggie Code of Honor: “Aggies do not lie, cheat, or steal, nor do they tolerate those who do.” Instances of scholastic dishonesty will be treated in accordance with Section 20 of the TAMU Student Rules. Please inform yourself on the student rules regarding cheating, plagiarism, fabrication of information, conspiracy at the Code of Honor website (http://aggiehonor.tamu.edu).

Note: Using another student’s clicker in an attempt to earn points for that student or allowing another student to use your clicker in an attempt to earn points for you is considered cheating, and will be handled as such.
<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aug 28, 2012</td>
<td>Intro to the class &amp; climate debate</td>
<td>Chapter 1</td>
</tr>
<tr>
<td>Aug 30, 2012</td>
<td>Introduction to climate change</td>
<td>Chapter 2</td>
</tr>
<tr>
<td>Sep 4, 2012</td>
<td>Is the climate warming, I</td>
<td>Chapter 3</td>
</tr>
<tr>
<td>Sep 6, 2012</td>
<td>Is the climate warming, II</td>
<td>Chapter 4</td>
</tr>
<tr>
<td>Sep 11, 2012</td>
<td>Simple physics, I</td>
<td>Chapter 5</td>
</tr>
<tr>
<td>Sep 13, 2012</td>
<td>Simple physics, II</td>
<td></td>
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<tr>
<td>Sep 18, 2012</td>
<td>How the greenhouse works, I</td>
<td></td>
</tr>
<tr>
<td>Sep 20, 2012</td>
<td>How the greenhouse works, II</td>
<td></td>
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<tr>
<td>Sep 25, 2012</td>
<td>Carbon cycle, I</td>
<td></td>
</tr>
<tr>
<td>Sep 27, 2012</td>
<td><strong>Exam 1 (covers chap. 1-4)</strong></td>
<td></td>
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<tr>
<td>Oct 2, 2012</td>
<td>Carbon cycle, II</td>
<td>Chapter 6</td>
</tr>
<tr>
<td>Oct 4, 2012</td>
<td>Forcing and feedback, I</td>
<td></td>
</tr>
<tr>
<td>Oct 9, 2012</td>
<td>Forcing and feedback, II</td>
<td></td>
</tr>
<tr>
<td>Oct 11, 2012</td>
<td>Are humans causing climate change?</td>
<td>Chapter 7</td>
</tr>
<tr>
<td>Oct 16, 2012</td>
<td>Future climate change, I</td>
<td>Chapter 8</td>
</tr>
<tr>
<td>Oct 18, 2012</td>
<td>Future climate change, II</td>
<td></td>
</tr>
<tr>
<td>Oct 23, 2012</td>
<td>Impacts of climate change,</td>
<td></td>
</tr>
<tr>
<td>Oct 25, 2012</td>
<td><strong>Exam 2 (covers chap. 5-8)</strong></td>
<td></td>
</tr>
<tr>
<td>Oct 30, 2012</td>
<td>Exponentials and discounting, I</td>
<td>Chapter 9</td>
</tr>
<tr>
<td>Nov 1, 2012</td>
<td>Exponentials and discounting, II</td>
<td></td>
</tr>
<tr>
<td>Nov 6, 2012</td>
<td>Policy options for climate change, I</td>
<td>Chapter 10</td>
</tr>
<tr>
<td>Nov 8, 2012</td>
<td>Policy options for climate change, II</td>
<td></td>
</tr>
<tr>
<td>Nov 13, 2012</td>
<td>Carbon tax &amp; cap and trade, I</td>
<td>Chapter 11</td>
</tr>
<tr>
<td>Nov 15, 2012</td>
<td>Carbon tax &amp; cap and trade, II</td>
<td></td>
</tr>
<tr>
<td>Nov 20, 2012</td>
<td>History of climate change, I</td>
<td>Chapter 12</td>
</tr>
<tr>
<td>Nov 22, 2012</td>
<td><strong>thanksgiving holiday — no class</strong></td>
<td></td>
</tr>
<tr>
<td>Nov 27, 2012</td>
<td>History of climate change, II</td>
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</tr>
<tr>
<td>Nov 29, 2012</td>
<td>Solving the problem</td>
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</tr>
<tr>
<td>Dec 4, 2012</td>
<td>TBD</td>
<td></td>
</tr>
<tr>
<td>Dec 7, 2012</td>
<td><strong>Final Exam (covers chap. 1-14)</strong></td>
<td>3-5 pm</td>
</tr>
</tbody>
</table>
3. Change in Courses – Core Curriculum

**BIOL 113. Essentials in Biology**

**Course description**

From: One-semester survey of basic biological principles, including chemical basis of life, cell biology, bioenergetics, genetics, evolution, anatomy and physiology, reproduction and development, and interaction with the environment. Not suitable for students who plan to take additional courses in the Biology Department. BIOL 123 is the corresponding laboratory course.

To: One-semester in introductory biology for non-majors; chemical basis of life, cellular and molecular biology, genetics, evolution, biodiversity and interaction of organisms with their environment; includes a laboratory to supplement and reinforce lecture topics.

**Lab and semester credit hours**

From: (3-0). Credit 3.
To: (3-3). Credit 4.

**GEOG 203. Planet Earth.**

**Course description**

From: Overview of Earth’s physical environment including climate, water, landforms, and ecosystems; processes that control these systems and their global distributions; human effects on these processes; topics illustrated through hands-on laboratory activities.

To: Earth’s physical environment including climate, water, landforms, and ecosystems; processes that control these systems and their global distributions; human effects on these processes.

**Lab and semester credit hours**

From: (3-2). Credit 4.
To: (3-0). Credit 3.

**GEOS 210. Climate change.**

**Lab and semester credit hours**

From: (3-2). Credit 4.
To: (3-0). Credit 3.
Texas A&M University
Departmental Request for a Change in Course
Undergraduate • Graduate • Professional
• Submit original form and attachments •

1. Request submitted by (Department or Program Name): Department of Atmospheric Sciences

2. Course prefix, number and complete title of course:
   GEOS 210: Climate change

3. Change requested
   a. Prerequisite(s): From: ____________________________ To: ____________________________
   b. Withdrawal (reason): ____________________________
   c. Cross-list with: ____________________________
   d. Change in course title and description. Enter complete current course title and current course description in item 5; enter proposed course title and proposed course description in item 6. Complete item 7 for change in title.
   e. Change in course number, contact hours (lab & lecture), and semester credit hours. Complete item 7. Attach a course syllabus.

