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

1. This request is submitted by (department name): Geology & Geophysics

2. Course prefix and number: GEOL 101
3. Texas Common Course Number: GEOL 1303, 1103, 1403

4. Complete course title: Principles of Geology
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 semester

9. Number of class sections per semester: 50 fall and spring, 5 summer

10. Number of students per semester: 1000

11. Historic annual enrollment for the last three years: 1,884, 1,956, 2,391

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
   [Date]

14. Department Head
   [Signature]
   [Date]

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.

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

Course topics will follow the Earth Science Literacy Principles, published by the Earth Science Literacy Project (http://www.earthscienceliteracy.org). This NSF-sponsored publication was developed in conjunction with every major geosciences professional society. The overall focus of the course is on understanding the functioning of Earth systems. A lab provides practical exposure to scientific reasoning and the scientific method as they are applied to geological problems.

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):

Critical thinking will be integrated into each learning objective through lab activities allowing students to work with geological data. The lab will provide exercises requiring students to think critically about geological problems by 1) identifying data and areas of uncertainty, 2) distinguishing between data that are relevant and irrelevant to specific problems, and 3) logically testing hypotheses. Evaluation will be based on written lab reports and quizzes and graded using a rubric based on the Steps for Better Thinking Competency Rubric (Walcott, 2006; http://www.WolcottLynch.com). Lectures will provide examples of evidence-based reasoning providing the basis for major geological theories. Lab instructors will guide students through specific examples and provide feedback on exercises.

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

Communication will be integrated into each learning objective through lab discussions, debates, reports, and quizzes. The lab will provide exercises requiring students to communicate about geological problems by 1) organizing written and oral discussions in order to emphasize relevant data and provide a logical flow to a well-supported conclusion, and 2) supporting written text with well-chosen diagrams or illustrations. Evaluation will be based on debates and written lab reports and quizzes. Students will be supplied with examples of excellent, satisfactory, and poor geological writing and asked to compare with their own writing.

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

Empirical and quantitative skills will be integrated into each learning objective through lab reports and quizzes. The lab will provide exercises requiring students to use empirical and quantitative skills to solve geological problems by 1)
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constructing and analyzing graphs, 2) describing three-dimensional structures or surfaces from two-dimensional representations (e.g. maps or projections), and 3) identifying patterns or trends from historical data. Lectures will regularly include examples of graphs, maps, and historical 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):

Teamwork will be integrated into many learning objectives through group lab exercises. The lab will provide several exercises requiring students to work in teams to solve geological problems by 1) recognizing different points of view, 2) designing and executing plans to test or reconcile opposing hypotheses, and 3) identifying and reporting areas of uncertainty that prevent consensus.

Please be aware that instructors should be prepared to submit samples/examples of student work as part of the future course recertification process.
Course title and number  GEOL 101: Principles of Geology
Term  Fall 2014
Meeting times and location

Course Description and Prerequisites
Physical and chemical nature of the Earth and dynamic processes that shape it; plate tectonics, Earth's interior, materials it is made of, age and evolution, earthquakes, volcanism, erosion and deposition; introduces physical and chemical principles applied to the Earth. Not open to students who have taken GEOL 104 or GEOL 320.

Prerequisites: none

Learning Outcomes
Students who successfully complete GEOL 101 will demonstrate knowledge of the following general themes in the geological sciences:\footnote{Learning outcomes are modified from \textit{Earth Science Literacy Principles}, published by the Earth Science Literacy Project (http://www.earthscienceliteracy.org)}

- Rocks and other materials record the 4.6 billion year history of the Earth. A variety of rock types are distributed throughout the Earth's surface and interior.
- The Earth is a complex system of interacting rock, water, air, and life.
- The Earth is continuously changing through geological, hydrological, physical, chemical, and biological processes that are explained by laws.
- Plate tectonics is a unifying theory that explains many dynamic features of the Earth.
- Water plays critical roles in a wide range of surface and subsurface Earth processes.
- Life evolves on a dynamic Earth and continuously modifies the Earth.
- Humans depend on the Earth for resources.
- Natural hazards pose risks to humans.
- Humans significantly alter the Earth.

Students will learn how to use and express the above bodies of geological knowledge through individual and group lab exercises that will also develop the following core skills. Students will be assessed on both knowledge and skills in exercises and tests in lab. (For instance, students may be asked to work in groups to identify specific rocks that would record information about the tectonic history of a region, analyze a map showing the distribution of their selected rocks, and then report their findings in writing.)

- Think critically about geological problems by 1) identifying data and areas of uncertainty, 2) distinguishing between data that are relevant and irrelevant to specific problems, and 3) logically testing hypotheses.
- Communicate about geological problems by 1) organizing written and oral discussions in order to emphasize relevant data and provide a logical flow to a well-supported conclusion, and 2) supporting written text with well-chosen diagrams or illustrations.
- Use empirical and quantitative skills to solve geological problems by 1) constructing and analyzing graphs, 2) describing three-dimensional structures or surfaces from two-dimensional representations (e.g. maps or projections), and 3) identifying patterns or trends from historical data.
- Work in teams to solve geological problems by 1) recognizing different points of view, 2) designing and executing plans to test or reconcile opposing hypotheses, and 3) identifying and reporting areas of uncertainty that prevent consensus.
Instructor Information
Name: Michael Tice
Telephone number: 845-3138
Email address: mice@geos.tamu.edu
Office hours: 314 Halbouty

Textbook and/or Resource Material
Tarbuck, Lutgens, and Tasa, Earth, 10th Ed., 2011
Busch, Physical Geology Laboratory Manual, 4th Ed.

Grading Policies
Grades will be assigned based on the following assessments: three tests (total of 30%), lab (30%), and final exam (40%). All grades will be rounded to the nearest tenth of a percent (i.e., 89.95% → 90.0%, 89.94% → 89.9%) and converted to a letter grade as follows: 90.0–100.0 = A, 80.0–89.9 = B, 70.0–79.9 = C, 60.0–69.9 = D, <60.0 = F.

Course Topics, Calendar of Activities, Major Assignment Dates

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Required Reading (Tarbuck page numbers)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction to class and geology; the scientific method; introduction to geologic time; origin of the solar system; Earth's internal structure and external features; plate tectonics</td>
<td>1–22, 22–29</td>
</tr>
<tr>
<td>2</td>
<td>Minerals and the rock cycle</td>
<td>29–34, 87–105</td>
</tr>
<tr>
<td>3</td>
<td>Igneous rocks</td>
<td>107–128, 128–135</td>
</tr>
<tr>
<td>4</td>
<td>Volcanoes; weathering and sedimentary rocks</td>
<td>137–171, 173–186, 199–214</td>
</tr>
<tr>
<td>5</td>
<td><strong>Test 1</strong>: sedimentary rocks</td>
<td>214–227</td>
</tr>
<tr>
<td>6</td>
<td>Metamorphic rocks; relative time</td>
<td>229–253, 255–267</td>
</tr>
<tr>
<td>7</td>
<td>Absolute time; crustal deformation</td>
<td>267–277, 279–290</td>
</tr>
<tr>
<td>8</td>
<td>Crustal deformation</td>
<td>290–301</td>
</tr>
<tr>
<td>9</td>
<td><strong>Test 2</strong>: Earthquakes</td>
<td>303–331</td>
</tr>
<tr>
<td>10</td>
<td>Divergent plate boundaries; convergent plate boundaries</td>
<td>381–403</td>
</tr>
<tr>
<td>11</td>
<td><strong>Convergent plate boundaries, groundwater</strong></td>
<td>381–403, 401–487</td>
</tr>
<tr>
<td>12</td>
<td>Groundwater and streams; deserts and winds</td>
<td>429–459, 515–535</td>
</tr>
<tr>
<td>13</td>
<td><strong>Test 3</strong>: glaciers and glaciations</td>
<td>489–517</td>
</tr>
<tr>
<td>14</td>
<td>Geologic record of global climate change; petroleum geology</td>
<td>575–607</td>
</tr>
</tbody>
</table>

Americans with Disabilities Act (ADA)
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
For additional information please visit: http://aggiehonor.tamu.edu

"An Aggie does not lie, cheat, or steal, or tolerate those who do."
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): Geology & Geophysics
   GEOL 1304,

2. Course prefix and number: GEOL 106 3. Texas Common Course Number: 1104, 1404

4. Complete course title: Historical Geology

5. Semester credit hours: 4

6. This request is for consideration in the following Foundational Component Area:
   [ ] Communication  [ ] Creative Arts
   [ ] Mathematics  [ ] American History
   [x] 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  [x] No

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

9. Number of class sections per semester: 6

10. Number of students per semester: 100

11. Historic annual enrollment for the last three years: 206 182 194

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: [Signature]
    Date: 1/14/13

13. Course Instructor

14. Department Head
    Date: 1/14/15

15. 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?

This course focuses on the physical, chemical, and biologic changes that have taken place on Earth since its formation 4.6 billion years ago. Particular emphasis will be placed on the biosphere and how scientists use the fossil record to help reconstruct Earth’s past. Students will see how the scientific method is applied to reconstruct the past and will have numerous opportunities to engage in geologic inquiry. The scientific method is applied in laboratory exercises to interpret past Earth surface conditions and reconstruct the sequence of events in Earth history.

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):

Critical thinking skills will be emphasized in all graded lab activities. In particular, students will interpret depositional environments based on observations of sedimentary rocks and fossils. Students will analyze radiometric measurements to identify outliers when estimating geologic ages. Students will assess cause-and-effect feedbacks in Earth history using data from the rock record.

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

Communication skills will be emphasized in all graded lab activities and in oral group presentations. Students will present Earth history using distance as a metaphor for geologic time. Students will build phylogenetic trees showing the evolutionary relationships among biological lineages. Students will diagram the distribution of time in a stratigraphic cross-section using Wheeler diagrams. Students will display quantitative radiometric age data as scatterplots with all units and quantities clearly labeled. Students will orally present and defend group stratigraphic interpretations to the class.

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

Students will develop and test interpretations of ancient depositional environments from sedimentary rocks and fossils in the laboratory and in the field. Students will use geologic materials to construct and interpret geologic maps. Students will construct stratigraphic cross-sections based on correlation of geologic successions from multiple locations. Students will construct cladograms depicting the degree of evolutionary relatedness of different organisms.
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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 will measure and describe a stratigraphic succession in the field as a group; they will present and defend their interpretation to the class. Students will develop and test competing hypotheses to explain the properties of sedimentary rocks as a group in lab; they will present a scientifically defendable consensus interpretation.

Please be aware that instructors should be prepared to submit samples/examples of student work as part of the future course recertification process.
GEOL 106 SYLLABUS
HISTORICAL GEOLOGY
XXX Semester 20XX, Sections XXX-XXX

Professor: XXX XXX
XXX Haughton Building
office phone: 845-XXXX
e-mail: XXX@geos.tamu.edu

Office Hours: XXX
XXX
or by appointment

Time and Place: XXX

Course Description and Prerequisites: “Historical Geology. (3-3). Credit 4. Hypotheses of Earth's origin; age dating of geologic materials; development and history of life; plate tectonic reconstructions, geologic history, and paleogeography, with emphasis on the North American plate. Not open to students who have taken GEOL 101 or GEOL 104.”

Learning Outcomes
Upon successful completion of this course, students will:
- Scale the timeline of major events in Earth history.
- Reconstruct past continental configurations.
- Interpret past depositional environments using sedimentary rocks and fossils.
- Correlate stratigraphic successions from different locations.
- Translate stratigraphic data into a time framework.
- Calculate radiometric ages.
- Construct and interpret phylogenetic trees.

Core Objectives
Critical Thinking
- Students will interpret depositional environments based on observations of sedimentary rocks and fossils.
- Students will analyze radiometric measurements to identify outliers when estimating geologic ages.
- Students will assess cause-and-effect feedbacks in Earth history using data from the rock record.

Communications Skills
- Students will present Earth history using distance as a metaphor for geologic time in both written and oral formats.
- Students will build phylogenetic trees showing the evolutionary relationships among biological lineages.
- Students will diagram the distribution of time in a stratigraphic cross-section using Wheeler diagrams.
- Students will display quantitative radiometric age data as scatterplots with all units and quantities clearly labeled.

Empirical and Quantitative Skills
- Students will develop and test interpretations of ancient depositional environments from sedimentary rocks and fossils in the laboratory and in the field.
- Students will use geologic materials to construct and interpret geologic maps.
- Students will construct stratigraphic cross-sections based on correlation of geologic successions from multiple locations.
- Students will construct cladograms depicting the degree of evolutionary relatedness of different
organisms.

Teamwork

- Students will measure and describe a stratigraphic succession in the field as a group; they will orally present and defend their interpretation to the class.
- Students will develop and test competing hypotheses to explain the properties of sedimentary rocks as a group in lab; they will prepare a scientifically defensible consensus interpretation in written form.

Textbook and Resource Material:


Grading Policies:

<table>
<thead>
<tr>
<th>Exam</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exam #1</td>
<td>15%</td>
</tr>
<tr>
<td>Exam #2</td>
<td>15%</td>
</tr>
<tr>
<td>Exam #3</td>
<td>15%</td>
</tr>
<tr>
<td>Exam #4</td>
<td>15%</td>
</tr>
<tr>
<td>Exam #5 (Final):</td>
<td>15%</td>
</tr>
<tr>
<td>Lab</td>
<td>25%</td>
</tr>
</tbody>
</table>

Letter grades will be assigned on the following scale:
A ≥ 90%, B ≥ 80% but < 90%, C ≥ 70% but < 80%, D ≥ 60% but less than 70%, and F < 60%.
Grades will be posted on the course web site: http://elearning.tamu.edu/

Academic Integrity: The Aggie Honor Code states that "An Aggie does not lie, cheat, or steal, or tolerate those who do." For more information, go to http://aggiehonor.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 of their disabilities. If you believe you have a disability requiring an accommodation, please contact Texas A&M University Disability Services located in Room B118 Cain Hall, phone: 845-1637, web address: http://disability.tamu.edu/.

Schedule of Topics

(Subject to change at instructor’s discretion)

<table>
<thead>
<tr>
<th>Topic</th>
<th>Required Reading (page numbers)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 1 Geologic Dating and Timescale</td>
<td>125-150</td>
</tr>
<tr>
<td>Week 2 Origin of the Earth</td>
<td>239-250</td>
</tr>
<tr>
<td>Week 3 Arehean Tectonics</td>
<td>250-256</td>
</tr>
<tr>
<td>Week 4 Origin and Evolution of Microbial Life</td>
<td>256-261</td>
</tr>
<tr>
<td>Week 5 Proterozoic Tectonics</td>
<td>266-268, 280-285</td>
</tr>
<tr>
<td>Week 6 Rise of Eukaryotic Life</td>
<td>269-275</td>
</tr>
<tr>
<td>Week 7 Proterozoic Climate</td>
<td>275-280</td>
</tr>
<tr>
<td>Week 8 Precambrian-Cambrian Transition</td>
<td>287-314</td>
</tr>
<tr>
<td>Week 9 Paleozoic Tectonics</td>
<td>314-340</td>
</tr>
<tr>
<td>Week 10 Paleozoic Climate</td>
<td>341-372</td>
</tr>
<tr>
<td>Week 11 Mesozoic Tectonics</td>
<td>373-402</td>
</tr>
<tr>
<td>Week 12 Mesozoic Climate</td>
<td>403-427</td>
</tr>
<tr>
<td>Week 13 Cenozoic Tectonics</td>
<td>429-452</td>
</tr>
</tbody>
</table>
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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
   - Life and Physical Sciences
   - Language, Philosophy and Culture
   - Creative Arts
   - American History
   - Government/Political Science
   - Social and Behavioral Sciences
   - Current core - Yes

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: 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.

12. Submitted by: ____________________________
    Course Instructor ____________________________
    Date 2/11/2013 ____________________________

    Approvals: ____________________________
    Date 2/11/2013 ____________________________

13. Department Head ____________________________
    Date 2/11/2013 ____________________________

14. College Dean/Designee ____________________________
    Date 2/11/2013 ____________________________

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.
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):

Oral: At the end of every class, a group of 3-4 students will 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, the rest of the class will then grade that group’s summary (and transmit the grades to me via clickers). Visual: Students will be required to work in groups (4-6 students) to create a youtube video explaining some aspect of climate science (e.g., how does the greenhouse effect work). The rest of the class will grade the group’s video using a rubric. Written: Several times during the semester, students will turn in written analyses of climate-change-related events in the news.

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.
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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):

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. In addition, the end-of-class summaries and youtube project (both described above) require teamwork to complete.

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

Mission statement: 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></th>
<th>Points</th>
<th>Fraction of grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 exams</td>
<td>100 points each (200 points total)</td>
<td>25% each (50% total)</td>
</tr>
<tr>
<td>Clicker questions</td>
<td>40 points total (120 clicker questions during the semester @ 1/3 point per question)</td>
<td>10%</td>
</tr>
<tr>
<td>Class round-up</td>
<td>20 points total over the semester</td>
<td>5%</td>
</tr>
<tr>
<td>YouTube project</td>
<td>20 points</td>
<td>5%</td>
</tr>
<tr>
<td>Write-up of climate news</td>
<td>20 points over the semester</td>
<td>5%</td>
</tr>
<tr>
<td>Final exam</td>
<td>100 points</td>
<td>25%</td>
</tr>
<tr>
<td>Total</td>
<td>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%)
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>clicker 2 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.

YouTube project: working in a group of 4-6 students, you will produce a 3-minute YouTube video that describes some aspect of climate (e.g., how the greenhouse effect works, how a cap and trade system works).

Current events write-up: Three times during the semester, you will turn in a one-page write up of a climate story that is in the news. It will be graded on content and on the quality of the writing.