4. For informational purposes only, please indicate course number if this course will be stacked:

5. Complete current course title and current catalog course description:

6. Complete proposed course title and proposed catalog course description (not to exceed 50 words):

7. a. As currently in course inventory:

   Prefix | Course # | Title (excluding punctuation) | Lect | Lab | SGII | CIP and Fund Code | Admin. Unit | FICE Code | Level |
   --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
   GEOS | 210 | CLIMATE CHANGE | 03 | 02 | 04 | 4006010002 | 1320 | 0036322 |

   b. Change to:

   Prefix | Course # | Title (excluding punctuation) | Lect | Lab | SGII | CIP and Fund Code | Admin. Unit | FICE Code | Level |
   --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
   GEOS | 210 | CLIMATE CHANGE | 03 | 00 | 03 | 4006010002 | 1320 | 14150036322 |

   Approval recommended by: ____________________
   Date: 2/4/2013
   Chair, College Review Committee:
   Date: ____________________
   Dean of College:
   Date: 2/11/2012

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra.williams@tamu.edu.
Curricular Services – 02/11
Texas A&M University

Core Curriculum

Initial Request for a lower division course included in the current Core Curriculum
to be considered for the Fall 2014 Core Curriculum

1. This request is submitted by (department name): Physics and Astronomy

2. Course prefix and number: PHYS 211

3. Texas Common Course Number: 1301 + 1101

4. Complete course title: College Physics

5. Semester credit hours: 4

6. This request is for consideration in the following Foundational Component Area:
   - [☐] Communication
   - [☐] Mathematics
   - [☒] Life and Physical Sciences
   - [☐] Language, Philosophy and Culture
   - [☐] Creative Arts
   - [☐] American History
   - [☐] Government/Political Science
   - [☐] Social and Behavioral Sciences

7. This course should also be considered for International and Cultural Diversity (ICD) designation:
   - [☐] Yes
   - [☒] No

8. How frequently will the class be offered? every fall, spring, summer

9. Number of class sections per semester:
   - fall: 26
   - spring: 16
   - summer: 4

10. Number of students per semester:
    - fall: 550
    - spring: 350
    - summer: 60

11. Historic annual enrollment for the last three years: 1111 1147 1137

This completed form must be attached to a course syllabus that sufficiently and specifically details the appropriate core objectives through multiple lectures, outside activities, assignments, etc. Representative from department submitting request should be in attendance when considered by the Core Curriculum Council.

13. Submitted by:
    Course Instructor
    Approvals:
    Department Head
    College Dean/Designee

14. Date
    3/4/2013

For additional information regarding core curriculum, visit the Texas Higher Education Coordinating Board website at www.thecb.state.tx.us/corecurriculum2014

See form instructions for submission/approval process.
Texas A&M University
Core Curriculum

Initial Request for a Course Addition to the Fall 2014 Core Curriculum

Foundational Component Area: Life and Physical Sciences

In the box below, describe how this course meets the Foundational Component Area description for Life and Physical Sciences. Courses in this category focus on describing, explaining, and predicting natural phenomena using the scientific method. Courses involve the understanding of interactions among natural phenomena and the implications of scientific principles on the physical world and on human experiences.

The proposed course must contain all elements of the Foundational Component Area. How does the proposed course specifically address the Foundational Component Area definition above?

PHYS 201 College Physics. PHYS 201 teaches fundamental laws of physics and their application to mechanics, wave motion and thermodynamics. The physics concepts and laws are related to real-world phenomena and technology.

Core Objectives

Describe how the proposed course develops the required core objectives below by indicating how each learning objective will be addressed, what specific strategies will be used for each objective and how student learning of each objective will be evaluated.

The proposed course is required to contain each element of the Core Objective.

Critical Thinking (to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information):

Problem solving is a primary emphasis of the course. Students are taught how to apply physics laws and concepts to solving problems and analyzing data.

Communication (to include effective development, interpretation and expression of ideas through written, oral and visual communication):

Students are taught to present their solutions to problems in a clear and logical fashion. Constructing diagrams and sketches is an important component of problem solving. Graded homework problems include essay questions.

Empirical and Quantitative Skills (to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions):

Homework and exam problems include analysis of data and numerical information. In the laboratory data is collected and analyzed and conclusions are reached.

Teamwork (to include the ability to consider different points of view and to work effectively with others to support a shared purpose or goal):

The laboratory is conducted by teams of two students. The two members of the team must work together to collect and analyze data and to draw conclusions. Discussion in lecture and recitation involves considering different ways to approach a problem and working together to achieve the solution.
PHYS 201 College Physics  Fall 2012   MWF 9:10

Course Description: Fundamentals of classical mechanics, heat and sound.
Prerequisites: High school algebra and trigonometry or the equivalent.
Learning Outcomes: Upon completion of PHYS 201 a student will understand the basic laws and concepts of physics in the following areas and will be able to apply them in problems relating to physical situations: mechanics, mechanical waves, and thermodynamics.

Instructor: Lewis Ford  Web page: faculty.physics.tamu.edu/ford   email: ford@physics.tamu.edu
Office: MPHY 315  Office Hours: M 11 a.m.-noon, T 11- noon, W 1-2 p.m. Office phone: 458-7908
Text: Physics 9th ed by Young, with Mastering Physics; PHYS 201 Lab Manual
Optional: Student Solutions Manual, Student Study Guide
Grading: 4 exams 60%; Final (comprehensive) 20%; Lab 7%; Recitation 5%; Homework (Mastering Phys) 8%
You must achieve 70% or better in the laboratory in order to pass the course.
If your grade on the Final Exam is higher than your lowest grade on one of the four exams during the semester, that lowest grade will be replaced by its average with the Final in computing the course grade.
Aug. 31 is last day for no record drop. Nov. 2 is the last day to Q-drop.
Final Exam is Monday, Dec. 10, 8-10 a.m.

Syllabus: (MC denotes multiple-choice problems)

<table>
<thead>
<tr>
<th>Wk</th>
<th>Date</th>
<th>Topic</th>
<th>Sect. in Text</th>
<th>Homework problems</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Aug. 27</td>
<td>Units; Vectors</td>
<td>1: 1-6</td>
<td>1: MC6,9,13</td>
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<td></td>
<td>Aug. 29</td>
<td>Vector Addition; Components</td>
<td>1: 7-8</td>
<td>1: P2,5,9,44,45,46,49,61,62</td>
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<td></td>
<td>Aug. 31</td>
<td>Velocity; Acceleration</td>
<td>2: 1-3</td>
<td>2: MC3,12,13; P3,6,12,17,20</td>
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<td>2</td>
<td>Sept. 3</td>
<td>Constant Acceleration</td>
<td>2: 4-6</td>
<td>2: MC5,10,14,15; P3,4,35,40,45,46,49</td>
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<td></td>
<td>Sept. 5</td>
<td>Projectiles</td>
<td>3: 1-3</td>
<td>2: P5,4,5,7,5,5,4,6,7,7,7</td>
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<td>Sept. 7</td>
<td>Circular Motion; Rel. Velocity</td>
<td>3: 4-5; 2: 7</td>
<td>3: MC1,2,6,8,13; P5,8,11,13,20,22</td>
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<td>3: 23,30,38,40,41,48,52,57,61,62,63</td>
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<td>3</td>
<td>Sept. 10</td>
<td>Newton’s laws</td>
<td>4: 1-5</td>
<td>4: MC5,15,16; P5,11,20,37,42,49,50</td>
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<td></td>
<td>Sept. 12</td>
<td>Free-Body Diagrams</td>
<td>4: 6</td>
<td>4: P5,1,52,54</td>
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<td></td>
<td>Sept. 14</td>
<td>F = me Examples</td>
<td>5: 1-2</td>
<td>5: MC3,4,8,13; P3,6,12,16,23,24,29</td>
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<td>4</td>
<td>Sept. 17</td>
<td>Friction; Springs</td>
<td>5: 3-5</td>
<td>5: MC12; P3,3,37,46,47,48,50,</td>
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<td></td>
<td>Sept. 19</td>
<td>Examples; Review</td>
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<td>5: P6,66,71,72,76,81,87</td>
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<td>Sept. 21</td>
<td>Exam 1 Chs. 1-5</td>
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<td>5</td>
<td>Sept. 24</td>
<td>Circular Motion</td>
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<td>6: MC1,4,6,15; P5,6,10,14,25,27,33,38</td>
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<td>Sept. 26</td>
<td>Gravity; Satellite Motion</td>
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<td>6: P4,5,4,7,2,5,4,5,5,5</td>
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<td>Sept. 28</td>
<td>Work; Energy</td>
<td>7: 1-4</td>
<td>7: MC7; P5,5,6,18,21,24,25</td>
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<td>6</td>
<td>Oct. 1</td>
<td>Conservation of Energy</td>
<td>7: 5-6</td>
<td>7: MC5,8,13,14, P3,3,3,33,45,48,52,54</td>
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<td>Oct. 3</td>
<td>Nonconservative Forces; Power</td>
<td>7: 7-8</td>
<td>7: P5,8,5,9,6,2,6,7,5,5,5,5,5,5,5</td>
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<td>Oct. 5</td>
<td>Momentum; Collisions</td>
<td>8: 1-4</td>
<td>8: MC1,7,8,9,11; P3,1,2,4,16,17,19,23</td>
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<td>8: P2,5,26,29</td>
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<td>7</td>
<td>Impulse; Center of Mass</td>
<td>Review</td>
<td>Exam 2 Chs 6--8</td>
<td>Rotational Kinematics</td>
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<td></td>
<td></td>
<td>8: 5-7</td>
<td>8: P40,42,60,61,63,65,66,69,80</td>
</tr>
</tbody>
</table>

**Americans with Disabilities Act (ADA) Policy Statement:** The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact the Department of Student Life, Services for Students with Disabilities, in Cain Hall, Room B118, or call 845-1637. For additional information visit http://disability.tamu.edu.

**Academic Integrity Statement:** "An Aggie does not lie, cheat, or steal or tolerate those who do." Visit The Honor Council Rules and Procedures may be found on the web at http://www.tamu.edu/aggiehonor.
Texas A&M University
Core Curriculum

*Initial Request for a lower division course included in the current Core Curriculum to be considered for the Fall 2014 Core Curriculum*

1. This request is submitted by (department name): Physics and Astronomy
   PHYS 1402 or

2. Course prefix and number: PHYS 202
   Texas Common Course Number: 1302 + 1102

3. Complete course title: College Physics
   Semester credit hours: 4

4. This request is for consideration in the following Foundational Component Area:
   - Communication
   - Creative Arts
   - Mathematics
   - American History
   - Life and Physical Sciences
   - Government/Political Science
   - Language, Philosophy and Culture
   - Social and Behavioral Sciences

5. This course should also be considered for International and Cultural Diversity (ICD) designation:
   - Yes
   - No

8. How frequently will the class be offered? every fall, spring, summer

9. Number of class sections per semester:
   - fall: 9 spring: 14 summer: 2

10. Number of students per semester:
    - fall: 190 spring: 280 summer: 40

11. Historic annual enrollment for the last three years: 632 696 729

This completed form must be attached to a course syllabus that sufficiently and specifically details the appropriate core objectives through multiple lectures, outside activities, assignments, etc. **Representative from department submitting request should be in attendance when considered by the Core Curriculum Council.**

13. Submitted by: [Signature]
   Date: 3/4/2013

   Course Instructor

14. Approvals:
    [Signature]
    Date: 3/4/2013

15. Department Head
    [Signature]
    Date: 3/5/13

   College Dean/Designee

For additional information regarding core curriculum, visit the Texas Higher Education Coordinating Board website at

www.thecb.state.tx.us/corecurriculum2014

See form instructions for submission/approval process.
Texas A&M University

Core Curriculum

Initial Request for a Course Addition to the Fall 2014 Core Curriculum

Foundational Component Area: Life and Physical Sciences

In the box below, describe how this course meets the Foundational Component Area description for Life and Physical Sciences. Courses in this category focus on describing, explaining, and predicting natural phenomena using the scientific method. Courses involve the understanding of interactions among natural phenomena and the implications of scientific principles on the physical world and on human experiences.

The proposed course must contain all elements of the Foundational Component Area. How does the proposed course specifically address the Foundational Component Area definition above?

PHYS 202 College Physics. PHYS 202 teaches fundamental laws of physics and their application to electricity, magnetism, optics and modern physics. The physics concepts and laws are related to real-world phenomena and technology.

Core Objectives

Describe how the proposed course develops the required core objectives below by indicating how each learning objective will be addressed, what specific strategies will be used for each objective and how student learning of each objective will be evaluated.

The proposed course is required to contain each element of the Core Objective.

Critical Thinking (to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information):

Problem solving is a primary emphasis of the course. Students are taught how to apply physics laws and concepts to solving problems and analyzing data.

Communication (to include effective development, interpretation and expression of ideas through written, oral and visual communication):

Students are taught to present their solutions to problems in a clear and logical fashion. Constructing diagrams and sketches is an important component of problem solving. Graded homework problems include essay questions.

Empirical and Quantitative Skills (to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions):

Homework and exam problems include analysis of data and numerical information. In the laboratory data is collected and analyzed and conclusions are reached.

Teamwork (to include the ability to consider different points of view and to work effectively with others to support a shared purpose or goal):

The laboratory is conducted by teams of two students. The two members of the team must work together to collect and analyze data and to draw conclusions. Discussion in lecture and recitation involves considering different ways to approach a problem and working together to achieve the solution.
PHYS 202 College Physics  Spring 2013  MWF 10:20

Course Description: Fundamentals of electricity, magnetism, optics and modern physics.
Prerequisites: High school algebra and trigonometry or the equivalent. PHYS 201.
Learning Outcomes: Upon completion of PHYS 202 a student will understand the basic laws and concepts of physics in the following areas and will be able to apply them in problems relating to physical situations: electricity, magnetism, optics and modern physics.