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. on 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.
# Class Schedule

<table>
<thead>
<tr>
<th>Date</th>
<th>GEOS 210 Schedule</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></td>
<td></td>
</tr>
<tr>
<td>Aug 30, 2012</td>
<td>Introduction to climate change</td>
<td>Chapter 1</td>
<td></td>
</tr>
<tr>
<td>Sep 4, 2012</td>
<td>Is the climate warming, I</td>
<td>Chapter 2</td>
<td></td>
</tr>
<tr>
<td>Sep 6, 2012</td>
<td>Is the climate warming, II</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sep 11, 2012</td>
<td>Simple physics, I</td>
<td>Chapter 3</td>
<td></td>
</tr>
<tr>
<td>Sep 13, 2012</td>
<td>Simple physics, II</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sep 18, 2012</td>
<td>How the greenhouse works, I</td>
<td>Chapter 4</td>
<td></td>
</tr>
<tr>
<td>Sep 20, 2012</td>
<td>How the greenhouse works, II</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sep 25, 2012</td>
<td>Carbon cycle, I</td>
<td>Chapter 5</td>
<td></td>
</tr>
<tr>
<td>Sep 27, 2012</td>
<td><strong>Exam 1 (covers chap. 1-4)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oct 2, 2012</td>
<td>Carbon cycle, II</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oct 4, 2012</td>
<td>Forcing and feedback, I</td>
<td>Chapter 6</td>
<td></td>
</tr>
<tr>
<td>Oct 9, 2012</td>
<td>Forcing and feedback, II</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oct 11, 2012</td>
<td>Are humans causing climate change?</td>
<td>Chapter 7</td>
<td></td>
</tr>
<tr>
<td>Oct 16, 2012</td>
<td>Future climate change, I</td>
<td>Chapter 8</td>
<td></td>
</tr>
<tr>
<td>Oct 18, 2012</td>
<td>Future climate change, II</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oct 23, 2012</td>
<td>Impacts of climate change,</td>
<td>Chapter 9</td>
<td></td>
</tr>
<tr>
<td>Oct 25, 2012</td>
<td><strong>Exam 2 (covers chap. 5-8)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oct 30, 2012</td>
<td>Exponentials and discounting, I</td>
<td>Chapter 10</td>
<td></td>
</tr>
<tr>
<td>Nov 1, 2012</td>
<td>Exponentials and discounting, II</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nov 6, 2012</td>
<td>Policy options for climate change, I</td>
<td>Chapter 11</td>
<td></td>
</tr>
<tr>
<td>Nov 8, 2012</td>
<td>Policy options for climate change, II</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nov 13, 2012</td>
<td>Carbon tax &amp; cap and trade, I</td>
<td>Chapter 12</td>
<td></td>
</tr>
<tr>
<td>Nov 15, 2012</td>
<td>Carbon tax &amp; cap and trade, II</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nov 20, 2012</td>
<td>History of climate change, I</td>
<td>Chapter 13</td>
<td></td>
</tr>
<tr>
<td>Nov 22, 2012</td>
<td>Thanksgiving holiday – no class</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nov 27, 2012</td>
<td>History of climate change, II</td>
<td>“ClimateDebate” on eLearning</td>
<td></td>
</tr>
<tr>
<td>Nov 29, 2012</td>
<td>Solving the problem</td>
<td>Chapter 14</td>
<td></td>
</tr>
<tr>
<td>Dec 4, 2012</td>
<td>TBD</td>
<td></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>
<td></td>
</tr>
</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): Ecosystem Science and Mgmt, Wildlife and Fisheries Science

2. Course prefix and number: RENR 205

3. Texas Common Course Number: none


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
   - [ ] Currently con - yes

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

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

9. Number of class sections per semester: 2

10. Number of students per semester: each section up to 250, total 500

11. Historic annual enrollment for the last three years: 2010 - 675 2011 - 737 2012 - 631

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:
   - [Signature]
   - Date 2/7/13

13. Course Instructor
   - [Signature]
   - Date 1/31/13

14. Department Head
   - [Signature]
   - Date 2/12/13

15. College Dean/Designee
   - [Signature]
   - Date 2/12/2013

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.

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

Ecology is by definition the study of interactions between organisms and their environment. Natural selection and evolution strongly influence these interactions, they are central to the concept of ecological systems, and they have direct relevance to human society by identifying solutions to contemporary environmental challenges. Emphasis is placed on science as a systematic means of acquiring information about our physical world via the scientific method. The course addresses a diverse range of natural components from individual genes to the entire Earth System. Interactions among these various hierarchies within natural systems are also emphasized.

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 are routinely challenged to reevaluate origins, consequences and solutions of a broad range of environmental challenges confronting human societies. This is based in part upon recognizing that ecological principles governing all life on the planet – life cannot exist without the paramount ecological processes of energy flow, nutrients cycling and ecosystem processes of stability or resilience within ecosystems. Common and widely held ecological misconceptions are emphasized to promote critical evaluation and assessment of current ecological knowledge. Students are required to apply and strengthen their ecological knowledge outside the classroom by critically evaluating relevant readings, assignments, websites, and lecture presentations as well as inside the classroom through active learning activities using clickers and think-pair-share with probing questions and cases. Students also conduct an individual ecological inquiry project and they conduct background study, develop testable hypothesis based on observations, design investigation, collect data, analyze and interpret data, develop a scientific report, conduct peer review of reports using a detailed rubric, and revise own report based on peer reviews.

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

Students are provided with numerous opportunities to interpret multiple forms of scientific information, including tabular and graphical data. Information synthesis is promoted by challenging students to identify interrelations, trade-offs, and cause-effect mechanisms among disparate processes and variables within ecological systems. There are frequent in-class discussions, both among peers and the class as a whole, on ecological concepts and applications as well as interpretation of tabular and graphical data. Students also develop a written report for their individual inquiry project (including presenting their data graphically and interpreting them), conduct peer reviews of these reports using a detailed rubric, and revise their reports in
Empirical and Quantitative Skills (to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions):

The course is founded on quantitative scientific evidence and methods of inquiry, and the instructors go to great lengths to emphasize and familiarize students with scientific perspective. Various mathematical equations are evaluated as they relate to population growth, species biodiversity, population genetics, and chemical transformation associated with nutrient cycling. Students are familiarized with various scientific units and expressions, including the use of Systems International Units. For the ecological inquiry project, students analyze and interpret data they collected, draw conclusions, and discuss potential mechanisms and limitations of the findings.

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 are challenged to develop and exchange views and rationales to develop shared understanding for various topics through think-pair-share or peer instruction activities coupled with clicker questions. These collaborative learning and formative assessment activities facilitate peer interaction and collaboration to promote deep learning and appreciation of diverse perspectives. For the ecological inquiry project, students also conduct online group discussions and provide feedback to each other at multiple stages of the ecological inquiry process. Peer evaluations are conducted on the performance and contribution of individual group members.

Please be aware that instructors should be prepared to submit samples/examples of student work as part of the future course recertification process.
Course title and number  RENR 205  
Term  Fall/Spring  
Meeting times and location  
Section 501: MWF 09:10 am -10:00am: ILSB 1105  
Section 502: MWF 01:50 pm-02:40pm: ARCB 101  

Course Description and Prerequisites

Principles of ecology using a holistic approach treating plants, animals and humans as one integrated whole; composition, structure, nutrient cycles and energetics of biotic communities; adaptations to environmental factors; biotic relationships; and problems of environmental quality and resource use.

Prerequisites: None

Learning Outcomes or Course Objectives

1. The primary objective of this course is to explore ecology, its applications, and ecological inquiry. As a result of taking this course you should be able to:

   1. explain and distinguish between basic ecological concepts related to:  
      a. effects of environmental factors on organisms and adaptations of organisms to their environment  
      b. structure and dynamics of populations and communities and the role of disturbances  
      c. structure of ecosystems including energy flow dynamics and nutrient cycling  
      d. landscape pattern and process, and their interactions  
      e. characteristics of major ecosystems and factors determining their spatial distributions  

2. use ecological concepts and principles to interpret and critique current issues in environmental management and natural resource conservation

3. explain the scientific inquiry process and conduct simple ecological inquiries

Instructor Information

Dr. Mariana Mateos  
Dept. of Wildlife & Fisheries Sciences  
Heep Lab. Bldg (Old Heep), Rm 320B  
Telephone: 847-9462  
E-mail: mmateos@tamu.edu

Dr. David D. Briske  
Ecosystem Science & Management Dept.  
Room 328  
Animal Industries Building  
Telephone: 845-7331  
Email: dbriske@tamu.edu

Dr. X. Ben Wu  
Dept. of Ecosystem Science & Mgmt  
Animal Industries Bldg., Room 209D  
Telephone: 845-7334  
E-mail: xbw@tamu.edu

Dr. Kirk O. Winemiller  
Wildlife & Fisheries Sciences Dept.  
Room 110-D  
Old Heep Building  
Telephone: 862-4020  
Email: k-winemiller@tamu.edu

Office hours:  Mon. 3:00-4:00 PM, Wed. 10:30-11:30 AM, or by appointment
Teaching Assistant
TBA
Dept. of Ecosystem Sciences and Mgmt/ Dept. of Wildlife & Fisheries Sciences
Contact via eLearning
Office hours: Fri. 10:30am-12:30pm, or by appointment, 103E Animal Industries Bldg. Annex

Textbook and/or Resource Material


Weekly reading needs to be completed before class and there will be a closed-book clicker quiz for the readings in each class.

Clicker
You are required to purchase an i-clicker2 remote for in-class quizzes and activities. i-clicker is a response system that allows you to respond to questions we pose during class, and you will be graded on your i-clicker2 responses. You must register your i-clicker2 remote online before Sep 5th. You must have voted in class on at least one question in order to complete this registration properly. Once you have voted on a question in our class, go to http://www.iclicker.com/registration. Complete the fields with your first name, last name, student ID, and remote ID. The remote ID is the series of numbers and sometimes letters found on the bottom of the back of your i-clicker2 remote. You are responsible to make sure that your clicker is functional and with power in every class period.

Grading Policies

\[
\begin{align*}
(\geq 90\% & \quad A, \ 80-89\% \quad B, \ 70-79\% \quad C, \ 60-69\% \quad D, \ \text{and} \ <60\% \quad F) \\
\text{Weekly on-line quizzes} & \quad 100 \text{ points} \\
\text{In-class clicker questions} & \quad 100 \text{ points} \\
4 \text{ unit exams (@100 points each)} & \quad 400 \text{ points} \\
\text{Inquiry project and peer review} & \quad 100 \text{ points} \\
\text{Total:} & \quad 700 \text{ points}
\end{align*}
\]

Attendance Policy

"The University views class attendance as the responsibility of an individual student. Attendance is essential to complete the course successfully. University rules related to excused and unexcused absences are located on-line at http://student-rules.tamu.edu/rule07."

Lecture Outline

UNIT I

Week 1 (Aug 27) Introduction to course
Part I – Introduction and Life in the Physical Environment
Chapter 1: Introduction
Chapter 2: Adaptations to the Physical Environment: Water and Nutrients

Week 2 Chapter 3: Adaptations to the Physical Environment: Light, Energy, & Heat
Week 3  
**Part II – Organisms**  
(Sep 10)  
Chapter 6: Evolution and Adaptation  
Chapter 7: Life Histories and Evolutionary Fitness  
Chapter 8: Sex and Evolution  

Week 4  
Chapter 9: Family Society, and Evolution  
(Sep 17)  
Review (Sep 19)  
**Exam I (Sep 21)**

**UNIT II**

Week 5  
**Part III – Populations**  
(Sep 24)  
Chapter 10: The Distribution and Spatial Structure of Populations  
Chapter 11: Population Growth and Regulation  
Chapter 12: Temporal and Spatial Dynamics of Populations  

Week 6  
(Sep 28)  
Chapter 13: Population Genetics  
**Part IV – Species Interactions**  
Chapter 14: Species Interactions  
Chapter 15: Dynamics of Consumer-Resource Interactions  

Week 7  
(Oct 1)  
Chapter 16: Competition  
(Oct 8)  
Chapter 5: The Biome Concept in Ecology  
Review (Oct 12)

**UNIT III**

Week 8  
**Exam II (Oct 15)**  
**Part V – Communities**  
Chapter 18 Community Structure  
Inquiry project  

Week 9  
(Oct 22)  
Chapter 19 Ecological Succession and Community Development  
Online Lecture: Disturbance and Fire Ecology  
Inquiry project  

Week 10  
(Oct 29)  
Chapter 20 Biodiversity  
Chapter 21 History, Biogeography, and Biodiversity  
Inquiry project  

Week 11  
**Part VI – Ecosystems**  
(Nov 5)  
Chapter 22 Energy in the Ecosystem  
Review (Nov 7)  
**Exam III (Nov 9)**  
Inquiry project

**UNIT IV**

Week 12  
(Nov 12)  
Chapter 23 Pathways of Elements in Ecosystems  
Chapter 24 Nutrient Regeneration in Terrestrial and Aquatic Ecosystems  
Inquiry project
Week 13  Part VII – Ecological Applications  
(Nov 19)  Chapter 25 Landscape Ecology  
Inquiry project  
Thanksgiving holiday – No class on Nov 23  

Week 14  Chapter 26 Biodiversity, Extinction, and Conservation  
(Nov 26)  Chapter 27 Economic Development and Global Ecology  

Week 15  Review (Dec 3)  
(Dec 3)  Reading days (Dec 5-6)  

Week 16  Exam IV for Section 501 (Dec 10, 8:00-10:00am)  

In-Class Clicker Quizzes and Activities  
There will be two kinds of clicker questions: closed-book clicker quizzes in class over the reading  
assignments; and open book questions for learning activities. The purpose of the clicker quizzes is to  
assess your understanding of the reading material and to guide classroom activities to improve your  
understanding.  

For each class, the total points for clicker questions will be 5, of which 2 are participation points and 3  
are based on performance in the clicker quiz questions. Participating in 50% or more of the clicker  
questions is required to obtain participation points in each class.  

At the end of the semester, the lowest 20% of the clicker grades will be discarded, and the rest will be  
averaged. There will be no make-ups or adjustments for clicker quizzes or participation, except for  
situations with university excused absences.  

On-line Quizzes  
Weekly online quizzes will be given in eLearning, each with about 10-15 questions based on readings,  
lectures and assignments during the preceding week. Each quiz can be taken twice within the allowed  
time period; the higher of the two scores will be used. A portion of the exam questions will come from  
the quiz questions. Each quiz will begin at 5:00 am on Saturday and will be available until 5:00 am on  
the following Saturday. At the end of the semester, the lowest grade will be dropped and others will be  
averaged.  

Inquiry Project  
An inquiry project will be conducted during the second half of the semester. Each student will conduct  
an individual inquiry project that involves the full process of ecological inquiry – developing research  
hypothesis based on observations and published knowledge on the ecological phenomena, design and  
conduct sampling to collect data, analyze and interpret the data to test the hypothesis, writing a scientific  
report based on the investigation, participate in peer review of the reports, and improve one’s report  
based on peer review feedback. Specific directions for the inquiry project will be provided in eLearning.  

Exams  
There will be 4 unit exams each consisting of 40 multiple choice questions worth 2.5 points each.  
Exams will be scantron graded; students must provide their own full page scantrons (NCS mp90051  
or 0-101607-TAMU). For all exams, please bring your valid student ID card and a No. 2 lead pencil  
with an eraser. No other materials (notebooks, etc.) will be allowed in the room during exams. No  
personal electronic devices may be used during the exams.  

Make-up Policy  
A make-up exam will be given for students with a University-excused absence (http://student-  
rules.tamu.edu/rule07) for a unit exam. If physically able, you must register your excused absences with
course instructors within 5 days of the missed exam, quiz or assignment.

**Americans with Disabilities Act (ADA)**
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)

**Academic Integrity**

*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](http://aggiehonor.tamu.edu)
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 & Astronomy

2. Course prefix and number:
   ASTR 101

3. Texas Common Course
   Number:
   ASTR 1304
   PHYS 1311

4. Complete course title:
   Basic Astronomy

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

   Current Core - ___ Yes

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:
    F2011/S2012: 664
    F2010/S2011: 853
    F2009/S2010: 1040

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

   [Signature]

   Date: 01 March 2013

14. Department Head

   [Signature]

   Date: 3/4/2013

15. College Dean/Designee

   [Signature]

   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?

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  
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 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. Individual student progress is assessed regularly throughout the semester using metrics that include homework, in-class participation via polling, and exams.

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). Astronomy also is particularly attuned to teaching students visual interpretation and understanding, specifically by using figures and images of astronomical objects to infer empirical relations and thus learn universal physical concepts. 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, and exams.
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):

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 lmacri@tamu.edu, Mitchell Institute #423, (979) 314-1592
• Teaching Assistants: Steven Boada & Yi Yang
  o sboada@physics.tamu.edu; ngc4594@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 (12:45 pm) 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 8 am.
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 $\geq 90$: A
- $80 \leq$ % of all possible points $< 90$: B
- $70 \leq$ % of all possible points $< 80$: C
- $60 \leq$ % 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): Physics & Astronomy

Course prefix and
title: ASTR 111 Texas Common Course

3. Number: ASTR 1103

Complete course
title: Overview of Modern Astronomy

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
  ___ 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 and Spring semester (ASTR 111 first offered F2010)

9. Number of class sections per
semester: 2 to 4 classes with total of 12 to 16 lab sections

10. Number of students per semester:
    130 to 280 (projected to grow to target of 400)
    yet available

11. years: 381 280

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]

14. Department Head

       [Signature]

15. College Dean/Designee

       [Signature]

       Date: 01 March 2013

See form instructions for submission/approval process.

       Date: 3/14/2013

       Date: 3/5/13

       Associate Provost

   for Undergraduate Studies

   MAR 09
   310
   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?

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. Individual student progress is assessed regularly throughout the semester using metrics that include homework, in-class participation via polling, exams, and lab quizzes.

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. Astronomy also is particularly attuned to teaching students visual interpretation and understanding, specifically by using figures and images of astronomical objects to infer empirical relations and thus learn universal physical concepts as well as to navigate the sky using celestial coordinates. 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, interpret their results, and possibly reconcile differing interpretations. 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
(immediately rings my phone, sends text of voicemail, and sends voicemail recording to my email)

Textbooks: "21st Century Astronomy", Third Edition by Hester et al.;
"Astronomy 111 Handbook" (available at Notes & Quotes; www.aggienotes.com)

Equipment: iClicker
(bring to every lecture; 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/
E-learning 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 MPHYS 331.
Bring sturdy Lab or Composition Notebook with about 80 pages and the Astronomy 111 Lab Handbook (Fall 2011 Edition, purchase at Notes & Quotes).