Instructor: Lewis Ford  Web page: faculty.physics.tamu.edu/ford  email: ford@physics.tamu.edu
Office: MPHY 315  Office Hours: M noon - 1 p.m., T 11 a.m.- noon, W 1-2 p.m. Office phone: 458-7908
Text: Physics 9th ed by Young with Mastering Physics Volume 2; PHYS 202 Lab Manual
Optional: Student Solutions Manual, Student Study Guide

Mastering Physics Course ID: MPFORD39219
There are tutorial problems assigned in Mastering Physics (for grade) in addition to the problems from the textbook that are listed on the syllabus.
Grading: 4 exams 60%; Final (comprehensive) 20%; Lab7%; Recitation 5%; Homework (Mastering Phys) 8%
You must achieve 70% or better in the laboratory in order to pass the course.
If your grade on the Final Exam is higher than your lowest grade on one of the four exams during the semester, that lowest grade will be replaced by its average with the Final in computing the course grade.
April 2 is the last day to Q-drop. Final Exam is Tuesday, May 7, 8:00-10:00 a.m.

Syllabus: (MC denotes multiple-choice problems)

<table>
<thead>
<tr>
<th>Wk</th>
<th>Date</th>
<th>Topic</th>
<th>Sections in Text</th>
<th>Homework problems</th>
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<tbody>
<tr>
<td>1</td>
<td>Jan. 14</td>
<td>Coulomb's law</td>
<td>17: 1-4</td>
<td>MC17: 3,4,7,8; 17: 10,12,14,19,21,32,33</td>
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<td>Jan. 16</td>
<td>electric field</td>
<td>17: 5-6</td>
<td>17: 34,38,41,42,43,65,71,72,77</td>
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<td>Jan. 18</td>
<td>Gauss's law</td>
<td>17: 7-9</td>
<td>MC17: 9; 17: 55,57,61,64</td>
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<td>2</td>
<td>Jan. 21</td>
<td>No Classes</td>
<td>18: 1-4</td>
<td>MC18: 2,3,7,11,14; 18: 1,4,12,16,18,21</td>
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<td>Jan. 23</td>
<td>potential</td>
<td>18: 5-6</td>
<td>18: 22,24,38,44,49,53,54,75,76,78</td>
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<td>Jan. 25</td>
<td>capacitors</td>
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<td>3</td>
<td>Jan. 28</td>
<td>dielectrics</td>
<td>18: 7-8</td>
<td>MC18: 4,5; 18: 61,63,64,70,71,73,81,82</td>
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<td>dc circuits</td>
<td>19: 1-3</td>
<td>MC19: 2,3,5,6,10,13,14,15</td>
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<td>Feb. 1</td>
<td>resistor networks</td>
<td>19: 4-5</td>
<td>19: 6,18,23,31,32,33,35,42,48,50</td>
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<td>19: 51,52,53,72,75,85</td>
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<td>Feb. 6</td>
<td>examples; review</td>
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<td>Feb. 8</td>
<td>Exam 1 Chs. 17-19</td>
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<td>5</td>
<td>Feb. 11</td>
<td>magnetic force</td>
<td>20: 1-4</td>
<td>MC20: 1,2,4,6,7,8,11</td>
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<td></td>
<td>Feb. 13</td>
<td>magnetic force and torque</td>
<td>20: 5-6</td>
<td>20: 4,8,10,14,18,19,23,29,31,34,39,50,51</td>
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<td>fields of wires</td>
<td>20: 7-10</td>
<td>20: 52,53,56,59,64,77,78,82,84,87,88</td>
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<td>21: 1-5</td>
<td>MC21: 2,6,10,13,14,15</td>
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<td>22: 1-3</td>
<td>MC22: 5,6,7,14; 22: 11,14,16,18</td>
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<td>Feb. 27</td>
<td>power; series resonance</td>
<td>22: 4-5; review</td>
<td>22: 24,25,26,32,36,40,41,42</td>
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<td>Mar. 1</td>
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<td>Mar. 4</td>
<td>em waves</td>
<td>23: 1-6</td>
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<td>23: 40,42,44,47,57,59,66,67,73,74,78,84</td>
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<td>MC24: 6; 24: 8,11,14,15,18,58,59</td>
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<td>thin lenses</td>
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<td>24: 33,41,45,47,48,51,52,55,56</td>
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<td>angular magnification</td>
<td>25: 4-6</td>
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<td>MC26: 2,6,9,10,13; 26: 3,4,7,9,10,20,23</td>
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</tr>
<tr>
<td>Mar. 27</td>
<td>thin films</td>
<td>26: 3</td>
<td>MC26: 4,8,14; 26: 27,28,29,34</td>
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<tr>
<td>Mar. 29</td>
<td>No Class</td>
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<tr>
<td>Apr. 1</td>
<td>diffraction</td>
<td>26: 4-9</td>
<td>26: 41,43,45,47,52,53,55,58,59</td>
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<tr>
<td>Apr. 3</td>
<td>examples; review</td>
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<tr>
<td>Apr. 5</td>
<td>Exam 3 Chs 23-26</td>
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<td>Apr. 8</td>
<td>photoelectric effect</td>
<td>28: 1</td>
<td>MC28: 1,2,3,4,5,10,13,16</td>
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<tr>
<td>Apr.10</td>
<td>spectra; Bch model</td>
<td>28: 2-4</td>
<td>28: 3,6,9,11,19,21,24,26,27,29,36,38</td>
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<td>Apr.12</td>
<td>wave nature of particles</td>
<td>28: 5-8</td>
<td>28: 41,43,45,49,50,60</td>
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<td>Apr.15</td>
<td>atomic structure</td>
<td>29: 1-2</td>
<td>MC29: 1,6,8,9,10</td>
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<td>Apr.17</td>
<td>nuclei</td>
<td>30: 1-2</td>
<td>29: 2,5,7,8,13,14,31,39</td>
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<tr>
<td>Apr.19</td>
<td>radioactivity</td>
<td>30: 3-4</td>
<td>MC30: 3,5,11,12,14,15; 30:1,3,5,8,10,12</td>
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<td>30: 15,18,20,53,64</td>
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<td>Apr.22</td>
<td>nuclear reactions</td>
<td>30: 5-7</td>
<td>30: 33,39</td>
<td></td>
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<tr>
<td>Apr.24</td>
<td>examples; review</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Apr.26</td>
<td>Exam 4 Chs 28-30</td>
<td></td>
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<tr>
<td>Apr.29</td>
<td>review</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Apr.30</td>
<td>review</td>
<td></td>
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</tbody>
</table>

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**Academic Integrity Statement:** "An Aggie does not lie, cheat, or steal or tolerate those who do." The Honor Council Rules and Procedures may be found on the web at http://www.tamu.edu/aggiehonor.
Texas A&M University
Core Curriculum Cover Sheet
Initial Request for a course to be considered for the Fall 2014 Core Curriculum