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<td>11:30-13:30</td>
<td>Mike Smitka</td>
<td><a href="mailto:mikesmitka34@neo.tamu.edu">mikesmitka34@neo.tamu.edu</a></td>
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<td>09:35-11:35</td>
<td>Heath Shipley</td>
<td><a href="mailto:heath.shipley@tamu.edu">heath.shipley@tamu.edu</a></td>
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<td>Ting Li</td>
<td><a href="mailto:saisabi@neo.tamu.edu">saisabi@neo.tamu.edu</a></td>
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<td>15:55-17:55</td>
<td>Adam Tomczak</td>
<td><a href="mailto:tomczak@neo.tamu.edu">tomczak@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:tomczak@neo.tamu.edu">tomczak@neo.tamu.edu</a></td>
</tr>
<tr>
<td>509</td>
<td>Monday</td>
<td>09:10-11:10</td>
<td>Heath Shipley</td>
<td><a href="mailto:heath.shipley@tamu.edu">heath.shipley@tamu.edu</a></td>
</tr>
<tr>
<td>510</td>
<td>Thursday</td>
<td>15:55-17:55</td>
<td>Ting Li</td>
<td><a href="mailto:saisabi@neo.tamu.edu">saisabi@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

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.
Astronomy 111: Class Schedule (Fall 2011)

http://smartwork.wwnorton.com/

<table>
<thead>
<tr>
<th>WEEK</th>
<th>LECTURE</th>
<th>DATE</th>
<th>ASSIGNMENT (READ CHAPTERS BEFORE LECTURE)</th>
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<td>1</td>
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<td>30 Aug</td>
<td>Ch. 1, 2</td>
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<td></td>
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<td>* HW1 assigned on Ch. 1, 2 (due 06 Sept)</td>
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<tr>
<td>2</td>
<td>3</td>
<td>06 Sept</td>
<td>Ch. 2; Tutorial (Seasons)</td>
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<td></td>
<td>4</td>
<td>08 Sept</td>
<td>Ch. 3; Tutorial (Kepler's 2nd Law)</td>
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<td>5</td>
<td>13 Sept</td>
<td>Ch. 3; Tutorial (Newton's Laws &amp; Gravity)</td>
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<td>7</td>
<td>13</td>
<td>11 Oct</td>
<td>Ch. 9, 10</td>
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<td>14</td>
<td>13 Oct</td>
<td>Ch. 10; Summary &amp; review</td>
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<td>8</td>
<td>15</td>
<td>18 Oct</td>
<td>Ch. 13; Tutorial (The Parsec)</td>
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<td>9</td>
<td>17</td>
<td>25 Oct</td>
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<td>18</td>
<td>27 Oct</td>
<td>Ch. 14, 15; Tutorial (Star Formation)</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>
<td>Ch. 18; Tutorial (Expanding Universe)</td>
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<td>12</td>
<td>23</td>
<td>15 Nov</td>
<td>Ch. 18, 19; Tutorial (Galaxy Classes)</td>
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<td>24</td>
<td>17 Nov</td>
<td>Ch. 19, 20</td>
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<td>22 Nov</td>
<td>Ch. 19, 20</td>
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<td>14</td>
<td>27</td>
<td>01 Dec</td>
<td>Ch. 21, 22</td>
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<td>15</td>
<td>28</td>
<td>06 Dec</td>
<td>Redefined Thursday; Summary &amp; review</td>
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<td>16</td>
<td>09 Dec</td>
<td></td>
<td>Final Exam: 12:30-14:30 (for lecture TR@12:45)</td>
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<tr>
<td>16</td>
<td>13 Dec</td>
<td></td>
<td>Final Exam: 13:00-15:00 (for lecture TR@08:00)</td>
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</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): Physics and Astronomy
   Course prefix and number: PHYS 201
   Texas Common Course Number: PHYS 1401 or 1301 + 1101

2. Complete course title: College Physics
   Semester credit hours: 4

3. 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

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

5. How frequently will the class be offered? every fall, spring, summer

6. Number of class sections per semester: fall: 26 spring: 16 summer: 4

7. Number of students per semester: fall: 550 spring: 350 summer: 60

8. 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.

    Course Instructor

14. Department Head
    [Signature] 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 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. The course includes applications of the Scientific Method and its use in the development of scientific theories. The laboratory and in-class lecture demonstrations connect the concepts developed in the course to real-world phenomena that are part of students’ experiences.

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):

Written communication is developed by teaching students to present their solutions to problems in a clear and logical fashion. This is tested on exams. Graded homework problems include essay questions. Visual communication skills are developed in the course through the construction and interpretation of graphical presentations of data. Students are taught that constructing diagrams and sketches is an important component of problem solving. Verbal communication skills are developed through in-class discussions. In addition, the first hour of the laboratory period is used for recitation, where assigned homework problems are discussed, in the context of the concepts presented in the lecture portion of the course. And in the laboratory portion of the course, taking data, analyzing data and writing the lab report requires discussion between the two lab partners.

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.
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 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.

Please be aware that instructors should be prepared to submit samples/examples of student work as part of the future course recertification process.
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; P34,35,40,45,46,49</td>
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<td>Sept. 5</td>
<td>Projectiles</td>
<td>3: 1-3</td>
<td>2: P5,15,47,59,66,69,74,79</td>
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<td></td>
<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; P5,11,20,37,43,49,50</td>
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<td></td>
<td>Sept. 12</td>
<td>Free-Body Diagrams</td>
<td>4: 6</td>
<td>4: P5,12,54</td>
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<tr>
<td></td>
<td>Sept. 14</td>
<td>( F = ma ) 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; P3,37,46,47,48,50,</td>
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<td>Sept. 19</td>
<td>Examples; Review</td>
<td>5:</td>
<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>
<td>6: 1-2</td>
<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>
<td>6: 3-5</td>
<td>6: P5,45,75,52,54,55</td>
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<td>Sept. 28</td>
<td>Work; Energy</td>
<td>7: 1-4</td>
<td>7: MC7; P5,6,18,21,24,25</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; P30,32,33,45,48,52,54</td>
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<td>Oct. 3</td>
<td>Nonconservative Forces; Power</td>
<td>7: 7-8</td>
<td>7: P5,8,9,62,67,81,82,85,87,93,94,100</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; P3,12,14,16,17,19,23</td>
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<td>8: P2,26,29</td>
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<td>Oct. 8</td>
<td>Impulse; Center of Mass</td>
<td>8: 5-7</td>
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<td>8: P40,42,60,61,63,65,66,69,80</td>
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<td>Review</td>
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<td>Oct. 12</td>
<td><strong>Exam 2 Chs 6--8</strong></td>
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<td>Oct. 15</td>
<td>Rotational Kinematics</td>
<td>9: 1-3</td>
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<td>Oct. 17</td>
<td>Moments: Moving Axis</td>
<td>9: P12,19,26,29,33,34,42,46,49,51,63,64,70</td>
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<td>Oct. 19</td>
<td>Torque; Rotational Dynamics</td>
<td>10: 1-2</td>
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<td>10: MC2,5,6; P2,3,9,11,17</td>
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<td>Oct. 22</td>
<td>Work; Angular Momentum</td>
<td>10: 3-5</td>
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<td>Oct. 24</td>
<td>Rotational Statics</td>
<td>10: P47,50,60,62,63,70,73,75</td>
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<td>Oct. 26</td>
<td>SHM</td>
<td>11: 1-3</td>
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<td>Oct. 29</td>
<td>SHM; Pendulums</td>
<td>11: 4-5</td>
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<td>Nov. 2</td>
<td><strong>Exam 3 Chs 9--11</strong></td>
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<td>Nov. 5</td>
<td>Waves</td>
<td>12: 1-4</td>
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<td>Nov. 7</td>
<td>Standing Waves</td>
<td>12: P18,19,26,33,35,42,43,50,53,54,60</td>
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<td>Interfererence; Sound</td>
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<td>Nov. 12</td>
<td>Expansion; Heat</td>
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<td>Nov. 14</td>
<td>Heat Transfer; Ideal Gas</td>
<td>14: MC3,4,5,6,7,9,11; P4,7,11,13,16</td>
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<td>Kinetic Theory; 1st Law</td>
<td>14: P49,53,56,64,73,74,82</td>
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<td>Nov. 19</td>
<td>Heat Engines; 2nd law</td>
<td>16: 1-5</td>
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<td>Nov. 21</td>
<td>Carnot Cycle; Entropy</td>
<td>16: P4,9,17,19,21,24,27,31,40,42,48,50</td>
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<td>Nov. 23</td>
<td>Thanksgiving Holiday</td>
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<td>Nov. 26</td>
<td>Fluid Statics</td>
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<td>Nov. 28</td>
<td>Examples; Review</td>
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<td><strong>Exam 4 Chs 12--16</strong></td>
<td>13: P2,19,29,32,33,35,61,66,67,68</td>
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<td>Dec. 3</td>
<td>Review</td>
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**Academic Integrity Statement:** “An Aggie does not lie, cheat, or steal or tolerate those who do.” /shillbreak
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

2. Course prefix and number: PHYS 202

3. Texas Common Course Number: PHYS 1402 or 1302 + 1102

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: 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.

12. Date: 3/4/2013

13. Submitted by: [Signature]
   Course Instructor

14. Date: 3/4/2013
   Department Head

15. 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. The course includes applications of the Scientific Method and its use in the development of scientific theories. The laboratory and in-class lecture demonstrations connect the concepts developed in the course to real-world phenomena that are part of students’ experiences.

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):

Written communication is developed by teaching students to present their solutions to problems in a clear and logical fashion. This is tested on exams. Graded homework problems include essay questions. Visual communication skills are developed in the course through the construction and interpretation of graphical presentations of data. Students are taught that constructing diagrams and sketches is an important component of problem solving. Verbal communication skills are developed through in-class discussions. In addition, the first hour of the laboratory period is used for recitation, where assigned homework problems are discussed, in the context of the concepts presented in the lecture portion of the course. And in the laboratory portion of the course, taking data, analyzing data and writing the lab report requires discussion between the two lab partners.

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.
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 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.

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: 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 11 a.m.-12 noon, T 11 a.m.-12 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%; Lab 7%; Recitation 5%; Homework (Mastering Physi) 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>
</tr>
</thead>
<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></td>
<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></td>
<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>
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<tr>
<td></td>
<td>Jan. 23</td>
<td>potential</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></td>
<td>Jan. 25</td>
<td>capacitors</td>
<td>18: 5--6</td>
<td>18: 22,24,38,44,49,53,54,75,76,78</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>Jan. 30</td>
<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></td>
<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></td>
<td></td>
<td></td>
<td>19: 51,52,53,72,75,85</td>
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<tr>
<td></td>
<td>Feb. 6</td>
<td>examples; review</td>
<td></td>
<td></td>
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<td></td>
<td>Feb. 8</td>
<td>Exam 1 Chs. 17-19</td>
<td></td>
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<tr>
<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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<tr>
<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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<tr>
<td></td>
<td>Feb. 15</td>
<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>6</td>
<td>Feb. 18</td>
<td>induced emf</td>
<td>21: 1--5</td>
<td>MC21: 2,6,10,13,14,15</td>
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<td></td>
<td>Feb. 20</td>
<td>inductance</td>
<td>21: 6--9</td>
<td>21: 2,4,7,10,12,13,16,17,21,25,28,29</td>
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<tr>
<td></td>
<td>Feb. 22</td>
<td>$RL$ and $LC$ circuits</td>
<td>21: 10--12</td>
<td>21: 33,37,45,46,50,51,56,57,58,63</td>
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<tr>
<td>Date</td>
<td>Topic</td>
<td>Sections</td>
<td>Remarks</td>
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<tr>
<td>Feb. 25</td>
<td>ac circuits</td>
<td>22: 1-3</td>
<td>MC22: 5,6,7,14; 22: 11,14,16,18</td>
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<tr>
<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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<tr>
<td>Mar. 1</td>
<td>Exam 2 Chs 20-22</td>
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<td>Mar. 4</td>
<td>em waves</td>
<td>23: 1-6</td>
<td>MC23: 1,2,3,8,11,12; 23: 13,14,16,21,22</td>
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<tr>
<td>Mar. 6</td>
<td>reflection, refraction</td>
<td>23: 7-10</td>
<td>23: 40,42,44,47,57,59,66,67,73,74,78,84</td>
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<td>Mar. 8</td>
<td>images by mirrors</td>
<td>24: 1-3</td>
<td>MC24: 6; 24: 8,11,14,15,18,58,59</td>
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<td></td>
<td>Spring Break</td>
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<td>Mar. 18</td>
<td>thin lenses</td>
<td>24: 4-6</td>
<td>MC24: 2,3,9,13,14; 24: 21,22,28,29,31</td>
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<td></td>
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<td>24: 33,41,45,47,48,51,52,55,56</td>
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<td>Mar. 20</td>
<td>optical instruments</td>
<td>25: 1-3</td>
<td>MC25: 9,10</td>
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<td>Mar. 22</td>
<td>angular magnification</td>
<td>25: 4-6</td>
<td>25: 9,11,14,20,22,30,31,34,40,52</td>
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<td>Mar. 25</td>
<td>interference</td>
<td>26: 1-2</td>
<td>MC26: 2,6,9,10,13 26: 3,4,7,9,10,20,23</td>
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<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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<td>Mar. 29</td>
<td>No Class</td>
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<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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<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; Bohr 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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<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></td>
<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>
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<td>Apr. 24</td>
<td>examples; review</td>
<td></td>
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<tr>
<td>Apr. 26</td>
<td>Exam 4 Chs 28-30</td>
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<tr>
<td>Apr. 29</td>
<td>review</td>
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<tr>
<td>Apr. 30</td>
<td>review</td>
<td></td>
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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 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
   □ Life and Physical Sciences
   □ Language, Philosophy and Culture
   □ Creative Arts
   □ American History
   □ Government/Political Science
   □ Social and Behavioral Sciences
   [Current Core: Yes]

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: 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

   This completed annual report 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: Jairo Sinova

    Course Instructor

    Date 3/1/2013

    Approvals:

    Date 3/1/2013

    Department Head

    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 208 (4 credits): ELECTRICITY
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 related 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. Students taking this course learn the key arguments behind the scientific method and how to analyze and interpret what is being observed.

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 fo 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):

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 designing.
Texas A&M University

Core Curriculum

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

They will compose scientific reports on their findings, learning how to defend their work in a scientific way. Oral communication between lab partners is an essential part of taking data, analyzing data and preparing a report. The first hour of the laboratory period is dedicated to recitation, where concepts presented in lecture and homework problems that apply these concepts are discussed among students. And, there is in-class discussion in the lecture portion of the course. Visual communication skills are developed in the course through the construction and interpretation of graphical presentations of data. Students are taught that constructing diagrams and sketches is an important component of problem solving. Written communication is developed by teaching students to present their solutions to problems in a clear and logical fashion. This is tested on exams. 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):

Similarly as in the previous PHYS 218 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 aswes (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) 8-5-1411; (email) hardy@comp.tamu.edu
Office hours: Mon. 2-4 & Tues. 2-4, or by appointment

Web page: http://yclotum.tamu.edu/jch

Textbooks

"University Physics," 13th ed. by Hugh Young and Roger Freedman (Volume 2)
"Laboratory (E&K) Experiments for Physics 208," 11th ed. by S. Ramirez, J. Ross and W. Saslow

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 class 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% on 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></th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 Midterm Exams</td>
<td>300/200</td>
</tr>
<tr>
<td>Final Exam</td>
<td>200/300</td>
</tr>
<tr>
<td>Recitation quizzes</td>
<td>75</td>
</tr>
<tr>
<td>Laboratory</td>
<td>100</td>
</tr>
<tr>
<td>Homework</td>
<td>75</td>
</tr>
<tr>
<td>Total</td>
<td>750</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 mid-term 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>
</tr>
<tr>
<td>Jan. 28</td>
<td>23 (1-5)</td>
<td>Electric Potential</td>
</tr>
<tr>
<td></td>
<td></td>
<td>23:1, 5, 13, 14, 19, 26, 29, 32, 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>
<tr>
<td></td>
<td></td>
<td>24:3, 8, 11, 14, 17, 18, 28, 34, 42, 47, 48, 52, 57, 69, 61, 65, 66, 74, 77.</td>
</tr>
<tr>
<td>Feb. 11</td>
<td>Exam 1 (Chap. 21-23) - Wed. in class 25 (1-5)</td>
<td>Help session, Sunday, Feb. 10, 7-9pm, Current, Resistance and Electromotive Force</td>
</tr>
<tr>
<td>Feb. 18</td>
<td>26 (1-5)</td>
<td>DC Circuits</td>
</tr>
<tr>
<td></td>
<td></td>
<td>26:8, 9, 13, 16, 27, 36, 43, 50, 53, 60, 64, 66, 74, 77, 78, 83, 92.</td>
</tr>
<tr>
<td>Feb. 25</td>
<td>27 (1-7)</td>
<td>Magnetic Fields and Magnetic Forces</td>
</tr>
<tr>
<td></td>
<td></td>
<td>27.1, 4, 8, 11, 14, 18, 23, 26, 43, 48, 54, 57.</td>
</tr>
<tr>
<td>Mar. 4</td>
<td>Exam 2 (Chap. 24-26) - Wed. in class 28 (1-7)</td>
<td>Help session, Sunday, Mar. 3, 7-9pm, Sources of Magnetic Field</td>
</tr>
<tr>
<td></td>
<td></td>
<td>28:1, 8, 13, 28, 34, 37, 42, 44, 45, 53, 60, 61, 62, 67, 75, 84.</td>
</tr>
<tr>
<td>Mar. 11-15</td>
<td></td>
<td>Spring Break</td>
</tr>
<tr>
<td>Mar. 18</td>
<td>29 (1-7)</td>
<td>Electromagnetic Induction</td>
</tr>
<tr>
<td></td>
<td></td>
<td>29:3, 4, 7, 9, 17, 23, 28, 36, 39, 44, 49, 57, 63, 67, 73, 77.</td>
</tr>
<tr>
<td>Mar. 25</td>
<td>30 (1-5)</td>
<td>Inductance</td>
</tr>
<tr>
<td>Apr. 1</td>
<td>32 (1-4)</td>
<td>Electromagnetic Waves</td>
</tr>
<tr>
<td></td>
<td></td>
<td>32:1, 4, 8, 11, 14, 18, 23, 26, 43, 48, 54, 57.</td>
</tr>
<tr>
<td>Apr. 8</td>
<td>Exam 3 (Chap. 27-30) - Wed. in class 33 (1-3, 5, 7)</td>
<td>Help session, Sunday, Apr. 7, 7-9pm, The Nature and Propagation of Light</td>
</tr>
<tr>
<td></td>
<td></td>
<td>33:3, 7, 12, 19, 22, 31, 34, 36, 42, 43, 48, 52, 59, 60, 66.</td>
</tr>
<tr>
<td>Apr. 15</td>
<td>34 (1-4, 6)</td>
<td>Geometrical Optics and Optical Instruments</td>
</tr>
<tr>
<td></td>
<td></td>
<td>34:2, 7, 8, 19, 20, 28, 36, 37, 53, 74, 76, 81, 113, 118.</td>
</tr>
<tr>
<td>Apr. 22</td>
<td>35 (1, 2, 4, 5)</td>
<td>Interference</td>
</tr>
<tr>
<td></td>
<td></td>
<td>35:1, 6, 11, 16, 18, 28, 39, 46, 47, 54.</td>
</tr>
<tr>
<td>Apr. 29 (Mon.)</td>
<td></td>
<td>Interference, Help session</td>
</tr>
<tr>
<td>Apr. 30 (redefined Fri.)</td>
<td></td>
<td>Final Exams (Chap. 21-30, 32-35)</td>
</tr>
<tr>
<td>May 7 (Tues.)</td>
<td></td>
<td>8-10am for MWF 10:20-11:10</td>
</tr>
<tr>
<td>May 8 (Wed.)</td>
<td></td>
<td>10:30am-12:30pm for MWF 11:30-12:20</td>
</tr>
</tbody>
</table>

### ADA Note

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 979-845-1637. For additional information visit [http://disability.tamu.edu](http://disability.tamu.edu).