1. This request is submitted by (department name): Physics and Astronomy
2. Course prefix and number: PHYS 208
3. Texas Common Course Number: PHYS 2426
4. Complete course title: Electricity and Optics
5. Semester credit hours: 4
6. This request is for consideration in the following Foundational Component Area:
   □ Communication
   □ Mathematics
   X Life and Physical Sciences
   □ Language, Philosophy and Culture
   □ Creative Arts
   □ American History
   □ Government/Political Science
   □ Social and Behavioral Sciences
7. This course should also be considered for International and Cultural Diversity (ICD) designation:
   □ Yes    X No
8. How frequently will the class be offered? Fall, Spring, and Summer semesters
9. Number of class sections per semester: Fall 25, Spring 37, Summer 5
10. Number of students per semester: Fall 700, Spring 900, Summer 104
11. Historic annual enrollment for the last three years: 1572 1522 1407
12. This completed form must be attached to a course syllabus that sufficiently and specifically details the appropriate core objectives through multiple lectures, outside activities, assignments, etc. Representative from department submitting request should be in attendance when considered by the Core Curriculum Council.
13. Submitted by: Jairo Sinova
    Course Instructor
    Date
    3/1/2013
14. Department Head
    Approvals: A. J. Smith
    Date
    3/1/2013
15. College Dean/Designee
    Date
    3/5/13

For additional information regarding core curriculum, visit the Texas Higher Education Coordinating Board website at
www.thecb.state.tx.us/corecurriculum2014

See form instructions for submission/approval process.
Texas A&M University  
Core Curriculum  
Initial Request for a Course Addition to the Fall 2014 Core Curriculum  

Foundational Component Area: Life and Physical Sciences

In the box below, describe how this course meets the Foundational Component Area description for Life and Physical Sciences. Courses in this category focus on describing, explaining, and predicting natural phenomena using the scientific method. Courses involve the understanding of interactions among natural phenomena and the implications of scientific principles on the physical world and on human experiences.

The proposed course must contain all elements of the Foundational Component Area. How does the proposed course specifically address the Foundational Component Area definition above?

PHYS 208 (4 credits): Electricity and Optics
This course introduces the fundamental laws governing electricity and magnetism of objects, electric circuits and its functional principles. It is the second course in physics that follows the PHYS 218 Mechanics course for science and engineer majors. The students are taught the basic principles governing electricity and how these principles where first observed and developed by using the scientific methodology. It couples directly to current technology and its basics, particularly when reated to basic circuit analysis. It requires a direct engagement by the student in order to learn to connect the theoretical concepts and tools with their own experience and with experimental laboratory exercises that reinforce the scientific method. The students learn how to evaluate the forces generated by charges, how to best model them mathematically and how they are related to basic electric circuits, electric motors, and other electro-magnetic based devices.

Core Objectives

Describe how the proposed course develops the required core objectives below by indicating how each learning objective will be addressed, what specific strategies will be used for each objective and how student learning of each objective will be evaluated.

The proposed course is required to contain each element of the Core Objective.

Critical Thinking (to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information):

This Core Objective is the primary one of the course. The students are continuously challenged to connect basic physical principles to predict new phenomena and to correctly model the behavior of mechanical systems. They learn how to synthesize a complex problem to its bare essentials that help them predict specific behavior and to critically assess the limitations of their predictions, e.g. induced magnetic fields by currents. The course incorporates active engagement through the use of i-Clickers that will challenge their conceptual understanding at each step of the way. The students watch a pre-lecture before the class room time and the bulk of the class time is spent challenging them to think critically on how the key physical principles are exploited to analyze different situations, predict phenomena, and create simple models for complex scenarios. This conceptual driven questions (i-Clickers) are then reinforced by context-rich problems in which a real life device related to basic science and engineering has to be analyzed, modeled based on sound scientific principles and appropriate assumptions.

Communication (to include effective development, interpretation and expression of ideas through written, oral and visual communication):

As a key part of the course the students take a laboratory component to the course. In this laboratory exercise they will perform experiments to assess and solidify their understanding of electricity in different materials and basic circuit desing. They will compose scientific reports on their findings, learning how to defend their work in
Texas A&M University

Core Curriculum

Initial Request for a Course Addition to the Fall 2014 Core Curriculum

In a scientific way. The key communication aspect of the course is a written component. No oral or visual presentations are expected. On the other hand, the students taking the course learn key arguments behind the scientific methods and how to analyze and assess the validity of what is being observed. It is this scientific way of communicating that the students will take with them as a life-long skill.

Empirical and Quantitative Skills (to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions):

As a part of the laboratory and homework exercises, the students will be asked to test mechanics physics problems that are context rich. This means they will be given a set of data and they will have to use the physical principles that they have learned in the class to analyze this data, predict subsequent behavior, and make accurate statements regarding error propagation and possible margin of error of their predictions.

Teamwork (to include the ability to consider different points of view and to work effectively with others to support a shared purpose or goal):

Similarly as in the previous PHYS 219 course, the students, throughout the lectures, will be periodically be asked pair-discuss-and-debate questions in which peer-instruction will be shown to produce better results than single student responses. As an example, during the pre-lectures that the students have to view on-line before the lecture the students are asked one or two concept questions and they have to write their logical reasoning for their answer. The instructor, at the beginning of the lecture, gives again the question with a set of multiple choices showing some of the best reasoned answers (some correct and some incorrect) and the students are asked to pair up, debate, and decide (through their i-Clickers) on the correct one by teaming with their neighbors. The result is always a better class average and as a result they learn the value of team learning and peer instruction, a necessary life-long learning skill.

Please be aware that instructors should be prepared to submit samples/examples of student work as part of the future course recertification process.
PHYSICS 208: Electricity and Magnetism (Spring 2013)

Co/Pre
requisites
You should have taken PHYS 218, MATH 151 and currently be enrolled in MATH 152 (or have taken it). You are expected to have a working knowledge of plane and solid geometry, trigonometry, algebra, vectors, differentiation and integration.

Instructor
Dr. John C. Hardy
Office: Mitchell Institute (MIST), Room 320
Contact: (tel) 845-1411; (e-mail) hardy@comp.tamu.edu
Office hours: Mon. 2-4 & Tues. 2-4, or by appointment

Web page
http://cyclotron.tamu.edu/jch

Textbooks
"University Physics," 13th ed. by Hugh Young and Roger Freedman (Volume 2)
"Laboratory (E&M) Experiments for Physics 208," 11th ed. by S. Ramirez, J. Ross and W. Saillow

Rec. & Lab
Recitation meets in 337 Mitchell Physics Building (MPHY) for one hour, and is followed every second week by a two-hour Laboratory session. If you have taken the course before and received 80% or more on the lab part, speak to me immediately. With my permission you will not have to repeat the lab; however, you must still attend Recitation and take the weekly quizzes The lab schedule is handed out separately. (Note, no recitations or labs meet in the first week.)

Quizzes/ HW
Homework assignments, recitations and quizzes are for your benefit so that you can practice problem solving techniques: (a) Weekly homework assignments appear on the class schedule. You are expected to do all the problems listed there and I recommend that you do them first on paper. To receive credit, though, you must also submit them via the "MasteringPhysics" web site by the end of the following week. Instructions for using "MasteringPhysics" appear on a separate page. (b) There will be short computer assignments due after each class that will be tutorial in style and based on the material given in that class. These are optional but will be worth a bonus of up to 5% in your final mark! (c) Recitations are problem-solving sessions, during which the recitation instructor will work problems and answer questions originating from you. (d) During the semester, at least 10 quizzes will be given in recitation. Each quiz will test your ability to work one of the assigned homework problems or a similar problem from the text.