### Honor Code

"An Aggie does not lie, cheat, or steal or tolerate those who do." All work for this course will be governed by the the Aggie Honor Code. To familiarize yourself with these rules they can be found on [the web at: http://www.tamu.edu/aggiehonor](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 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
   - Current core - Y

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.

12. Submitted by: Jairo Sinova
    Date: 3/1/2013

    Course Instructor

    Approvals:

13. Department Head
    Date: 3/1/2013

14. 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 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 engineer 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 where first observed and developed by using the scientific method and how they have been used in all known scientific disciplines. It requires of the students a direct engagement in connecting the theoretical concepts with their own experience and with experimental laboratory exercises that reinforce the scientific method. The students learn how to predict trajectories of objects, how to describe their motion mathematically, what are the physical principles that govern the dynamics and mechanics of objects, and how to apply to real world situations in engineering and other scientific disciplines. Students taking the course learn the key arguments behind the scientific method and how to analyze and interpret what is being observed.

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. 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 fo 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, model 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):

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
Texas A&M University

Core Curriculum

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

their findings, learning how to defend their work in a scientific way. Oral communication between lab partners is an essential part of taking data, analyzing the data and preparing a report. The first hour of the laboratory period is dedicated to recitation, where concepts presented in lecture and homework problems that apply these concepts are discussed among the students. And, there is in-class discussion in the lecture portion of the course. Visual communication skills are developed in the course through the construction and interpretation of graphical presentations of data. Students are taught that constructing diagrams and sketches is an important component of problem solving. Written communication is developed by teaching students to present their solutions to problems in a clear and logical fashion. This is tested on exams. 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 periodicaly 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><strong>Professor</strong></th>
<th>Jairo Sinova</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Email</strong></td>
<td><a href="mailto:Sinova@physics.tamu.edu">Sinova@physics.tamu.edu</a></td>
</tr>
<tr>
<td><strong>Phone</strong></td>
<td>979-845-4179</td>
</tr>
<tr>
<td><strong>Office</strong></td>
<td>MPH 413</td>
</tr>
<tr>
<td><strong>Lectures</strong></td>
<td>TIME AND LOCATION HERE</td>
</tr>
</tbody>
</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 13th edition. |
| **Lab info**     | TBA |
| **Web site**     | All course information will be posted at TBA |

## 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
a previous semester, you do **not** have to redo the lab part of the course (but you may if you want to improve the lab grade). However, you must contact the Physics Front Office *immediately* in order to transfer your grade. Note that you **must** still attend the recitation this semester.

| **ADA** | 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. |
| **Aggie Honor Code** | As a student at Texas A&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 [http://www.tamu.edu/aggiehonor](http://www.tamu.edu/aggiehonor). |
**Tentative Course Schedule for Phys 218 Spring 2011 Sinova**

Aug. 26 – 30    Math Primer: Trigonometry, Vectors, and Calculus Review
                Chapter 1: Units, Physical Quantities

Sept. 2-6      Chapter 2: 1-D Kinematics

Sept. 9-13    Chapter 3: Kinematics in 2- and 3-D
                Chapter 3: Relative and Circular Motion

Sept. 16-20   Chapter 4: Newton's Laws

Sept. 23-24   Review for Exam 1

       Sept. 25 (Wednesday evening) Exam 1 (Ch.1-4)

Sept. 25-27   Chapter 5: Applications of Newton's Laws, Types of Forces, and
                Friction

Sept. 30-Oct.4 Chapter 6: Work, Kinetic Energy, Work-Energy Theorem

Oct. 7-11     Chapter 7: Conservative Forces and Potential Energy,
                Conservation of Energy

Oct. 14-18   Chapter 8: Center of Mass, Momentum, Conservation of
                Momentum, Collisions

Oct.21-22   Review for Exam 2

       Oct. 23 (Wednesday evening) Exam 2 (Ch.5-8)

Oct. 23-25   Chapter 9: Rotational Kinematics and Moment of Inertia

Oct. 28-Nov.1 Chapter 10: Torque, Dynamics of Rotation,
              Conservation of Angular Momentum

Nov.4-8     Chapter 11: Statics and Elasticity

Nov. 11-13   Chapter 13: Gravitation and Kepler's Laws, and Review for Exam 3
                (Nov. 15 is last day to Q-drop)

Nov. 18-19   Review for Exam 3

       Nov. 20 (Wednesday evening)) Exam 3 (Ch.9-11,13)

Nov. 20-22   Chapter 14: Simple Harmonic Motion

Nov. 25-27   Chapter 14: Pendula
                Chapter 15: Mechanical Waves
                (Nov. 28-29 is Thanksgiving Holiday)

Dec.2-3     Chapter 15: Review for Final Exam
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): Anthropology

2. Course prefix and number: ANTH 225

3. Texas Common Course Number: 2401

4. Complete course title: Introduction to Biological Anthropology

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

Current Core - ☐ Yes
Current ICD - ☐ No

4 Pending ICD Approval by CCC, July 1st

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

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

9. Number of class sections per semester: 4

10. Number of students per semester: 70


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

   Date: 3/26/2013

   Approvals:

14. Department Head
    [Signature]

   Date: 3/27/2013

   Associate Provost for Undergraduate Studies

15. College Dean/Designee
    [Signature]

   Date: Mar. 28, 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.
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?

Life and physical sciences focus on describing, explaining, and predicting natural phenomena using the scientific method. Biological Anthropology is among the most scientifically oriented endeavors within the Liberal Arts, focusing on rigorous data collection and hypothesis testing to advance our understanding of one of the core unifying principles of all life sciences: evolution. Biological anthropologists study living primates using well established wildlife research techniques. They examine, measure, and analyze the skulls, jaws, teeth, and skeletons of both modern humans and primates, as well as the fossil ancestors of these groups. Biological anthropologists investigate the DNA of living and fossil primates, and undertake research into the isotope chemistry underlying the diets of living and fossil primates. And, biological anthropologists are deeply involved in the forensic sciences. All of this research is undertaken with the aim of understanding and explaining the biological diversity of primates worldwide, including humans and our fossil ancestors. The ultimate goal is to better understand the complex interactions between climate/environment/ecology and human and primate populations, and how these external factors have influenced primate and human evolution. If we want to understand what makes us human, we must first recognize our primate heritage, as well as our deeper mammalian heritage. Only then can we grasp how the natural world has shaped our evolutionary history, and resulted in the diverse array of biological adaptations that characterizes modern *Homo sapiens*. Students receive detailed and integrated lectures in the classroom setting, as well as hands-on practical experience with conducting biological anthropological research in a weekly laboratory setting.

---

**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):**

Evolution is a controversial topic, in particular human evolution. In both the lecture and lab settings, students are encouraged to think critically about their preconceived ideas, religious or otherwise, and to reflect on how they know what they think they know. Within paleoanthropology, the study of human evolution, there is often controversy over the exact position of various fossil species in the line leading to humans. As a result, students are also challenged to think critically about the fossil evidence for human evolution presented to them, as well as the various interpretations of that evidence that scientists have made. In the labs, students are provided with various datasets for them to evaluate and analyze, and to use to develop their own understanding of what the various lines of evidence tell us. These include inquiries into the structure of the cell and DNA, genetic inheritance, evolutionary forces, and forensics, as well as measurements of bones, teeth, and fossils. The ultimate goal is to have the students develop a synthesis of human evolutionary history, and how it has been influenced by both extrinsic and intrinsic factors.
Texas A&M University
Core Curriculum

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

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

A major component of the scientific endeavor is the effective communication of ideas. In the classroom students are continually encouraged to raise questions or comments, with the goal of having them think critically about what they are being taught, and then articulate their thoughts in front of a group. In the labs, students are encouraged even more to formulate thoughts into coherent expressions, and to communicate these questions, and their answers, within a larger body of peers. Classroom examinations include written components that move far beyond multiple choice, and which require synthetic analysis of multiple components of the lectures; roughly half of each test is comprised of such long answer questions. Weekly lab assignments and reports require further development of effective visual and written communication, as students are required to analyze, evaluate and present visual representations of data and write lab reports in a coherent and thoughtful manner that conveys complex ideas in meaningful ways.

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

Students perform a weekly series of tasks as outlined in their lab manuals that provide them first-hand access to both numerical data and observable facts. The lab manual that we use includes a substantial number of datasets that students are required to manipulate and analyze. In addition, students create their own datasets from comparative dental, skeletal, and fossil materials available in the labs that they measure on their own. This hands-on approach provides students with direct access to original data that they can then work through on their own, or in groups, depending on the assignment. As a result, students obtain direct exposure to the data that underlies scientific interpretations, thereby gaining first-hand experience in conducting scientific research.

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

Several of the lab assignments require students to work in groups, both to collect and analyze data. These groups then present combined results that require a concerted effort to develop a consensus opinion. As a result, students learn to consider alternate points of view, and critically assess the evidence that underlies these differing perspectives. They work together toward a shared purpose, and even if they disagree with interpretations, they learn to appreciate why other people think the way that they do. Thus we are training students to become responsible colleagues and future effective collaborators or "team players."

Please be aware that instructors should be prepared to submit samples/examples of student work as part of the future course recertification process.
Kristin – see below. Thanks.

ICD Statement:

**ANTH 225**: This course is 100% about human biocultural diversity, meaning it teaches students how all humans today resulted from a complex, diverse biocultural evolutionary process (in human evolution, we cannot separate the biological and cultural evolutionary processes – they have worked in tandem since we became humans - they are what make us uniquely human). All lecture, textbook, assignment/lab, and exam content is geared toward teaching students about the biocultural diversity of humankind, both across space and through time. As for the 30/50 rule, six weeks (weeks 1-3 and weeks 13-15 or 40% of the class) are spent on concepts that directly affect or deal with contemporary society and life. During weeks 1-3 students learn about the history of evolutionary thought and the theory behind human molecular genetics to explain contemporary human diversity. During weeks 13-15 students learn about human adaptability and variation in contemporary societies (essentially what makes contemporary peoples diverse).

ICD Statement:

**ANTH 204**: This course provides students with an overview of all ancient world cultures. Every day of the semester this course challenges students to consider how today’s global cultural diversity developed, giving students an appreciation for the deep history and complexity of modern human society and importance of cultural diversity. As for the 30/50 rule, lectures during the first week evidence how the study of past human cultures is relevant to and affects modern society. During weeks 3-5, students learn how humans colonized the world and how the diversity we see today took root. During weeks 9-15, students learn about the development of the world’s major cultural traditions and culture areas. In this respect 10 weeks (67%) of course lectures expose students to the diversity of humankind today. Two hundred of 550 points (36%) that form the basis of the semester grade deal with written and oral activities focusing on relevance of archaeology to contemporary society. For example, the two essays (politics of culture, politics of collecting) ask students to research and consider how contemporary societies view their own and others’ pasts. Four class exercises relate archaeology to modern cultural issues. Exercise 1 deals with pros and cons of excavating Native American burials. Exercise 2 introduces students to diverse diets of humans around the world. Exercise 3 explores how an exciting archaeological discovery (Ötzi the Iceman) provides a sense of shared heritage to the transnational population living in the Alps today. Exercise 4 deals with environmental catastrophe, where students investigate how ancient peoples dealt with the same problems facing human societies today in a period of global climate change (e.g., deforestation, overpopulation, environmental degradation, rising sea level, hurricanes, typhoons, volcanic eruptions, tsunamis, etc.) so that they learn how humans adapt to these situations. Clearly more than 30% of this course puts the archaeological record in the context of the past 50 years of contemporary society.
ANTHROPOLOGY 225
BIOLOGICAL ANTHROPOLOGY
SPRING 2013

Lecture: TR 11:10 – 12:25 HELD 105      Lab:  
Section 501: W 9:10 – 12:20 RDMC 230  
Section 502: M 12:35 – 3:45 RDMC 230  
Section 503: R 12:45 – 3:35 RDMC 230  
Section 504: F 9:10 – 12:20 RDMC 230

Instructor: Darryl de Ruiter  
BOLT 309F  
&45-5242  
deRuiter@tamu.edu

Teaching Assistants/Lab Instructors:  
Kristin Hoffmeister: RDMC 230B; khoffmei@tamu.edu  
Brittany Staff: RDMC 230B; bstaff@tamu.edu

Office Hours:  
Dr. de Ruiter: TR 1:00-2:00, or by appointment

Office Hours:  
Kristin Hoffmeister: W 2:00-4:00, or by appointment  
Brittany Staff: T 2:30-4:30 or by appointment

13th Edition

2nd Edition

Prerequisites: no prerequisites

Foundational Component: Area: Life and Physical Sciences
Life and physical sciences focus on describing, explaining, and predicting natural phenomena using the scientific method. Biological Anthropology is among the most scientifically oriented endeavors within the Liberal Arts, focusing on rigorous data collection and hypothesis testing to advance our understanding of one of the core unifying principles of all life sciences: evolution. Biological anthropologists study living primates using well established wildlife research techniques. They examine, measure, and analyze the skulls, jaws, teeth, and skeletons of both modern humans and primates, as well as the fossil ancestors of these groups. Biological anthropologists investigate the DNA of living and fossil primates, and undertake research into the isotope chemistry underlying the diets of living and fossil primates. And, biological anthropologists are deeply involved in the forensic sciences. All of this research is undertaken with the aim of understanding and explaining the biological diversity of primates worldwide, including humans and our fossil ancestors. The ultimate goal is to better understand the complex interactions between climate/environment/ecology and human and primate populations, and how these external factors have influenced primate and human evolution. If we want to understand what makes us human, we must first recognize our primate heritage, as well as our deeper mammalian heritage. Only then can we grasp how the natural world has shaped our evolutionary history, and resulted in the diverse array of biological adaptations that characterizes modern Homo sapiens. Students receive detailed and integrated lectures in the classroom setting, as well as hands-on practical experience with conducting biological anthropological research in a weekly laboratory setting.

Core Objectives
This course is intended to provide students with a basic introduction to the evolutionary history of modern humans. We will begin by examining the basic principles of evolution and heredity, in particular as they relate to humans. We will also be studying primate evolution, behavior, and ecology, with an eye towards modeling early hominin behavior. The Australopithecines and early Homo will receive particular attention in this course, followed by the study of modern human variation and adaptation. Although we will be following the outline of the textbook, keep in mind that the textbook is only a supplement to the information provided in the classroom. Therefore, attendance at lectures is essential if you wish to do well in this course. If you come to class prepared (i.e. doing the assigned reading before coming to class) you will gain a much greater understanding of the material; this will also translate into improved performance in your grade. Labs count for 25% of your final grade, and also serve to give you hands-on experience in Biological Anthropology. Attendance is obligatory, so please come to all of the weekly labs prepared. At the end of the course, you should have both a deeper and broader knowledge of the evolution of humans and their ancestors, and a greater understanding of the evolutionary mechanisms responsible. You will also develop a deeper awareness of how we fit into the natural world around us.

Critical Thinking
Evolution is a controversial topic, in particular human evolution. In both the lecture and lab settings, students are encouraged to think critically about their preconceived ideas, religious or otherwise, and to reflect on how they know what they think they know. Within paleoanthropology, the study of human evolution, there is often
controversy over the exact position of various fossil species in the line leading to humans. As a result, students are also challenged to think critically about the fossil evidence for human evolution presented to them, as well as the various interpretations of that evidence that scientists have made. In the labs, students are provided with various datasets for them to evaluate and analyze, and to use to develop their own understanding of what the various lines of evidence tell us. These include inquiries into the structure of the cell and DNA, genetic inheritance, evolutionary forces, and forensics, as well as measurements of bones, teeth, and fossils. The ultimate goal is to have the students develop a synthesis of human evolutionary history, and how it has been influenced by both extrinsic and intrinsic factors.

Communication
A major component of the scientific endeavor is the effective communication of ideas. In the classroom students are continually encouraged to raise questions or comments, with the goal of having them think critically about what they are being taught, and then articulate their thoughts in front of a group. In the labs, students are encouraged even more to formulate thoughts into coherent expressions, and to communicate these questions, and their answers, within a larger body of peers. Classroom examinations include written components that move far beyond multiple choice, and which require synthetic analysis of multiple components of the lectures; roughly half of each test is comprised of such long answer questions. Weekly lab assignments and reports require further development of effective communication, as students are required to write in a coherent and thoughtful manner that conveys complex ideas in meaningful ways.

Empirical and Quantitative Skills
Students perform a weekly series of tasks as outlined in their lab manuals that provide them first-hand access to both numerical data and observable facts. The lab manual that we use includes a substantial number of datasets that students are required to manipulate and analyze. In addition, students create their own datasets from comparative dental, skeletal, and fossil materials available in the labs that they measure on their own. This hands-on approach provides students with direct access to original data that they can then work through on their own, or in groups, depending on the assignment. As a result, students obtain direct exposure to the data that underlies scientific interpretations, thereby gaining first-hand experience in the conduct of scientific research.

Teamwork
Several of the lab assignments require students to work in groups, both to collect and to analyze data. These groups then present combined results that require a concerted effort to develop a consensus opinion. As a result, students learn to consider alternate points of view, and to critically assess the evidence that underlies these differing perspectives. They work together toward a shared purpose, and even if they disagree with interpretations, they learn to appreciate why other people think the way that they do.

Course Requirements
There will be three tests this semester, each of which is worth 25% of your final grade. The format of the tests will be a mixture of multiple choice, matching and short-answer questions. These tests will be non-cumulative, covering only the material presented since the last test. Each test will consist of 50-60 questions. I will be curving the gross test scores by adding to each test the amount of points necessary to bring the class average to 75. The final 25% of the grade will be based on attendance and the completion of all lab section requirements. Since this course includes a lab credit, you must attend all labs, each and every week. I do not offer extra credit assignments. Anything covered in the class, in the labs, or in the textbook is fair game for the tests.

Marks will be assigned as follows: 90+ A
80-89 B
70-79 C
60-69 D
<60 F

Make-up Exam Policy
Make-up exams will not be offered unless you have a valid excuse as outlined in the Texas A&M University regulations (http://student-ules.tamu.edu/rules7.htm). Legitimate excuses include:
1. Participation in an activity appearing on the University Authorized Activity List (http://stuact.tamu.edu/activitylist/list.html)
2. Death or major illness in a student's immediate family
3. Illness of a dependent family member
4. Participation in legal proceedings or administrative procedures that require a student's presence
5. A religious holy day (defined as a holy day observed by a religion whose places of worship are exempt from property taxation under Section 11.20 of the Texas Tax Code)
6. Illness that is too severe or contagious for the student to attend class (I
will require proof of your confinement because of illness in the form of a note from the Student Health Center or from an off-campus physician.

7. Required participation in military duties.
8. Mandatory admission interviews for professional or graduate school which cannot be rescheduled.

If your reason for missing an examination fulfills one of the foregoing conditions, provide documentation within two working days of your absence. You will then be allowed to take a make-up test within 30 days from your date of absence.

Copyright Statement
The handouts used in this class are copyrighted. By “handouts” I mean all materials generated for this class, which include but are not limited to syllabi, quizzes, exams, lab problems, in-class materials, review sheets, and additional problem sets. Because these are copyrighted, you do not have the right to copy the handouts unless I give express permission. As commonly defined, plagiarism consists of passing off as one’s own the ideas, words, writings, etc. of another. In accordance with the definition, you are committing plagiarism if you copy the work of another person and turn it in as your own, even if you have the permission of the person. If you have any questions regarding plagiarism, please consult the latest issue of the Texas A&M University Student Rules, under the section “Scholastic Dishonesty”.

Academic Dishonesty
Academic dishonesty is never tolerated at Texas A&M University, and should be actively discouraged by both the instructor and students (http://student-rules.tamu.edu/). Academic dishonesty comprises the unauthorized distribution of information and/or plagiarism. Any student caught cheating on an exam will receive a zero for that exam, and will be reported to the Department Head for further possible disciplinary proceedings at the discretion of the department of Anthropology and the College of Liberal Arts.

For more information on Texas A&M University academic dishonesty policies, follow these steps:
1. go to the library home page: http://library.tamu.edu
2. select the menu option “Research Tools & Advice”
3. select “Tutorials”
4. select “Student Resources on Academic Integrity and Plagiarism”

Academic Integrity
“An Aggie does not lie, cheat or steal or tolerate those who do”
Student Honor Council rules and procedures may be accessed on the web at http://aggiehonor.tamu.edu/.

Remember that Integrity means doing the right thing even if no one is watching.

Americans with Disabilities Act (ADA)
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.

Statement on Diversity
Respect for cultural and human biological diversity are core concepts of Anthropology. In this course, each voice in the classroom has something of value to contribute to class discussion. Please respect the different experiences, beliefs and values expressed by your fellow students and instructor, and refrain from derogatory comments about other individuals, cultures, groups, or viewpoints. The Anthropology Department supports the Texas A&M University commitment to Diversity, and welcomes individuals of all ages, backgrounds, citizenships, disabilities, education, ethnicities, family statuses, genders, gender identities, geographical locations, languages, military experience, political views, races, religions, sexual orientations, socioeconomic statuses, and work experiences (See http://diversity.tamu.edu/).
<table>
<thead>
<tr>
<th>Calendar</th>
<th>Lecture</th>
<th>Readings</th>
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<tbody>
<tr>
<td>Week 1:</td>
<td>01/15 Introduction</td>
<td>Ch. 1</td>
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<td></td>
<td>01/17 History of evolutionary thought</td>
<td>Ch. 2 (pp. 27-41)</td>
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<td>Lab 0 No lab this week</td>
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<td>Week 2:</td>
<td>01/22 Evolution and natural selection</td>
<td>Ch. 2 (pp. 41-49); Ch. 4 (pp. 98-109)</td>
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<td>01/24 The biological basis of life</td>
<td>Ch. 3</td>
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<td>Lab 1 Lab Introduction, Scientific Theory &amp; Evolution</td>
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<tr>
<td>Week 3:</td>
<td>01/29 Principles of heredity</td>
<td>Ch. 4 (pp. 81-98)</td>
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<td>01/31 Vertebrate macroevolution</td>
<td>Ch. 5</td>
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<td>Lab 2 Mitosis and Meiosis, Principles of Inheritance, Population Genetics</td>
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<td>Week 4:</td>
<td>02/05 Overview of the Living Primates</td>
<td>Ch. 6</td>
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<td>02/07 Primate behavior</td>
<td>Ch. 7</td>
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<td>Lab 3 Human Osteology</td>
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<td>Week 5:</td>
<td>02/12 Video: Great Transformations</td>
<td>DVD</td>
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<td>02/14 TEST 1</td>
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<td></td>
<td>Lab 4 Bioarchaeology and Forensic Anthropology</td>
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<td>Week 6:</td>
<td>02/19 Primate models for human evolution</td>
<td>Ch. 8</td>
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<td>02/21 Primate evolutionary history</td>
<td>Ch. 9</td>
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<td>Lab 5 Primate Taxonomy</td>
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<td>Week 7:</td>
<td>02/26 Paleoanthropology, taphonomy and dating</td>
<td>Ch. 10</td>
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<td>02/28 Trends in human evolution</td>
<td>Ch. 10, 11 (pp. 302-316)</td>
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<td>Lab 6 Comparative Anatomy &amp; Primate Evolution</td>
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<td>Week 8:</td>
<td>03/05 Australopithecines</td>
<td>Ch. 11 (pp. 316-333)</td>
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<td>03/07 Australopithecine diet and ecology</td>
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<td>Lab 7 Mid-Term Lab Practical; Primate Behavior, Video: Life in the Trees</td>
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<td>Week 9:</td>
<td>03/12 Spring break – no class</td>
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<td></td>
<td>03/14 Spring break – no class</td>
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<td>No lab this week</td>
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<td>Week 10:</td>
<td>03/19 Video: Walking With Cave-men I</td>
<td>DVD</td>
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<td>03/21 TEST 2</td>
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<td>Lab 8 Bipedality and Early Hominin Evolution</td>
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<tr>
<td>Week 11:</td>
<td>03/26 <em>Homo habilis</em> and <em>Homo erectus</em></td>
<td>Ch. 10 (pp. 333-339); Ch. 12</td>
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<td>03/28 Middle Pleistocene <em>Homo</em> and the Neanderthals</td>
<td>Ch. 13</td>
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<td>Lab 9 <em>Homo habilis</em> and <em>Homo erectus</em></td>
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<td>Week 12:</td>
<td>04/02 Early <em>Homo</em> diet and ecology</td>
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<td></td>
<td>04/04 Origin and dispersal of modern humans</td>
<td>Ch. 14</td>
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<td>Lab 10 Middle Pleistocene <em>Homo</em>, Neanderthals; Modern Humans</td>
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<td>Week 13:</td>
<td>04/09 Video: Walking with Cave-Men II</td>
<td>DVD</td>
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<td>04/11 AAPA Conference – no class or labs</td>
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<td>Week 14:</td>
<td>04/16 Human variability and “race”</td>
<td>Ch. 15</td>
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<td>04/18 Human adaptability</td>
<td>Ch. 16</td>
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<td>Lab 11 Human Variation, Anthropometry, &amp; Osteometrics</td>
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<tr>
<td>Week 15:</td>
<td>04/23 Legacies of human evolutionary history</td>
<td>Ch. 17</td>
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<td>04/25 Bioarchaeology and forensic anthropology</td>
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<td>Lab 12 Final Lab Practical</td>
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<tr>
<td>Week 16:</td>
<td>04/30 Last day of classes; redefined day – Friday</td>
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<td>05/02 Reading day – no class</td>
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<tr>
<td>Exam Week</td>
<td>05/03 Text 3 – 3:00-5:00 pm</td>
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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

1. This request is submitted by (department name): Physics and Astronomy

2. Course prefix and number: ASTR/PHYS 119

3. Texas Common Course Number:

4. Complete course title: Big Bang & Black Holes Companion Course

5. Semester credit hours: 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 semesters

9. Number of class sections per semester: 2

10. Number of students per semester: 50

11. Historic annual enrollment for the last three years: 81 (45+36) 66 (49+17) 289 - 24 students

   First time taught Fall 2010 as PHYS/ASTR

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

   Date: 2/27/13

   Approvals:

   [Signature]

   Department Head

   Date: 4/1/2013

   [Signature]

   College Dean/Designee

   Date: 4/1/13

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?

This is the 1-hour companion course for ASTR/PHYS 109. It is designed to give more of a hands-on understanding of the concepts surrounding the Big Bang and Black Holes in an effort to de-mystify them for the non-scientist. In particular, students will work in teams to use critical thinking and quantitative data analysis to inform evidence-based decisions about the origin and evolution of the Cosmos and communicate their understanding using their own words to a lay audience. The emphasis will be on the interpretation of data with minimal data analysis techniques. The mathematics used will be straightforward and use only basic high school algebra. The primary goal is for students to gain insight into the process of gathering and interpreting evidence for use in the field of Cosmology and to do so in a way that is communicable to a lay audience.

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 primary objective of this course is to go through the process of taking data (done with sophisticated simulation) and then analyzing and presenting the data in a scientific report format. The bulk of the grade for this course is in the lab report component. A premium is placed on the ability to understand, interpret and convey the data that provide evidence for our understanding of cosmology and the physical universe to the lay reader. In order to pass the course, all labs must have a passing grade.

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

Students communicate a number of ways throughout the course. In particular, they are required to write multiple laboratory reports in a way that they must communicate modern scientific information in lay language. They must interpret data through graph during the reading, and there are many times during the class time where they must discuss their thoughts with peers. Finally, within their reports they must report their results both in tabular and graphical format for the reader.
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):

The students must bring in empirical data and observational facts to explain their evidence-based reasoning in their course in the context of established scientific theories such as Quantum Mechanics and General Relativity.

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 engage in pairs of question answering teams during the class period and engage in teamwork-like activities where they help each other analyze data and provide feedback on each other's reports using a Calibrated Rubric. In particular, they give and receive feedback from their peers on their writing assignments and use this feedback for revisions to improve their writing and communication skills.

Please be aware that instructors should be prepared to submit samples/examples of student work as part of the future course recertification process.
ASTR/PHYS 119: Big Bang and Black Holes
Companion Course
Fall 2013

Course objectives: This is the 1-hour companion course for ASTR/PHYS 109. It is designed to
give more of a hands-on understanding of the concepts surrounding the Big Bang and Black
Holes in an effort to de-mystify them for the non-scientist. In particular, students will work in
teams to use critical thinking and quantitative data analysis to inform evidence-based decisions
about the origin and evolution of the Cosmos and communicate their understanding using their
own words to a lay audience. The emphasis will be on the interpretation of data with minimal
data analysis techniques. The mathematics used will be straight-forward and use only basic high-
school algebra. The primary goal is for students to gain insight into the process of gathering and
interpreting evidence for use in the field of Cosmology and to do so in a way that is
communicable to a lay audience.

Co-requisites: Concurrent registration in ASTR/PHYS 109 is required unless that course has
been taken in a previous semester. Any exceptions must be brought to the attention of the
instructor immediately.

Instructor: Prof. David Toback
Office/Phone: Mitchell Institute (MIST), Room M425
Email: toback@tamu.edu
Course website: http://faculty.tamu.edu/toback/119

Lab Assistant: Sean Yeager, syeager@physics.tamu.edu

Textbook: No required textbooks, but “Big Bang, Black Holes, No Math” (Toback) is
recommended. Lab materials can be obtained online on the course website.

Course Work and Grading: This class will meet two hours per week with an average of one
hour per week outside of class. The bulk of the grade for this course is in the lab report
component. A premium will be placed on the ability to understand, interpret and convey the data
that provide evidence for our understanding of cosmology and the physical universe to the lay
reader. In order to pass the course, all labs must have a passing grade. By percentage, the grade is
based on:

- Lab Reports: 90%
- Attendance/pre-class and in-class quizzes and Activities: 10%

The course schedule can be found at http://faculty.physics.tamu.edu/toback/119/lab/
ADA Policy
The American's 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 Disability Services in Cain Hall B118, call 845-1637, or e-mail disability@tamu.edu. Additional information is available at http://disability.tamu.edu.

Honor Code

Description of the report writing instruction
Each writing assignment will be discussed both in class and in outside help sessions with the teaching assistant. During these times, the topics will be discussed and effective methods of conveying the information will be illuminated. Each student will be encouraged to submit as many drafts as necessary to produce an excellent final draft paper. Feedback, written and in rubric form, will be provided with each iteration designed to help polish the documents into a clear, concise and readable form. The instructor and TA will be available to discuss papers during the drafting process. Resubmissions will be encouraged and the final draft as well as the quality of iterations will be taken into account in the grade for each paper.

Since there often confusion about what you can and cannot use from the lab manual in your report, or from working with partners, more details can be found at http://faculty.physics.tamu.edu/toback/109/WritingAssignments/plagiarism.shtml
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50-Word Summary:

This companion course is designed to teach about the collection, interpretation and explanation of data used as evidence in our understanding of the Big Bang and Black Holes. It is designed to be for non-scientists to understand and appreciate.
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: ASTR/PHYS 119

3. Texas Common Course Number:

4. Complete course title: Big Bang & Black Holes Companion Course

5. Semester credit hours: 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 semesters

9. Number of class sections per semester: 2

10. Number of students per semester: 50

11. Historic annual enrollment for the last three years: 81 (45+36) 66 (49+17) 289 - 24 students

   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
   - Approvals: George R. Welch
   - Department Head
   - College Dean/Desigree
   - Date 2/27/13
   - Date 4/1/2013

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 Four national Component Area definition above?

This is the 1-hour companion course for ASTR/PHYS 109. It is designed to give more of a hands-on understanding of the concepts surrounding the Big Bang and Black Holes in an effort to de-mystify them for the non-scientist. In particular, students will work in teams to use critical thinking and quantitative data analysis to inform evidence-based decisions about the origin and evolution of the Cosmos and communicate their understanding using their own words to a lay audience. The emphasis will be on the interpretation of data with minimal data analysis techniques. The mathematics used will be straightforward and use only basic highschool algebra. The primary goal is for students to gain insight into the process of gathering and interpreting evidence for use in the field of Cosmology and to do so in a way that is communicable to a lay audience.

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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 primary objective of this course is to go through the process of taking data (done with sophisticated simulation) and then analysing and presenting the data in a scientific report format. The bulk of the grade for this course is in the lab report component. A premium is placed on the ability to understand, interpret and convey the data that provide evidence for our understanding of cosmology and the physical universe to the lay reader. In order to pass the course, all labs must have a passing grade.

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

Students communicate a number of ways throughout the course. In particular, they are required to write multiple laboratory reports in a way that they must communicate modern scientific information in lay language. They must interpret data through graph during the reading, and there are many times during the class time where they must discuss their thoughts with peers. Finally, within their reports they must report their results both in tabular and graphical format for the reader.
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):

The students must bring in empirical data and observational facts to explain their evidence-based reasoning in their course in the context of established scientific theories such as Quantum Mechanics and General Relativity.

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 engage in pairs of question answering teams during the class period and engage in teamwork-like activities where they help each other analyze data and provide feedback on each other's reports using a Calibrated Rubric. In particular, they give and receive feedback from their peers on their writing assignments and use this feedback for revisions to improve their writing and communication skills.

Please be aware that instructors should be prepared to submit samples/examples of student work as part of the future course recertification process.
Course objectives: This is the 1-hour companion course for ASTR/PHYS 109. It is designed to give more of a hands-on understanding of the concepts surrounding the Big Bang and Black Holes in an effort to de-mystify them for the non-scientist. In particular, students will work in teams to use critical thinking and quantitative data analysis to inform evidence-based decisions about the origin and evolution of the Cosmos and communicate their understanding using their own words to a lay audience. The emphasis will be on the interpretation of data with minimal data analysis techniques. The mathematics used will be straight-forward and use only basic high-school algebra. The primary goal is for students to gain insight into the process of gathering and interpreting evidence for use in the field of Cosmology and to do so in a way that is communicable to a lay audience.

Co-requisites: Concurrent registration in ASTR/PHYS 109 is required unless that course has been taken in a previous semester. Any exceptions must be brought to the attention of the instructor immediately.

Instructor: Prof. David Toback
Office/Phone: Mitchell Institute (MIST), Room M425
Email: toback@tamu.edu
Course website: http://faculty.tamu.edu/toback/119

Lab Assistant: Sean Yeager, syeager@physics.tamu.edu

Textbook: No required textbooks, but "Big Bang, Black Holes, No Math" (Toback) is recommended. Lab materials can be obtained online on the course website.

Course Work and Grading: This class will meet two hours per week with an average of one hour per week outside of class. The bulk of the grade for this course is in the lab report component. A premium will be placed on the ability to understand, interpret and convey the data that provide evidence for our understanding of cosmology and the physical universe to the lay reader. In order to pass the course, all labs must have a passing grade. By percentage, the grade is based on:
- Lab Reports: 90%
- Attendance/pre-class and in-class quizzes and Activities: 10%

The course schedule can be found at http://faculty.physics.tamu.edu/toback/119/lab/
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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): Plant Pathology and Microbiology
   BIOL 2306
   Environmental
   Riol

2. Course prefix and number: BESC 204
3. Texas Common Course Number:

4. Complete course title: Molds and Mushrooms
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
   - [x] Current core - no

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? Current Spring semesters; If brought into core curriculum, Fall and Spring

9. Number of class sections per semester: 1

10. Number of students per semester: 95

11. Historic annual enrollment for the last three years: 90 SP2013 96 Sp2012 96 Sp2011

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:
   [Signature] Brian Shew
   Course Instructor
   Date 4/24/13

13. Approvals:
   [Signature] Kim Dooley
   Department Head
   Date 4/25/2013

14. 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.

rvnd 4-24-13
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?

**BESC 204: Molds and Mushrooms:** The Impact of Fungi on Society and the Environment surveys classification and diversity of fungi and highlight environmental and societal issues impacted by fungi. Through interaction with media, readings, lectures and class discussion students review and evaluate data and observable facts related to science-based studies of fungi and their role in the environment, with particular emphasis on the role of the scientific method in interpreting current data about each issue. A major theme will be to examine environmental and food safety issues in the context of these studies, with particular emphasis on the role of the scientific method in interpreting current data about each issue. For example, students will critically analyze the hypothesis that indoor toxic molds are not directly associated with sick building syndrome. Though some molds found in built environments produce toxins detrimental to human health, the current position of the CDC is that ingress of the toxic molds into the human respiratory system is not indicated.

**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):**

**Learning Outcomes:**
You will apply information learned through readings and other media posted within the learning management system.
You will comprehend the interdisciplinary concepts integral to environmental science and fungal biology.
You will be able to explain the effect of specific fungal metabolites on the environment and society.
You will assess current perceptions of indoor toxic fungi.

**Assessment:**
Students will take four unit exams to assess their comprehension of the reading and lectures. Students will write a position paper on the health risks of indoor molds. Instructor and group peer review of the position papers will enhance students comprehension and critical thinking of the topic. Use of the scientific method through hypothesis testing will be utilized to critically assess current data on the topic under instructor evaluation of the group project. Furthermore, creative and critical thinking will be assessed.

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

**Learning Outcomes:**
Recognize the impact of globalization on the environment and dissemination of pathogens of plants and animals.
Texas A&M University

Core Curriculum

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

Participate in class discussions and actively listen to student presentations
Work effectively in a group to create a position paper on toxic molds
Work effectively in a group to create a multimedia presentation on a topic of current interest in environmental fungal biology

Assessment:
Students will work in groups to create a position paper on indoor toxic molds, and to create a multimedia presentations that highlights a topic of current interest in environmental fungal biology. Assessment of these team projects includes use of a standard metric by the instructor and peer review to address the quality of the end product and also the quality of individual participation in its creation.