Exams
There will be three midterm exams and one final exam: (a) Each midterm exam will be 50 minutes long and the final exam will be 2 hours long. These exams will consist of problems taken from the homework or from examples worked in class (with different numbers). For each problem, the entire solution will be graded and partial credit given if merited. Your work must show the steps toward the solution; the answer alone is not sufficient. (b) You will be supplied with a formula sheet with each exam. To assist in your preparation, a copy of this sheet will be posted on the class web page the week before each exam. (c) You will need to bring a calculator to the exams. However, this must not be a programmable type calculator with large memory unless you can demonstrate that the memory is clear before beginning the exam. (d) If you miss an exam due to an authorized excused absence as outlined in the University Regulations, you must contact me no later than the next class meeting following the missed exam to arrange for a makeup exam. This exam will be administered outside normal class time within 7-10 days following the missed exam. It may be a course-wide exam and could include problems not taken from the assigned homework or class examples. Note that very few conditions qualify as an authorized excused absence, so avoid missing an exam at all costs. (e) You must bring your student ID with you to all exams for identification purposes.

Exam Grade
Midterm exams will each receive a numerical mark (not "curved"). The class will also be told approximate grade boundaries for each exam. By comparing your mark to these boundaries, you can get an indication of the grade you might expect in the course if you keep achieving at the same level. However these approximate grade boundaries are not necessarily the same as the boundaries that will be used for the final course grade. Note that in no case will these boundaries result in a lower letter grade than the standard 90-100% A, 80-89% B, 70-79% C, 60-69% D and <60% F.

Course Grade
The total course grade is derived from a total of 750 points distributed as follows:

<table>
<thead>
<tr>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 Midterm Exams</td>
</tr>
<tr>
<td>Final Exam</td>
</tr>
<tr>
<td>Recitation quizzes</td>
</tr>
<tr>
<td>Laboratory</td>
</tr>
<tr>
<td>Homework</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

NOTE: If your final exam mark is higher than the average of your three mid-term exams, it will count for 300 points (out of 750) and the mid-term average will count for 200. If the average of mid-terms is higher, then it will count for 300 and the final will be worth 200. If earned, the 5% bonus will be added onto the result obtained from the table. You must pass the lecture part of the course (3 midterm exams plus the final) and the laboratory part separately in order to pass the whole course. Completion of all laboratory experiments is required.
### Class Schedule

<table>
<thead>
<tr>
<th>Week of</th>
<th>Chapters</th>
<th>Topics/Homework Assignment/Help Sessions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan. 14</td>
<td>21 (1-7)</td>
<td>Electric Charge and Electric Field</td>
</tr>
<tr>
<td>Jan. 21</td>
<td>22 (1-5)</td>
<td>Gauss’s Law</td>
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<td></td>
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<td>22 6, 8, 11, 19, 22, 28, 31, 32, 34, 37, 39, 44, 46, 50, 53, 61, 65, 67.</td>
</tr>
<tr>
<td>Jan. 28</td>
<td>23 (1-5)</td>
<td>Electric Potential</td>
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<td>23 1, 5, 13, 14, 19, 26, 29, 33, 43, 47, 59, 62, 63, 65, 68 70, 89.</td>
</tr>
<tr>
<td>Feb. 4</td>
<td>24 (1-4)</td>
<td>Capacitance and Dielectrics</td>
</tr>
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<td>24 3, 8, 11, 14, 17, 28, 34, 42, 47, 48, 52, 57, 60, 61, 65, 66, 74, 77.</td>
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<tr>
<td>Feb. 11</td>
<td>Exam 1 (Chap. 21-23) – Wed. in class</td>
<td></td>
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<td></td>
<td>25 (1-5)</td>
<td>Help session, Sunday, Feb. 10, 7-9pm</td>
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<tr>
<td></td>
<td></td>
<td>Current, Resistance and Electromotive Force</td>
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<tr>
<td>Feb. 18</td>
<td>26 (1-5)</td>
<td>DC Circuits</td>
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<td>26 8, 9, 13, 16, 27, 36, 43, 50, 53, 60, 64, 66, 74, 77, 78, 83, 92.</td>
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<tr>
<td>Feb. 25</td>
<td>27 (1-7)</td>
<td>Magnetic Fields and Magnetic Forces</td>
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<td>27 1, 4, 8, 14, 22, 31, 38, 41, 46, 61, 69, 72, 74, 77, 83, 89.</td>
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<tr>
<td>Mar. 4</td>
<td>Exam 2 (Chap. 24-26) – Wed. in class</td>
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<td></td>
<td>28 (1-7)</td>
<td>Help session, Sunday, Mar. 3, 7-9pm</td>
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<tr>
<td></td>
<td></td>
<td>Sources of Magnetic Field</td>
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<td>28 1, 8, 13, 28, 34, 37, 42, 44, 45, 53, 60, 61, 62, 67, 72, 84.</td>
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<tr>
<td>Mar. 11-15</td>
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<td>Spring Break</td>
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<tr>
<td>Mar. 18</td>
<td>29 (1-7)</td>
<td>Electromagnetic Induction</td>
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<td>29 3, 4, 7, 9, 17, 23, 28, 36, 39, 44, 49, 57, 63, 67, 73, 77.</td>
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<tr>
<td>Mar. 25</td>
<td>30 (1-5)</td>
<td>Inductance</td>
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<td>30 5, 10, 16, 18, 23, 27, 35, 38, 39, 52, 57, 58, 62, 67, 69, 71, 74.</td>
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<tr>
<td>Apr. 1</td>
<td>32 (1-4)</td>
<td>Electromagnetic Waves</td>
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<td>32 1, 4, 8, 11, 14, 18, 23, 26, 43, 48, 49, 54, 57.</td>
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<tr>
<td>Apr. 8</td>
<td>Exam 3 (Chap. 27-30) – Wed. in class</td>
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<td>33 (1-3,5,7)</td>
<td>Help session, Sunday, Apr. 7, 7-9pm</td>
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<tr>
<td></td>
<td></td>
<td>The Nature and Propagation of Light</td>
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<td>33 3, 7, 12, 19, 22, 31, 34, 36, 42, 43, 48, 52, 59, 60, 36.</td>
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<tr>
<td>Apr. 15</td>
<td>34 (1-4,6)</td>
<td>Geometrical Optics and Optical Instruments</td>
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<td>34 2, 7, 8, 19, 20, 28, 36, 37, 53, 74, 76, 81, 113, 118.</td>
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<tr>
<td>Apr. 22</td>
<td>35 (1,2,4,5)</td>
<td>Interference</td>
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<td>35 1, 6, 11, 16, 18, 28, 30, 46, 47, 64.</td>
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<tr>
<td>Apr. 29 (Mon.)</td>
<td>Final Exams (Chap. 21-30, 32-35)</td>
<td>Interference, Help session</td>
</tr>
<tr>
<td>Apr. 30 (redefined Fri.)</td>
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<tr>
<td>May 7 (Tues.)</td>
<td>Final Exams</td>
<td>8-10am for MWF 10:20-11:10</td>
</tr>
<tr>
<td>May 8 (Wed.)</td>
<td>Final Exams</td>
<td>10:30am-12:30pm for MWF 11:30-12:20</td>
</tr>
</tbody>
</table>