Students will work in groups to create multimedia presentations that highlight current issues at the interface of fungal biology and environmental biology. These assignments require students to practice oral, written and visual communication skills. Effective group work will require oral negotiation among team members and the research papers, websites and news articles themselves will require effective narration. Students will work together to create the multimedia project including written, visual and oral outputs. The multimedia projects will be evaluated based on effective use of visual communication to include: graphs, photographs, animation, video clips or simulations as appropriate. Students will be expected incorporate data in their presentations to effectively convey the issues specific to the country. Assessment of the assignments includes the quality of the end product (based on a rubric provided, used by both the instructor and members of the class via peer review) and also the quality of individual participation in its creation (based on within group reflection on peer performance).

Student participation in class discussions also constitute oral communication. To deal with issues of class size and intravert/extravert inherent differences these discussions will be staged in a variety of different contexts (e.g. spontaneous responses to questions during lecture, think-pair-share arrangements, small groups with prompts provided prior to class) to provide ample opportunity for students to perform. Participation will involve subjective assessment by the instructor of the degree to which students contribute meaningfully to class discussion as well as evidence of active listening.

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

Learning Outcomes:
Apply information learned through readings and other media
Analyze current data on indoor toxic molds and develop an informed position while working in a team

Assessment:
Students will take four unit exams to assess their comprehension of the reading and other media. Students will write a position paper on the health risks of indoor molds and will create a multimedia project addressing current issues at the interface of fungal biology and environmental studies.
Assessment of group projects will be by the instructor and group peer review, and is designed to encourage students to reflect on the relationship between their worldview and the concepts in the course. Thus grading will be based on both effective communication (see communication) and also their critical evaluation of observable facts and data presented in source material to include scientific writing, journalistic source and websites. It is important to note, students will be prompted to support their positions with appropriate reference to data and observable facts (e.g. graphs, figures, specific conclusions from studies, etc) and the degree of effectiveness of this will be part of the assessment.
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):

Learning Outcomes:
Participate in class discussions and actively listen to student presentations
Work effectively in a group to create a position paper on toxic molds
Work effectively in a group to create a multimedia presentation on a topic of current interest in environmental fungal biology

Assessment:
Students will work in groups to create a position paper on indoor toxic molds, and to create a multimedia presentations that highlight a topic of current interest to environmental fungal biology. Assessment of these team projects includes use of a standard metric by the instructor and peer review to address the quality of the end product and also the quality of individual participation in its creation (based on group reflection of peer performance).

Please be aware that instructors should be prepared to submit samples/examples of student work as part of the future course recertification process.
BESC 204 - section 500
Molds and Mushrooms: The Impact of Fungi on Society and the Environment
Spring Semester, 2013
Tu/Th 12:45 – 2:00 Room 117 KLCT
3 credit hours

Instructor: Dr. Brian D. Shaw
320B Peterson
Phone: 862-7518
Email: bdshaw@tamu.edu

Office Hours: Wed. 1:00 – 3:00 Room 320b Peterson

Class Web Page:
elearning.tamu.edu

email:
All official communications for the class should be through neo. I will send emails to your neo.tamu.edu address and expect that you are checking it daily. Likewise if you send me an email to my address bdshaw@tamu.edu. You can expect that I will see it and respond.

Course Objectives: This course is designed to be an introduction to fungi and the impact these often overlooked organisms play on our society and the environment. After taking this course students will be prepared to continue studies in bioenvironmental science, plant pathology, or microbiology and will gain insights into a microscopic world around us.

Key Course Learning Outcomes
1. You will apply information learned through readings and other media posted within the learning management system
2. You will comprehend the interdisciplinary concepts integral to environmental science and fungal biology
3. You will define core concepts and terminology that will allow you to be conversant in modern fungal biology.
4. You will be able to summarize specific examples of fungi as pathogens of humans, animals and plants.
5. You will be able to explain the effect of specific fungal metabolites on the environment and society.
6. You will be able to explain the ecological roles of fungi with specific examples of their interactions with other species.
7. You will assess current perceptions of indoor toxic fungi
8. You will practice your presentation skills and your technical competency in the field.
9. You will recognize the impact of globalization on the environment and dissemination of pathogens of plants and animals.
10. You will participate in class discussions and actively listen to student presentations.
11. You will work effectively in a group to create a position paper on toxic molds
12. You will work effectively in a group to create a multimedia presentation on a topic of current interest in environmental fungal biology

**Prerequisites:** None

**Textbooks:**
*Magical Mushrooms, Mischievous Molds by George W. Hudler*
Additional supplemental readings provided by the instructor.

**Grading:**

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<td>80-89%</td>
<td>B</td>
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<td>70-79%</td>
<td>C</td>
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<td>60-69%</td>
<td>D</td>
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<td>59 and below</td>
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**Total 100%**

**Exams:** Three exams will be given:

- Exam #1 **Feb. 7th** in class
- Exam #2 **March 7th** in class
- Exam #3 **April 23rd** in class
- Final Exam **May 8th** (optional-comprehensive: replaces one test)

**Regrades:**
Regrade requests must be made no later than one week after the exam is handed back. The entire exam will be subject to regrade.

**Attendance:**
The course attendance policy is consistent with the University student rule 7. Attendance is each individual student's responsibility. Therefore, attendance will not be taken. Students are expected to attend class and to complete all assignments. However, the student should realize that regular attendance is directly correlated to performance in the class.
Indoor Toxic Molds Critique. Meet with your group to assemble a position paper on *Stachybotrys chartarum* and indoor toxic molds. The paper should be two pages double spaced, Times new Roman 12 pt, with 1 inch margins. In the paper you will formulate a position as a group on the following question: **Is indoor toxic mold a significant health concern in the US?** Time will be given in class on March 21. Assignment is due by email to Shaw (bdshaw@tamu.edu) on March 26th before class begins. Helpful resources include: *Carpet Monsters and Killer Spores*, by Nicholas Money (a pertinent chapter form this book is available as a pdf on the class elearning page). Quality online resources from governmental agencies include:

http://www.epa.gov/mold/append_b.html
http://www.epa.gov/mold/moldresources.html
http://www.epa.gov/mold/moldguide.html
http://www.cdc.gov/mold/stachy.htm
www.library.ca.gov/crb/01/notes/v8n1.pdf

Class Project: In depth coverage of a mycological topic of your choosing (not to include indoor toxic mold).

- You will form a team of three or four to cooperate on this project.
- We will discuss the project in depth, in class on February 12th (plan to be here that day!)
- A sign up sheet will be in class on February 19th: 1) team members; 2) project format (see below) and 3) team topics should be indicated on this sheet. **Missing this deadline will count against your project grade 10% for each day late, beginning at the end of class period on the 19th.**
- All projects are due in class on April 25.

Format of project. You can choose from four different formats

1) In class presentation 15 minutes per team (April 25). (There will only be time for 4 oral presentations)
2) A double sided brochure in tri-fold format on the topic of your choice
3) A write up suitable for submission to Wikipedia (equal to 5 pages in length in a word document 12pt, Times, 1” margin), on the topic of your choice
4) An audio or video podcast recording on the topic of your choice. This will be 5 to 8 minutes in length (In the style of ‘Invisible Jungle’ or ‘Earth and Sky’ from NPR).

Extra Credit: Throughout the semester I will make you aware of departmental seminars and symposia on topics of interest to the class. Please feel free to suggest lectures to me that I may not be aware of. I will give **2.5 extra credit points** (equal to 2.5 percentage points of your class grade) to each student once during the semester for attending and writing about one of these lectures. To receive credit you must make me aware of your presence at the lecture and give me a one page summary of the content of the lecture. The summary is due within 1 week of the lecture.
Academic Integrity Statement
“An Aggie does no lie, cheat, or steal or tolerate those who do.”
All syllabi shall contain a section that states the Aggie Honor Code and refers the student to the Honor Council Rules and Procedures on the web http://www.tamu.edu/aggiehonor/

Academic dishonesty:
If you are caught cheating on an exam, or plagiarizing any portion of your writing assignments you will receive a zero for that assignment and will be reported for scholastic dishonesty. As commonly defined plagiarism consists of claiming the ideas, words, writings etc. of another person as your own work. This means you are committing plagiarism if you copy another person and turn it in as your own, even if you have permission of that person. Plagiarism is one of the worst academic sins. If you have any questions regarding plagiarism, please consult the latest issue of the Texas A&M University Student Rules, under the section: Scholastic Dishonesty”.

Americans with Disabilities Act (ADA) Policy Statement
The following ADA Policy Statement (part of the Policy on Individual Disabling Conditions) was submitted to the University Curriculum Committee by the Department of Student Life. The policy statement was forwarded to the Faculty Senate for 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 B-118 Cain Building or call 845-1637.
Schedule
Jan. 15  Introduction (Hudler Chapter 1 and 2)

A few words about fungi (Ecology and Diversity)
Jan 17   What is a fungus? (Hudler Chapter 1 and 2)

Jan. 22  How fungi get their name and how they are classified Chytridiomycota (Deacon Chap 2 pdf on elearning)

Jan. 24  How fungi get their name and how they are classified Zygomycota (Deacon Chap 2 pdf on elearning)

Jan. 29  How fungi get their name and how they are classified Ascomycota and conidial fungi (Deacon Chap 2 pdf on elearning)

Jan. 31  How fungi get their name and how they are classified Basidiomycota (Deacon Chap 2 pdf on elearning)

Feb. 5   Wrap Up and review of Fungal Classification

Feb. 7   First exam

Fungi as pathogens
Feb. 12  Introduction to plant pathology: Irish potato famine, downy mildew of grapes (Hudler Chapter 3) (Project teams formed)

Feb. 14  Wheat, coffee and other rusts, and smuts (Hudler Chapter 3)

Feb. 19  invasive species: chestnut blight, dutch elm disease (Hudler Chapter 4) (Due date for Project teams formed and topics sent to Shaw at bdshaw@tamu.edu.)

Feb. 21  invasive Species: modern concerns. soybean rust, sudden oak death, white nose syndrome, amphibian decline

Feb. 26  Fungi as human pathogens (Hudler Chapter 7)

Fungal metabolites and secondary metabolites
Feb. 28  Discovery of mycotoxins and common examples (Hudler Chapter 6) ergct of rye and the story of LSD (Hudler Chapter 5)

March 5  The story of penicillin and other beneficial secondary metabolites (Hudler Chapter 8)
March 7        Second exam

Spring Break  No class March 11 or March 15

**Indoor Toxic Molds.**
March 19     Indoor Toxic molds (Toxic Mold reading pdf provided by Shaw)
March 21     Indoor Toxic Molds Group Critique
March 26     Fungal Ecology: nutrient succession and spore dispersal (Deacon Chap 11; provided as pdf by Shaw) (**Toxic mold assignment due**)

**Fungi in food and beverages**
Mar. 28     Yeast and fermentation, bread and alcoholic beverages: beer, wine, liquor, etc. (Hudler Chapter 9)
April 2      Fungi and their role in manufacturing other food products: cheese, tofu, tempe, misc, quorn etc. (Hudler Chapter 9)
April 4      Wild edible mushrooms and cultivated mushrooms (Hudler Chapter 10)
April 9      Poisonous mushrooms (Hudler Chapter 10)

**The Role of Fungi in producing Biofuels**
April 11     The role of fungi in producing Biofuels (PDF on elearning)

**Fungal interactions**
April 16     Symbiotic relationships: fungi and plants (mycorhizae), and algae (lichens) (Hudler Chapter 14)
April 18     Fungi and animals and insects (Hudler Chapter 13)
April 23     Exam 3

**Student Group Presentations**
April 25     Groups 1-4

April 30     Redefined day: go to your Friday Class

May 8 (Wednesday)     Final Exam 8:00-10:00 AM
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 101/111

3. Texas Common Course Number: 1311/1111, 1411

4. Complete course title: Fundamentals of Chemistry I

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 Semester

9. Number of class sections per semester: Fall 101/111; 11/109, Summer 101/111; 1/1, Spring 101/111; 3/27

10. Number of students per semester: Fall 2625/2539, Sum. 40/19, Spring 764/628

11. Historic annual enrollment for the last three years: 3429/3186 3207/3038 3324/3096

   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] 3/1/2013

   Course Instructor  Date

14. Department Head

   [Signature] 3/1/13

   Date

15. College Dean/Designee

   [Signature] 3/13/13

   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
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?

CHEM101/111 are a lecture/laboratory pair of courses with a mandatory co-registration requirement. They are the first in a two-semester sequence that introduce chemistry for students who intend to pursue degree programs in science or allied fields. The composition, structures, bonding, basic reactivity, and some of the properties of atoms and molecules are the the focus of the course. These properties are connected to applications in many fields. For example, why chemical structure matters in medicine is illustrated with the example of thalidomide. Application of gas laws is related to automobile airbags. Reaction stoichiometry is explained in relation to the Hindenberg explosion. Basic analytical aspects of the subject are introduced 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), and laboratory experiments. In particular, the laboratory component implements the 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.

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 how scientific theories have evolved with the need to accommodate new data that reveal the inadequacies of older theories. Lecture exams include questions to assess students’ ability to retain fundamental facts of chemistry, to engage in critical thinking, perform quantitative analysis, and their capacity for synthesizing and integrating information in problem solving. Each lab experiment is preceded by a quiz 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. CHEM111 labs include a blend of synthesis/preparative work, instrumental measurements, qualitative observation, and the use of simple 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 chemical reactions expressed in chemical equations. Both lecture and lab utilize visual communication through the preparation and interpretation of graphs, tables, and figures. Students must draw structures and interpret the results of chemical reactions. Several lab experiments
Texas A&M University

Core Curriculum

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

require manipulation and graphical depiction of scientific data and communication of how the experiments’ objectives have been met in the procedures and apparatus used. The collaborative nature of the laboratory requires effective oral communication. Lab reports, homework, and exams require students to use this new language in written format 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):

CHEM101/111 students are required to manipulate and interpret numerical data in terms of chemical theory when covering most of the the courses’ topics. After a survey/review of stoichiometry and descriptive chemistry, 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 cognisance of error propagation and significant figures is taught and practiced. The course strikes a balance between the concrete observational nature of chemistry and the numerical and abstract mathematical tools needed to fully comprehend it more fully. We demand and extend students’ knowledge of basic physics (e.g., kinetic and potential energy, basic understanding of electrostatics, thermal characteristics of reactions, and application of the results of quantum theory to atoms and molecules.) The role of intermolecular forces in determining the physical properties of substances are discussed in lectures and gathered in the laboratory and subjected to numerical fitting and comparison with expectations/predictions from theory. All of this forms a basis for deeper investigation of the chemical phenomena in CHEM102/112.

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 components. In some cases, experimentally determined values for each group are collected to determine average values. At other times, “pairs of pairs” divide tasks within an experiment and rely on the data obtained by the other group in their analysis or the entire lab. The three-week class project includes in-class analysis of experimental observations and construction of logic charts to explain the results. While the initial drafts of these charts are composed individually, the work is then peer reviewed by lab partners and other classmates before revisions are made and the final version is turned in. While students are evaluated individually, their participation and ability to learn with others is key to their success in the laboratory. In addition, teamwork is assessed by direct observation of the lab instructor and the assignment of appropriate participation points. 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 (OWL®) 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 Chemistry 101! The Merriam-Webster online dictionary defines chemistry as “a science that deals with the composition, structure, and properties of substances and with the transformations that they undergo.” An understanding of chemistry is important because chemistry can be found in almost everything aspect of our daily lives. Chemistry, for example, is involved in preparing and cooking food, purifying water, developing and preparing medications, and energy production. Chemistry is also important in your academic career. For example, biologists, geneticists and biochemists use chemistry to study molecular biology, proteomics, and genomics; engineers use chemistry to design new materials and products; and geologists use chemistry to classify and describe minerals.

The way a chemistry class is taught can be thought of as a story. My version of the story of chemistry will start with atomic structure and move to molecules, reactions and then thermodynamics/states of matter/organic. As we proceed through chemistry keep in mind that chemistry 101 will prepare you for further chemistry studies: general chemistry II, organic, physical chemistry, etc. To that end, I will be working problems during lecture, I will give online quizzes and I will prepare exams that heavily lean towards computational problems where applicable. The best way to prepare for this course is to work as many problems as possible and to spend 8-9 hours a week studying. I also encourage all students to take advantage of free tutoring and my office hours.

COURSE POLICIES

Course Description and Prerequisites: CHEM 101 (CHEM 1311, 1411*) Fundamentals of Chemistry I. (3-0). Credit 3. Introduction to modern theories of atomic structure and chemical bonding; chemical reactions; stoichiometry; states of matter; solutions; equilibrium; acids and bases; coordination chemistry. Prerequisite: Concurrent registration in CHEM 111 suggested.

(2) A scientific calculator is required for use on exams. The use of a computer or any device with Internet access is not allowed during an exam.

Reading Assignments: The purpose of lecture is to further explain and reinforce comprehension of the reading material. It is in your best interest to complete the reading assignments prior to coming to class. The reading assignments are grouped according to general topic and are listed after the calendar. A copy of the reading assignment is also posted in BlackBoard Vista.

Homework Assignments: Homework will be assigned using the OWL homework system (Online Web Learning). Homework assignments are due approximately every 2-3 weeks at 11:59 PM. See the calendar for due dates. Some assignments will contain more material than others. There are 6 assignments with each assignment is worth 10 points (normalized) for a total of 60 points toward your final grade. OWL is currently found at http://owl.chem.tamu.edu/.

Quizzes: A minimum of 13 quizzes will be given during the semester. Quizzes will be given as a BlackBoard Vista assessment. Each quiz is worth 2 points and the best 10 will be used in calculating the course average. Make up quizzes are not available.

Exams: A total of 3 in class exams will be given, each worth 100 points. In addition, there will be final exam worth 200 points. Make-up exams will be available for persons with an excused absence. Make-up exam times are scheduled individually following the exam. The hourly exams are primarily multiple choice with a free response component. The final exam format will be multiple choice only. Make-up exams are completely free response.
Grade Calculations: The 3 exams (100 points each), the final exam (200 points), the homework (60 points) and the quizzes (20 points) will be used to calculate the course average.

\[
\text{Course average} = \frac{\text{Sum of 3 Exams + Final Exam + Homework + Quizzes}}{5.80}
\]

Letter grades will be assigned based on the total course points earned, using the following scale.

\[
\geq 90.0\% = A, \quad 80.0 - 89.9\% = B, \quad 70.0 - 79.9\% = C, \quad 60.0 - 69.9\% = D, \quad < 59.9\% = F
\]

Note that your grade depends only on your scores, and not on class averages. Students missing a portion of the course, but having at least a 50% average will receive a grade of "I" (Incomplete) if they request an Incomplete and if they meet the University guidelines for receiving this grade.

Exam Administration: Each student will have a different seating assignment for each exam. The seating assignments will be posted a day in advance outside the classroom and on Blackboard Vista. If you are left handed or need table seating, please request special seating before the first exam (see me.) Arrive at the exam on time. Bring two sharpened #2 pencils, your TAMU ID card, and the appropriate calculator. Calculators may not be shared during the exam. See me if you are uncertain about the capabilities of your calculator. Any student attempting to use an unacceptable calculator will receive a zero for that exam. All non-test materials must be placed under your desk. Follow the directions on the front of your test. Do not write on the back of the scantron sheet. Failure to follow these directions may result in a withheld or zero score. Multiple-choice answers must be recorded on the scantron sheet. Failure to properly bubble personal information on scantron will result in a 5-point deduction. During the exam, keep all work covered. Talking or looking around the room may result in a withheld grade for the exam. Work carefully, but pace yourself to finish within the time allotted. After finishing the exam, remain in your seat until asked to leave. Exams can only be turned in during the exam period. Exams turned in after the allotted time will not be accepted.

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: http://www.tamu.edu/aggiehonor/

Absences: Absences less than three days may require completion of the TAMU Explanatory Statement for Absence from Class form found at http://attendance.tamu.edu. Absences will only impact examinations. If you are going to miss an examination with a University excuse, contact me prior to missing the examination. Documentation will be required in most instances for University excused absences. See http://student-rules.tamu.edu/rule7.htm to verify that your absence is excusable. If prior contact is impossible you must contact me by the end of the second working day after the absence to arrange make up work.

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.

Texas A&M Support Services for Students with Disabilities (845-1637): 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 provided 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. Their phone number is 845-1637. Their website is found at http://disability.tamu.edu. The Student Services office is very busy, so please make an appointment with them immediately if you feel you require assistance. If you have any questions, see me.

World Wide Web/BlackBoard Vista 4.0: The First Year Chemistry Program is on the World Wide Web: http://www.chem.tamu.edu/typ/. All course material will be available via BlackBoard Vista 4.0 (http://elearning.tamu.edu/). Your grades will be posted via BlackBoard Vista, in addition to old exams and other course material.
Tentative Module Coverage Order

1 The Atom
Chapter 2, Sections 1-5
Chapter 2, Section 9, pages 80-82
Interchapter pages 334-343
Chapter 6, Sections 1-7
Chapter 7, Sections 1-3
Chapter 2, Section 7, pages 69-72
Chapter 7, Sections 4-6

2 Molecules and Bonding
Chapter 2, Sections 6-11
Chapter 8, Sections 1-8
Chapter 9, Sections 1-3

3 Reactions and Thermochemistry
Chapter 3, Sections 1-9
Chapter 4, Sections 1-8
Chapter 5, Section 1-8
Chapter 8, Section 9

4 States of Matter
Chapter 11, Sections 1-8
Chapter 12 Section 1;
Chapter 13 Section 4;
Chapter 12 Section 3-4, 2, 5-6
Chapter 13, 1, 3, 5-7

5 Organic Chemistry
Chapter 10, Sections 1-5 (if time allows)

Only significant figures from Chapter 1 and Let's Review – The Tools of Quantitative Chemistry will be covered during class. The rest of Chapter 1 and Let's Review – The Tools of Quantitative Chemistry is included in Exam 1 coverage.

Tentative Lecture, Reading and Exam Schedule

<table>
<thead>
<tr>
<th>Week of</th>
<th>Monday</th>
<th>Wednesday</th>
<th>Friday</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aug. 27th</td>
<td>Review of Syllabus/The Atom</td>
<td>The Atom</td>
<td>The Atom</td>
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<tr>
<td>Sept. 3rd</td>
<td>The Atom</td>
<td>The Atom</td>
<td>The Atom</td>
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<tr>
<td>Sept. 10th</td>
<td>The Atom</td>
<td>Molecules and Bonding</td>
<td>Molecules and Bonding OWL #1 due at Midnight</td>
</tr>
<tr>
<td>Sept. 17th</td>
<td>Molecules and Bonding</td>
<td>Exam #1 Cut off New Material</td>
<td>Molecules and Bonding</td>
</tr>
<tr>
<td>Sept. 24th</td>
<td>Exam #1</td>
<td>Molecules and Bonding</td>
<td>Molecules and Bonding</td>
</tr>
<tr>
<td>Oct. 1st</td>
<td>Molecules and Bonding OWL #2 due at Midnight</td>
<td>Reactions and Thermochemistry</td>
<td>Reactions and Thermochemistry</td>
</tr>
<tr>
<td>Oct. 8th</td>
<td>Reactions and Thermochemistry</td>
<td>Reactions and Thermochemistry</td>
<td>Reactions and Thermochemistry</td>
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<tr>
<td>Oct. 15th</td>
<td>Reactions and Thermochemistry Exam #2 Cut off New Material OWL #3 due at Midnight</td>
<td>Reactions and Thermochemistry</td>
<td>Reactions and Thermodynamics</td>
</tr>
<tr>
<td>Oct. 22nd</td>
<td>Exam #2</td>
<td>Reactions and Thermodynamics</td>
<td>Reactions and Thermodynamics</td>
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<tr>
<td>Oct. 29th</td>
<td>Reactions and Thermodynamics</td>
<td>Reactions and Thermodynamics</td>
<td>Reactions and Thermodynamics OWL #4 due at Midnight</td>
</tr>
<tr>
<td>Nov. 5th</td>
<td>States of Matter</td>
<td>States of Matter</td>
<td>States of Matter</td>
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<tr>
<td>Nov. 12th</td>
<td>States of Matter</td>
<td>States of Matter Exam #3 Cut off New Material</td>
<td>States of Matter</td>
</tr>
<tr>
<td>Nov. 19th</td>
<td>Exam #3 OWL #5 due at Midnight</td>
<td>States of Matter</td>
<td>No Class/Thanksgiving</td>
</tr>
<tr>
<td>Dec. 3rd</td>
<td>Organic Chemistry (Redefined Friday)</td>
<td>OWL #6 due at Midnight</td>
<td></td>
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</tbody>
</table>

Final Exam Time
Dec. 10th 10:30 AM – 12:30 PM
Student Course Outcomes

By the end of this course, students will be able to:

1) Perform composition and reaction stoichiometry calculations. Name binary ionic compounds and molecular compounds. Calculate percent by mass composition and empirical/molecular formulas from data.

2) Identify different types of chemical reactions, predict products for aqueous reactions, and calculate concentration for solution from reaction data and dilution data. Write net ionic reactions for aqueous reactions.

3) Describe the arrangement of electrons around the atom for each element and use this arrangement to predict atomic and ionic size, ionization energies and electron affinities. Explain the structure of the periodic table based on electron arrangement/quantum numbers.

4) Predict bonding type between the atoms in a compound (ionic or covalent) and draw a Lewis dot structure for the compound. Recognize limitations of the octet rule and when violations of the octet rule are allowed. Minimize formal charges around the central atom.

5) Determine the molecular geometry around the central atom in a molecular, predict if the bonds are polar or nonpolar, and if the molecular has an overall polarity.

6) Explain covalent bonding between two atoms in terms of valence bond theory and molecular orbital theory.

7) Perform gas law calculations, using kinetic molecular theory to explain the ideal gas laws. Explain the difference between real gases and ideal gases, under what conditions each occurs and how to correct the ideal gas law to deal with real gases.

8) Know the difference between ion-ion, dipole-dipole, ion-dipole, hydrogen bonding and dispersion/van der Waals intermolecular attractive forces and to determine the attractive forces present in a molecule. Use the various intermolecular attractive forces to explain differences in melting and boiling points; capillary action; surface tension and viscosity. How the intermolecular attractive forces influence the phase of a compound.

9) Perform a thermochemistry calculation involving reactions and phase changes, determining the system and surroundings and changes in state. Calculate enthalpies of reactions from data and from enthalpies of formation. Estimate the enthalpy or energy change for a reaction using bond energies. Perform a calorimetry calculation.
CHEMISTRY 111
Fundamentals of Chemistry Lab I
Fall 2012

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

TA Name: _______________________________ Section: ____________________________

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

TA Email: ______________________________

Chemistry 111 is the first of two consecutive laboratory courses in general chemistry.

Prerequisite: The prerequisite for CHEM 111 is concurrent registration in or credit for CHEM 101. “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 111 and do not have the proper prerequisites you must drop this course. If you drop the co-requisite lecture course, CHEM 101, during the semester, you no longer meet the requirements to be enrolled in this laboratory course. Therefore, CHEM 111 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 protection: 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 primary goals of Chemistry 111 are the introduction to the equipment and methods used in chemistry laboratories and the development of the skills necessary for handling chemicals both safely and properly. In addition, insight into the use of the scientific method in the chemistry laboratory will be gained. As the semester proceeds, reactions will be explored that reinforce material presented in Chemistry 101 by utilizing problems chosen from the Texas environment.

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 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 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 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/ru07.htm](http://student-rules.tamu.edu/ru07.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/

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, post-lab 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.

Students wishing to receive accommodations for disabilities for CHEM 111 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 111 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 111 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. Prelab 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 hard-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 111. 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.

5. Exams: One 90 minute final exam is given in CHEM 111. 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.

6. Project Report: A full report must be submitted for the 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 for this assignment will be added on to the final exam for the course.

**There are no opportunities to earn “extra credit” in CHEM 111.**

**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 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>
</tr>
</thead>
<tbody>
<tr>
<td>9/3</td>
<td>Safety</td>
<td>**</td>
<td>20</td>
<td></td>
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<td>eso Worksheet (45)</td>
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<tr>
<td>9/10</td>
<td>Exercise 2: Graphical (Dry Lab)</td>
<td>***</td>
<td>65</td>
<td></td>
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<tr>
<td>9/17</td>
<td>Exp. 3: The Copper Cycle</td>
<td>9/27</td>
<td>80</td>
<td></td>
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<tr>
<td>9/24</td>
<td>Exp. 5: Introduction to Acid-Base Chemistry</td>
<td>10/4</td>
<td>65</td>
<td></td>
<td></td>
<td>Worksheet (20)</td>
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<tr>
<td>10/1</td>
<td>Project 2 - Part 1, Cations</td>
<td>10/11</td>
<td>50</td>
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<tr>
<td>10/8</td>
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<td>10/18</td>
<td>50</td>
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<tr>
<td>10/15</td>
<td>Exercise 1: Introduction to Scientific Literature (Dry Lab)</td>
<td>***</td>
<td>45</td>
<td></td>
<td>No quiz</td>
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<tr>
<td>10/22</td>
<td>Project 2 - Part 3, Unknown Analysis</td>
<td>11/1</td>
<td>30</td>
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<tr>
<td>10/29</td>
<td>Project report</td>
<td></td>
<td>65</td>
<td></td>
<td>Project report is due at the start of lab this week</td>
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<tr>
<td>10/29</td>
<td>Experiment 6: Enthalpy Change for an Acid-Base Reaction</td>
<td>11/8</td>
<td>65</td>
<td></td>
<td></td>
<td>Worksheet (20)</td>
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<tr>
<td>11/5</td>
<td>Exp. 2: Gas Laws</td>
<td>11/15</td>
<td>65</td>
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<td>Worksheet (20)</td>
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<tr>
<td>11/12</td>
<td>Exercise 3: From Atoms to Molecules (Dry Lab)</td>
<td>11/19</td>
<td>65</td>
<td></td>
<td>No quiz</td>
<td>Worksheet (45)</td>
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<tr>
<td>11/19</td>
<td>Thanksgiving Week</td>
<td></td>
<td></td>
<td></td>
<td>No labs this week</td>
<td>Worksheet (20)</td>
<td></td>
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<tr>
<td>TBA</td>
<td>Lecture Series Summary</td>
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<td>35</td>
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<td>Lecture Summary is due at the start of lab meeting the week after the lecture is given</td>
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<tr>
<td>11/26</td>
<td>Final Lab Exam</td>
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<td>100</td>
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<td></td>
<td>Worksheet (20)</td>
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</tbody>
</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 these weeks, 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 these experiments.
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
   - [X] 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, Spring: 154/1745, 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
   - Date: 3/1/2013

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

15. College Dean/Designee
   - [Signature]
   - 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?

CHEM102/112, 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. Connections between these concepts and real-life applications in health, environmental science, energy resources, and material science are countless. To name a few examples that are often introduced: freezing point depression is related to the salting of roads in winter; the study of equilibrium is related to ammonia production and the importance to Germany in WWI; automobile catalytic converters and their use in reducing the release of carbon monoxide is discussed; batteries and fuel cells are related to the proposed "hydrogen economy;" and nuclear radiation's application to medical imaging, such as PET scans is introduced. 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. In particular, the laboratory component implements the use of the scientific method to reinforce and provide supplemental information related to lecture topics.

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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 CHEM112 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 experience; 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):
Texas A&M University

Core Curriculum

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

Students extend their knowledge of 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 orally and in written mathematical form. In the laboratory, several experiments are dedicated to the manipulation and graphical depiction of scientific data and in the written communication of how the experiments' objectives have been met in the procedures and apparatus used in each experiment. The collaborative nature of the laboratory requires effective oral communication between partners. Lab reports, homework, and exams require students to extend their use this new language.

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

CHEM102/112 students are required to manipulate and interpret numerical data in terms of chemical theory when covering most of the course's 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 taxiing 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. Teamwork is assessed by direct observation of the lab instructor and the assignment of appropriate participation points.

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 misconceptions. 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 i>clicker 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 clicker into a course. Once you buy the clicker, you can use it for all your courses that require i>clickers for the remainder of your time at Texas A&M. You can also resell it.

You will need to register your clicker 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/registryyourclicker/ 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 i>clicker2 receipt (a copy will work)
(2) the actual UPC bar code cut out from the i>clicker2 box
(3) the remote ids of your new i>clicker2 and your old CPS clicker or old i>clicker
(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.

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<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>
<th>≥70</th>
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<td>Number added to your course points</td>
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<td>6</td>
<td>7</td>
<td>8</td>
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<td>10</td>
<td>11</td>
<td>12</td>
<td>13</td>
<td>14</td>
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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>
<th>90-94%</th>
<th>≥95%</th>
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<tr>
<td>Number added to your course points</td>
<td>0</td>
<td>4</td>
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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.

3
(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, 2013 from 3:30AM-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 test 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 makeup exam will be set after the 2-day signup period, from student schedules. Makeup 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 on line. 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>
<td>Exams (4 @ 100 points each)*</td>
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<tr>
<td>Comprehensive Final</td>
<td>165</td>
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</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, objectives list, frequently asked questions, etc. on my personal webpages (http://ched.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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<th>Quizzes:</th>
<th>Points Received:</th>
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Homework #3 points:____________________
Homework #4 points:____________________
Homework #5 points:____________________
Homework #6 points:____________________
Homework #7 points:____________________

Quiz best 9:____________________
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. Reread the problem and make a plan for solving it. Then ck your plan by looking at your previous work. DO NOT simply recalculate 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 on 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.
<table>
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<td>1/15</td>
<td>1/16</td>
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<td>1/18</td>
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| Introduction
CHAPTER 14 |               | CHAPTER 14   |               | CHAPTER 14   |
| Solutions  |              | Solutions    |               | Solutions    |
| 1/21       | 1/22         | 1/23         | 1/24         | 1/25         |
| NO Class
HOLIDAY   | *Beginning  |                |              |              |
|            | of Q Drop    |              |              |              |
| Martin Luther King, Jr. Day |              |              |              |              |
| 1/28       | 1/29         | 1/30         | 1/31         | 2/1          |
| CHAPTER 19 |               | CHAPTER 19   |               | CHAPTER 19   |
| Chemical   |              | Chemical      |               | Chemical     |
| Thermodynamics |            | Thermodynamics |            | Thermodynamics |
|            |              |                |              |              |
| 2/4        | 2/5          | 2/6          | 2/7          | 2/8          |
| CHAPTER 19 |               | CHAPTER 15   |               | CHAPTER 15   |
| Chemical   |              | Kinetics     |               | Kinetics     |
| Thermodynamics |            |                |              |              |
| 2/11       | 2/12         | 2/13         | 2/14         | 2/15         |
| ************ |          | CHAPTER 15   |               | CHAPTER 15   |
| EXAM 1     |              | Kinetics     |               | Kinetics     |
|            |              |                |              |              |
|            | 2/18         | 2/19         | 2/20         | 2/21         | 2/22         |
| CHAPTER 15 |              | CHAPTER 16   |               | CHAPTER 16   |
| Kinetics   |              | Chemical      |               | Chemical     |
|            |              | Equilibrium  |              | Equilibrium  |
| 2/25       | 2/26         | 2/27         | 2/28         | 3/1          |
| CHAPTER 16 |              | CHAPTER 16   |               | CHAPTER 16   |
| Chemical   |              | Chemical      |               | Chemical     |
| equilibrium |              | Equilibrium  |              | Equilibrium  |
|            |              |                |              |              |
| 3/4        | 3/5          | 3/6          | 3/7          | 3/8          |
| ************ |          | CHAPTER 16   |               | CHAPTER 16   |
| EXAM 2     |              | Chemical      |               | Chemical     |
| ************ |          | Equilibrium  |              | Equilibrium  |
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**Midterm grades due at noon**
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<td><strong>Hwk #4, Part 2 due</strong></td>
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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:

- Select a course: CHEM101/102 General Chemistry

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 fee 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 do 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 lab 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 protection: 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, post-lab 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.
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>
<td>**</td>
<td>20</td>
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<td>1/28</td>
<td>Exp. 9: Precipitation Titrations</td>
<td>2/7</td>
<td>65</td>
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<tr>
<td>2/4</td>
<td>Exp. 10: Colligative Properties</td>
<td>2/14</td>
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<td>2/11</td>
<td>Exp. 8: Spectrophotometry</td>
<td>2/21</td>
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<td>2/18</td>
<td>Exp. 12: Kinetics II (Dry Lab)</td>
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<td>65</td>
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<td>Worksheet (45)</td>
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<tr>
<td>2/25</td>
<td>Exp. 14: Determination of Equilibrium Constant</td>
<td>3/7</td>
<td>65</td>
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<td>(15)</td>
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<td>3/4</td>
<td>Exp. 19: Transition Metal Chemistry</td>
<td>3/21</td>
<td>65</td>
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<tr>
<td>3/11</td>
<td>Spring Break</td>
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<td>No classes this week</td>
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<td>3/18</td>
<td>Exp. 15: Buffers</td>
<td>4/4</td>
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<td>3/25</td>
<td>Week off</td>
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<td>No CHEM 112 lab this week.</td>
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<td>4/1</td>
<td>Exp. 16: Electrochemistry I</td>
<td>4/11</td>
<td>65</td>
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<td>4/8</td>
<td>Research Project, Week 1</td>
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<td>4/15</td>
<td>Research Project, Week 2</td>
<td>4/22</td>
<td>30</td>
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<td>TBA</td>
<td>Lecture Series Summary</td>
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<td>35</td>
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<td>Due at the start of lab meeting the week after the lecture is given</td>
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<tr>
<td>4/22</td>
<td>Final Report</td>
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<td>Due before the start of final exam. Late reports will not be accepted.</td>
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<tr>
<td>4/22</td>
<td>Final Lab Exam</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.
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  ☐ 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? 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 submitting request should be in attendance when considered by the Core Curriculum Council.