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Texas A&M University
Core Curriculum Cover Sheet
Initial Request for a course to be considered for the Fall 2014 Core Curriculum

1. This request is submitted by (department name): Physics and Astronomy

2. Course prefix and number: PHYS 218

3. Texas Common Course Number: PHYS 2425

4. Complete course title: Mechanics

5. Semester credit hours: 4

6. This request is for consideration in the following Foundational Component Area:
   □ Communication
   □ Mathematics
   ✔ Life and Physical Sciences
   □ Language, Philosophy and Culture
   □ Creative Arts
   □ American History
   □ Government/Political Science
   □ Social and Behavioral Sciences

7. This course should also be considered for International and Cultural Diversity (ICD) designation:
   □ Yes  ✔ No

8. How frequently will the class be offered? Fall, Spring, and Summer semesters

9. Number of class sections per semester: 57, 30, 3

10. Number of students per semester: 1596, 709

11. Historic annual enrollment for the last three years: 2381 2403 2390

This completed form must be attached to a course syllabus that sufficiently and specifically details the appropriate core objectives through multiple lectures, outside activities, assignments, etc. Representative from department

submitting request should be in attendance when considered by the Core Curriculum Council.


   Course Instructor

   Approvals: 3/1/2013

   Department Head

   College Dean/Designee 3/5/13

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See form instructions for submission/approval process.

Texas A&M University
Associate Provost for Undergraduate Studies

MHR 05
SEG 307
Texas A&M University
Texas A&M University

Core Curriculum

Initial Request for a Course Addition to the Fall 2014 Core Curriculum

Foundational Component Area: Life and Physical Sciences

In the box below, describe how this course meets the Foundational Component Area description for Life and Physical Sciences. Courses in this category focus on describing, explaining, and predicting natural phenomena using the scientific method. Courses involve the understanding of interactions among natural phenomena and the implications of scientific principles on the physical world and on human experiences.

The proposed course must contain all elements of the Foundational Component Area. How does the proposed course specifically address the Foundational Component Area definition above?

PHYS 218 (4 credits): MECHANICS
This course introduces the fundamental laws governing the motion and dynamics of objects. It serves as a first basis for science and engineering majors to understand the physical principles governing the dynamics and equilibrium properties of objects due to external and internal forces. The students are taught how these principles, first observed and developed by using the scientific method, and how these principles are used in all known scientific disciplines. It requires of the students a direct engagement in connecting the theoretical concepts with their own experiences and with experimental laboratory exercises that reinforce the scientific method. The students learn how to predict trajectories of objects, how to describe motion mathematically, and how to apply to real world situations in engineering and other scientific disciplines.

Core Objectives

Describe how the proposed course develops the required core objectives below by indicating how each learning objective will be addressed, what specific strategies will be used for each objective and how student learning of each objective will be evaluated.

The proposed course is required to contain each element of the Core Objective.

Critical Thinking (to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information):

This Core Objective is the primary one of the course. The students are continuously challenged to connect basic physical principles to predict new phenomena and to correctly model the behavior of mechanical systems. They learn how to synthesize complex problems into their essentials that help them predict specific behavior and to critically assess the limitations of their predictions, e.g. motion ignoring friction. The course incorporates active engagement through the use of i-Clickers that will challenge their conceptual understanding at each step of the way. The students watch a pre-lecture before the class room time and the bulk of the class time is spent challenging them to think critically on how the key physical principles are exploited to analyze different situations, predict phenomena, and create simple models to complex scenarios. This conceptual driven questions (i-Clickers) are then reinforced by context-rich problems in which a real life situation has to be analyzed, modeled based on sound scientific principles and appropriate assumptions, and a self-assessment of their answers must be followed.

Communication (to include effective development, interpretation and expression of ideas through written, oral and visual communication):

As a key part of the course the students take a laboratory component to the course. In this laboratory exercise they will perform experiments to assess and solidify their understanding of mechanics and they will compose scientific reports on their findings, learning how to defend their work in a scientific way. The key communication
Texas A&M University

Core Curriculum

Initial Request for a Course Addition to the Fall 2014 Core Curriculum

aspect of the course is a written component. No oral or visual presentations are expected. On the other hand, the students taking the course learn the key arguments behind the scientific methods and how to analyze and assess the validity of what is being observed. It is this scientific way of communicating that the students will take with them as a life-long skill.

Empirical and Quantitative Skills (to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions):

As a part of the laboratory and homework exercises, the students will be asked to test mechanics physics problems that are context rich. This means that they will be given a set of data and they will have to use the physical principles that they have learned in the class to analyze this data, predict subsequent behavior, and make accurate statements regarding error propagation and possible margin of error of their predictions.

Teamwork (to include the ability to consider different points of view and to work effectively with others to support a shared purpose or goal):

The students, throughout the lectures, will be periodically be asked pair-discuss-and-debate questions in which peer-instruction will be shown to produce better results than single student responses. As an example, during the pre-lectures that the students have to view on-line before the lecture the students are asked one or two concept questions and they have to write their logical reasoning for their answer. The instructor, at the beginning of the lecture, gives again the question with a set of multiple choices showing some of the best reasoned answers (some correct and some incorrect) and the students are asked to pair up, debate, and decide (through their i-Clickers) on the correct one by teaming with their neighbors. The result is always a better class average and as a result they learn the value of team learning and peer instruction, a necessary life-long learning skill.

Please be aware that instructors should be prepared to submit samples/examples of student work as part of the future course recertification process.
# Physics 218: Mechanics

<table>
<thead>
<tr>
<th>Professor</th>
<th>Jairo Sinova</th>
</tr>
</thead>
<tbody>
<tr>
<td>Email</td>
<td><a href="mailto:Sinova@physics.tamu.edu">Sinova@physics.tamu.edu</a></td>
</tr>
<tr>
<td>Phone</td>
<td>979-845-4179</td>
</tr>
<tr>
<td>Office</td>
<td>MPHY 413</td>
</tr>
<tr>
<td>Lectures</td>
<td>TIME AND LOCATION HERE</td>
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</table>

## Co-Requisites
MATH 151. You are expected to have a working knowledge of plane geometry, trigonometry, and algebra. As the semester progresses you will also be expected to have a **working knowledge** of derivatives and integrals, and be proficient in the use of vectors (addition, subtraction, dot and cross products).

| Office hours    | TBA                        |

## Primary text
University Physics, Young and Freedman 13\textsuperscript{th} edition.

## Lab info
All course information will be posted at TBA.

## Web site

## Course Grading
The total course grade consists of 750 points distributed as follows:

- 3 Exams  275 (75, 100, 100)
- Final Exam  200
- Laboratory  100
- Recitation Quizzes  100
- Homework/Math quizzes  75

**NOTE:** If your final exam grade is higher than your 3-exam average, then the final will count 275/750 points toward your final grade and your midterm exam average will count just 200/750.

**You must pass three parts of this course separately in order to pass the course:**

- Lectures (3 midterm exams, final exam, recitation quizzes);
- Laboratory (with a minimum score of 70%);
- Homework (with a minimum score of 70%)

## Exams
There will be three midterm exams and one final exam.

(a) Each exam will generally consist of multiple-choice problems similar in content and difficulty to the homework. **Although the questions are multiple-choice all work must be shown to get credit for the answer marked.** If the answer marked does not obviously follow from the shown work, even if the answer is correct, you will get zero credit for the answer. **Because it is multiple-choice format there will be no partial credit given.** If you mistakenly mark the wrong answer you will get zero credit for the answer. To compensate for the lack of partial credit in this exam format, there will be a practice exam similar in difficulty and content
available in MasteringPhysics. If you complete the practice exam before its assigned deadline (no late submissions accepted), you will get extra points in the corresponding exam. The maximum extra points per exam are 6 weighted by the grade of the practice exam rounded to the nearest integer, e.g. 80% in the practice exam will give you 6 x 0.8 = 5 extra points. This amounts to about 1-2 multiple-choice questions.

NOTE: This exam format and extra credit option may change through the semester at the discretion of the instructor.

(b) The exams are held in the evening (see Schedule for times and location)

(c) Formula sheets will be provided for each exam and the final.

(d) If you miss an exam due to an authorized excused absence as outlined in the University Regulations, then you should attempt to contact me prior to the exam, but no later than two working days following the missed exam to arrange for a makeup exam. There may be a single course-wide makeup exam for those missing an exam. This makeup exam will be written by a committee of Physics 218 lecturers and administered outside normal class time within 7-10 class days following the missed exam. Note: Very few conditions qualify as an authorized excused absence, so avoid missing an exam at all costs.

(e) You must bring your student ID with you to all exams for identification purposes, a pen and a pocket calculator capable of evaluating trigonometric functions (sin, cos, tan), exponentials and logarithms; these will not be supplied. Any hand-held calculator is acceptable.

### Homework
- MasteringPhysics is used to submit the homework assignments that are due on a weekly basis. The Course ID is MPSINOVASPRING2011, and you are reminded not to enter your TAMU ID as the Student ID.
- Each weekly assignment (aside from the 1st) is due the following Sunday at 11:00 pm as outlined in the course schedule below; late submissions are accepted, however full credit will not be given. The penalty is –10% per day past the deadline.
- Each incorrect answer to a problem reduces your credit for that problem by 3%. For multiple-choice problems, incorrect answers are reduced by 100%/(# of options −1) (e.g. if there are four options, you lose 33.3% per wrong guess). More details on MP grading can be found on its website.
- There is an introductory "assignment" about using MasteringPhysics, which is optional (not counted for grade).

### Labs
If you miss a regularly scheduled laboratory for valid reasons, it is your responsibility to inform your TA immediately and promptly make suitable arrangements. Any missed laboratory that is not remedied will count as a zero towards your final laboratory grade.

Even though the lab work worth 13.33% of your final grade, you MUST achieve a 70% or better grade in the laboratory to pass the course. Note that if you miss two labs without an excuse and do not make them up then you will have failed the course.

If you are repeating PHYS 218 and have an 80% or better in the lab from
<p>| <strong>ADA</strong> | The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact the Department of Student Life, Services for Students with Disabilities, in Room 126 of the Koldus Building or call 845-1637. |
| <strong>Aggie Honor Code</strong> | As a student at Texas A&amp;M University, you are bound by the Aggie Honor Code: “An Aggie does not lie, cheat, or steal or tolerate those who do.” Should you have concerns or questions about ethical conduct in your studies or become aware of unethical conduct by others, please refer to the Honor Council Rules and Procedures on the web at <a href="http://www.tamu.edu/aggiehonor">http://www.tamu.edu/aggiehonor</a>. |</p>
<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
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<td>Chapter 1: Units, Physical Quantities</td>
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<tr>
<td>Sept. 2-6</td>
<td>Chapter 2: 1-D Kinematics</td>
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<td>Sept. 9-13</td>
<td>Chapter 3: Kinematics in 2- and 3-D</td>
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<td>Chapter 3: Relative and Circular Motion</td>
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<td>Sept. 16-20</td>
<td>Chapter 4: Newton’s Laws</td>
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<td>Sept. 23-24</td>
<td>Review for Exam 1</td>
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<td>Sept. 25 (Wednesday evening) Exam 1 (Ch.1-4)</td>
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<tr>
<td>Sept. 25-27</td>
<td>Chapter 5: Applications of Newton’s Laws, Types of Forces, and Friction</td>
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<tr>
<td>Sept. 30-Oct.4</td>
<td>Chapter 6: Work, Kinetic Energy, Work-Energy Theorem</td>
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<tr>
<td>Oct. 14-18</td>
<td>Chapter 8: Center of Mass, Momentum, Conservation of Momentum, Collisions</td>
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<tr>
<td>Oct. 21-22</td>
<td>Review for Exam 2</td>
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<td>Oct. 23 (Wednesday evening) Exam 2 (Ch.5-8)</td>
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<tr>
<td>Oct. 23-25</td>
<td>Chapter 9: Rotational Kinematics and Moment of Inertia</td>
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<tr>
<td>Oct. 28-Nov.1</td>
<td>Chapter 10: Torque, Dynamics of Rotation, Conservation of Angular Momentum</td>
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<tr>
<td>Nov. 4-8</td>
<td>Chapter 11: Statics and Elasticity</td>
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<tr>
<td>Nov. 11-13</td>
<td>Chapter 13: Gravitation and Kepler’s Laws, and Review for Exam 3</td>
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<td>(Nov. 15 is last day to Q-drop)</td>
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<tr>
<td>Nov. 18-19</td>
<td>Review for Exam 3</td>
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<td></td>
<td>Nov. 20 (Wednesday evening)) Exam 3 (Ch.9-11,13)</td>
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<tr>
<td>Nov. 20-22</td>
<td>Chapter 14: Simple Harmonic Motion</td>
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<td>Nov. 25-27</td>
<td>Chapter 14: Pendula</td>
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<td>Chapter 15: Mechanical Waves</td>
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<td>(Nov. 28-29 is Thanksgiving Holiday)</td>
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<tr>
<td>Dec. 2-3</td>
<td>Chapter 15: Review for Final Exam</td>
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