13. Submitted by: [Signature]

Course Instructor

Date: 3-1-13

14. Department Head

[Signature]

Date: 3/1/13

15. College Dean/Designee

[Signature]

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?

CHEM106/116 is a lecture/laboratory pair with mandatory co-registration that introduces 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. Examples include: the production of air pollution (industrial vs. photochemical smog), its connection to acid rain and water pollution, and its reduction through automobile catalytic converters; chlorofluorocarbons and their relation to the ozone hole and response of the Montreal Protocol; the rise of carbon dioxide and connection to climate change; acid-base buffers in human blood and swimming pools; nuclear isotopes in energy production and medical imaging; and polymer structure relationship to properties and applications in everyday materials. Risk-benefit analysis is considered in the context of current events. The laboratory component emphasizes the 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.

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, an important form of written communication. In the laboratory, one experiment is dedicated to the manipulation and graphical
Texas A&M University

Core Curriculum

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

depiction of scientific data. Lab reports, quizzes and exams require students to use this new language in written form 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, emphasizing oral communication. In the fall semester, the students in groups of 2 or 3 learn a chemical demonstration, prepare a poster with handouts and orally 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.

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%. In addition, 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.
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@ nec.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.

Prerequisitses: 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 every day 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.  Last day for adding/dropping courses for the spring semester
Spring break
Monday, March 11 –Friday, March 15
Tuesday, April 2, 5 p.m  Last day for all students to drop courses with no penalty (Q-drop)
Tuesday, April 30:
May 3, Friday, 12:30 – 2:30 p.m.  Last day of classed. Redefined day, students attend their Friday classes
Final Exam

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>

Grading Cutoffs

- A 855-950
- B 760-854
- C 665-759
- D 570-664
- F 0-569

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

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 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 reading assignments 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:

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

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.
<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Reading</th>
<th>OWL DUE</th>
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<tbody>
<tr>
<td><strong>JAN</strong></td>
<td></td>
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<td><strong>Wednesday at 11:59 p.m.</strong></td>
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<tr>
<td>T 15</td>
<td>Syllabus and Course Overview; Chemistry in Our World</td>
<td>1.1-1.6</td>
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<tr>
<td>R 17</td>
<td>Elements, Compounds, Mixtures, Symbols</td>
<td>2.1-2.8</td>
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<tr>
<td>T 22</td>
<td>Atoms</td>
<td>3.1-3.4</td>
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<tr>
<td>R 24</td>
<td>Periodic Table and Trends</td>
<td>3.5-3.8</td>
<td>OWL 1</td>
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<tr>
<td>T 29</td>
<td>Electronegativity &amp; Bonding</td>
<td>5.1-5.3</td>
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<tr>
<td>R 31</td>
<td>Molecular Shapes &amp; Molecular and Ionic Compounds</td>
<td>5.4-5.7</td>
<td>OWL 2</td>
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<td><strong>FEB</strong></td>
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<tr>
<td>T 5</td>
<td>States of Matter</td>
<td>5.8-5.13</td>
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<tr>
<td>R 7</td>
<td>EXAM 1</td>
<td><strong>Chapters 1-3, 5</strong></td>
<td>OWL 3</td>
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<tr>
<td>T 12</td>
<td>Air and Air Pollution</td>
<td>4.1-4.9</td>
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<tr>
<td>R 14</td>
<td>Carbon Dioxide</td>
<td>4.10-4.11, 6.1-6.5</td>
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<tr>
<td>T 19</td>
<td>Responses to Global Warming</td>
<td>6.6-6.9</td>
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<tr>
<td>R 21</td>
<td>Ozone</td>
<td>7.1-7.4</td>
<td>OWL 4</td>
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<tr>
<td>T 26</td>
<td>Ozone Hole and CFCs</td>
<td>7.5-7.7</td>
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<tr>
<td>R 28</td>
<td>Water and Water Pollution</td>
<td>11.1-11.8</td>
<td>OWL 5</td>
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<td><strong>MAR</strong></td>
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<tr>
<td>T 5</td>
<td>Water Treatment and Purification</td>
<td>11.9-11.14</td>
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<tr>
<td>R 7</td>
<td>EXAM 2</td>
<td><strong>Chapters 4, 6, 7, 11</strong></td>
<td>OWL 6</td>
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<tr>
<td>T 12</td>
<td>spring break</td>
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<tr>
<td>R 14</td>
<td>spring break</td>
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<tr>
<td>T 19</td>
<td>Moles, Chemical Reactions, Rates of Reaction</td>
<td>8.1-8.3</td>
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<tr>
<td>R 21</td>
<td>Chemical Equilibrium</td>
<td>8.4-8.6</td>
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<tr>
<td>T 26</td>
<td>Acids and Bases, pH and Molarity, Buffers</td>
<td>9.1-9.6</td>
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<td>R 28</td>
<td>Oxidation and Reduction</td>
<td>10.1-10.4</td>
<td>OWL 7</td>
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<td><strong>APRIL</strong></td>
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<tr>
<td>T 2</td>
<td>Batteries &amp; Electrochemistry</td>
<td>10.4-10.6</td>
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<tr>
<td>R 4</td>
<td>Nuclear Radioactivity and Decay</td>
<td>13.1-13.5</td>
<td>OWL 8</td>
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<tr>
<td>T 9</td>
<td>Applications of Radioactivity</td>
<td>13.6-13.10</td>
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<tr>
<td>R 11</td>
<td>EXAM 3</td>
<td><strong>Chapters 8-10; 13</strong></td>
<td>OWL 9</td>
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<tr>
<td>T 16</td>
<td>Energy from fuels</td>
<td>12.1-12.5</td>
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<tr>
<td>R 18</td>
<td>Organic Chemistry</td>
<td>12.6-12.9; 14.1-14.3</td>
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<tr>
<td>T 23</td>
<td>Polymer Chemistry</td>
<td>14.4-14.6</td>
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<tr>
<td>R 25</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>T 30</td>
<td>No class. (Attend Friday classes.)</td>
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<td><strong>MAY</strong></td>
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<tr>
<td>F 3</td>
<td>Final Exam. <strong>Cumulative, with extra emphasis on Ch. 12, 14, 15, 16</strong></td>
<td>12:30 – 2:30 p.m.</td>
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</tr>
</tbody>
</table>

CHEM 106 Spring 2013
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>
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</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>
</tr>
</tbody>
</table>

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

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### Grading for Chemistry 116 Fall 2012

<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>
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</thead>
<tbody>
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<td></td>
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<td>20</td>
<td>15</td>
<td>5</td>
<td>40</td>
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<tr>
<td>09/07/12</td>
<td>Meet &amp; Greet</td>
<td>20</td>
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<tr>
<td>09/14/12</td>
<td>Exp 1 - Models of the Atom</td>
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<tr>
<td>09/21/12</td>
<td>Exp 2 – Graphing</td>
<td>80</td>
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<tr>
<td>09/28/12</td>
<td>Exp 3 – Concepts</td>
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<tr>
<td>10/05/12</td>
<td>Exp 4 – Bevo</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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<td>10/26/12</td>
<td>Exp 6 – Acid/Base</td>
<td>80</td>
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<td>10/27/12</td>
<td>Open House</td>
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<td>11/02/12</td>
<td>Exp 7 – Heat</td>
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<tr>
<td>11/09/12</td>
<td>Exp 8 – Chromatography</td>
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<tr>
<td>11/16/12</td>
<td>Group Project</td>
<td>45</td>
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<td>11/30/12</td>
<td>**Final Exam</td>
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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.
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 107/117

3. Texas Common Course Number: 

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 from department: submitting request should be in attendance when considered by the Core Curriculum Council.

12. Submitted by:  

☐ Course Instructor  

☐ Date  

☐ Approvals:  

☐ Date  

13. Department Head  

☐ Date  

14. 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  

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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, as well as the implication of the chemical perspective to an engineer’s perspective and needs. Connections between these concepts and real-life applications in health, environmental science, energy resources, and material science are countless. A few examples are included here: isotopic enrichment for military and energy needs; the electromagnetic spectrum and the different uses of it in our lives, like x-rays, cell phones, microwave ovens; importance of molecular structure in medicines using the example of thalidomide; importance of catalysis in automobile catalytic converters; application of equilibrium principles in production of ammonia and its importance to Germany in WWI. 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. In particular, the laboratory component implements the use of the scientific method to reinforce and provide supplemental information relevant 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 on 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. CHEM117 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):
Texas A&M University  
Core Curriculum

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

The course requires that students learn some of the necessary vocabulary of chemistry, which involves an unfamiliar chemical symbols, chemical formulas, and 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 use written communication 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 written communication of how the experiments’ objectives have been met in the procedures and apparatus used in each experiment. The collaborative nature of the laboratory requires effective oral communication between partners. 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, CHEM107/117 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. Teamwork is assessed by direct observation of the lab instructor and the assignment of appropriate participation points. 

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)
Friday, 1:00—2:30 PM
Tuesday, 2:30—4:00 PM
Phone: 845-3755
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](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](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](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.

\[
\begin{align*}
3 \text{ Hour exams @ 100 pts. each} & = 300 \text{ pts.} \\
1 \text{ Final exam @ 150 pts.} & = 150 \text{ pts.} \\
\text{In-class “clicker” questions} & = 30 \text{ pts.} \\
\text{Homework} & = 60 \text{ pts.} \\
\text{total} & = 540 \text{ pts.}
\end{align*}
\]

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.

- $\geq 86 = A$
- $74 - 85 = B$
- $62 - 73 = C$
- $50 - 61 = D$
- $< 50 = F$

**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**

“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://www.tamu.edu/aggiehonor](http://www.tamu.edu/aggiehonor).

**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, please contact Disability Services, Cain Hall, Room B-118 or call 845-1637. The Disability Services office is very busy every fall, so please make an appointment with them today if you feel you require assistance.
CHEMISTRY 117
General Chemistry for Engineering Students Lab
Fall 2012

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

TA: ___________________________  Section: ___________________________
TA Office Hours in #116 HELD: __________  Laboratory Room: __________
TA Email: __________________________

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

Chemistry 117, Fall 2012
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, post-lab 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 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 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](http://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 5 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
<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 Reduction and Analysis</th>
<th>Report</th>
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<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>
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<tr>
<td>9/17</td>
<td>Exp. 2: Aqueous Solutions</td>
<td>9/27</td>
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<tr>
<td>9/24</td>
<td>Exp. 3: Gas Laws</td>
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<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: From Atoms to Molecules* (Dry Lab)</td>
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<td>65</td>
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<tr>
<td>10/15</td>
<td>Exp. 9: Intermolecular Forces</td>
<td>10/25</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>
<td></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>
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<td>Thanksgiving Week</td>
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<td>No labs this week</td>
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<tr>
<td>11/26</td>
<td>Final Lab Exam</td>
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<tr>
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<td>800</td>
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</tbody>
</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): Health and Kinesiology

2. Course prefix and number: KINE 120

3. Texas Common Course Number: 

4. Complete course title: The Science of Basic Health and Fitness

5. Semester credit hours: 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 fall and spring

9. Number of class sections per semester: approximately 50 sections

10. Number of students per semester: approximately 1,500 students

11. Historic annual enrollment for the last three years: NA

   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

   Date 3/19/13

14. Department Head

   [Signature]

   Date 3/19/13

15. College Dean/Designee

   [Signature]

   Date 3/19/13

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?

As a Life Science course, KINE 120 exceeds the foundational component objectives and provides an interdisciplinary learning experience. Objectives focus on the natural phenomena of longevity and human disease. Discussion centers on the basic scientific principles of health and disease and its impact on the human experience. Additional dialogue examines the impact of wellness choices on society and the role of personal and social responsibility. Students investigate the scientific method, discuss current research, and analyze controversial health recommendations. The course incorporates a fitness experiment and research analysis to describe, explain, and predict natural phenomena. In addition to intellectual and practical knowledge, the course incorporates applied skills such as demonstrating proper exercise form and technique and incorporating appropriate goal setting strategies.

Over the course of the semester, students accumulate 21 hours of in-class instruction which is slightly over the 19 hour minimum for a 3 credit course. In order to blend the cognitive (knowledge) domain with the affective (attitude) and psychomotor (skill) domain of learning, extra class time is necessary to connect weekly lecture material with a weekly fitness session.

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 develop critical thinking skills to analyze and to evaluate health recommendations and training methods. Teaching strategies include lecture discussion of current research in health and conditioning, basic scientific principles of health and disease, experiential course work, and kinesthetic lessons. In a written report, the learner identifies a controversial health recommendation, analyzes the current scientific research, identifies the benefits and drawbacks of the treatment and synthesizes implications based on their findings. Student dialogue regarding controversial health recommendations fosters curiosity and inquiry, allowing students to become an advocate for their wellness. Other assessments include a video analysis to evaluate training methods and a fitness experiment to examine data.

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

Students enhance communication skills by connecting with peers in a weekly kinesthetic lesson, discussing wellness choices, and generating discussion regarding scientific principles of health and disease. Formal assessment includes a written report interpreting data from a class experiment, a written critique expressing ideas surrounding a health recommendation and a video analysis of an applied skill. During video analysis, students
Texas A&M University

Core Curriculum

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

utilize oral and visual communication skills to offer feedback concerning safety and technique of a training method.

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

Students develop quantitative skills to diagnose problems with training methods and offer feedback concerning safety and technique. Each week the learner participates in a kinesthetic lesson to learn an applied skill. Teaching methods include in-class and/or video demonstrations to evaluate training methods and observe trends in performance. During a formal video analysis, the learner observes the problem, identifies a treatment and evaluates the outcome. To foster empirical skills, students participate in a fitness experiment to collect, process, and analyze data. Students analyze data in order to make an informed and educated conclusion.

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 apply teamwork capabilities when considering different points of view regarding controversial health recommendations, participating in weekly kinesthetic lesson to learn an applied skill, and working in small groups to evaluate training methods. Tremendous cooperation and support are needed by team members to complete a thorough evaluation. Formal assessment includes small groups of three to four students conducting a movement analysis.

Please be aware that instructors should be prepared to submit samples/examples of student work as part of the future course recertification process.
Course Title and Number: The Science of Basic Health and Fitness KINE 120 – 1 credit
Term: Fall 2014
Meeting Times: MW 8:00-8:50
Location: COLS 121

Course Description: A general overview of the human body. Scientific fundamentals of stress, fitness, nutrition, disease, and drug use. Interdisciplinary focus on wellness and longevity. Integrated physical activity experiences centering on principles and applications of the scientific basis of conditioning. Not open to students who have taken KINE 223.

Prerequisites: None. Course uses basic biology, chemistry, & physics concepts.

Course Content: 50 minutes of Lecture and 50 minutes of Application each week (1 credit course)

Learning Outcomes: By the end of the semester, the student should be able to:

- Recognize the outcome of healthy and unhealthy behaviors on the human body.
- Discuss the impact of wellness choices on the individual and society.
- Demonstrate principles of training and explain how science forms the basis of those principles.
- Diagnose common problems with training methods and offer feedback concerning safety and technique.
- Communicate and work effectively with team members in a fitness setting.
- Describe basic scientific principles of health and disease and their implication on the human experience and the physical world.
- Explore the scientific method by discussing current research in health & conditioning.
- Generate discussion regarding a current health recommendation.
- Apply critical thinking skills to analyze and evaluate health recommendations for the natural phenomena of longevity and disease.
- Incorporate the scientific method in a fitness experiment (construct a scientific hypothesis, identify a testable prediction, collect & process data, analyze data, and evaluate the results).

Class Requirements

Class Activities (10 points)
Participate in discussion, polling, application activities, & fitness training.
Research Analysis (15 points)
Identify a controversial health recommendation. Analyze current scientific research and examine the use of the scientific method. Provide a 250 word critique.

Fitness Experiment (15 points)
Examine how performance is assessed and construct a hypothesis about the fitness levels of a 199 running class at the beginning of the semester. Collect 1.5 mile run data at the start of the semester. Process the data. Run statistical analysis. Look at the data distribution and how it compares to the average population. Evaluate the results.

Movement Analysis (15 points)
Demonstrate a training method. Analyze the movement through video and offer feedback concerning safety and technique.

Assessment – Principles of Training (15 points)
Questions cover training methods, principles of training, and how science forms the basis of those principles.

Assessment 1 – Current Health Topics (10 points)
Questions cover the scientific method, the wellness continuum, behavior change strategies, scientific principles of fitness training, hypokinetic conditions, nutrition, weight management, complementary & alternative medicine and its impact on the human experience.

Assessment 2 – Current Health Topics (20 points)
Questions primarily focus on scientific principles of human disease, reproduction, pregnancy, sexually transmitted infections and drug use on the human body and its influence on the human experience. Additional questions cover key concepts from the semester.

Grading Scale
90-100 = A
80-89 = B
70-79 = C
60-69 = D
Below 60 = F

Academic Integrity
For additional information please visit: http://aggiehonors.tamu.edu

"An Aggie does not lie, cheat, or steal, or tolerate those who do."

Americans with Disabilities Act (ADA)
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
ATTENTION STUDENTS:
1. It is the responsibility of the student to inform his/her instructor if they have a condition that may impair or influence participation in an activity class (e.g. physical handicap, use of medication, etc.).
2. Should you become unable to participate in or complete the skill evaluation in this activity class, alternative methods of evaluation may be provided at the instructor's discretion.
3. The courses in which you have elected to participate are either required as part of your major or elected. Regardless of the case, you must realize that there is a certain assumption of risk, which you engender when you participate in activity classes such as these. You must be aware of the assumption.

ATTENDANCE POLICY
Attendance is a critical component of all KINESIOLOGY classes and is essential to learning a skill. Additionally due to the skill progressions found in teaching activities, it is crucial, for safety reasons, to require regular attendance.

For classes that meet two times a week for the full semester:
A student shall be allowed 2 unexcused absences without penalty. For each unexcused absence beyond the first two unexcused absences, 15 points will be deducted from the final grade.

PLEASE NOTE: A student will automatically fail upon receiving the 4th unexcused absence. Excused absences, as defined in Rule 7 of the Texas A&M University Student Rules http://student-rules.tamu.edu/rule07 will not result in any point deduction; however, written documentation will be required to receive an excused absence.

One point will be deducted from the final grade for each tardy up to 10 minutes. After 10 minutes, the student is considered absent.

Updated 04/13
Sample of KINE 123 (1 credit) Course Topics, Calendar of Activities, & Major Assignments


<table>
<thead>
<tr>
<th>Lecture Topic / Conditioning Topic</th>
<th>Assigned Reading</th>
<th>Applied Skill</th>
</tr>
</thead>
</table>
| **Week 1** Lecture: Scientific Inquiry  
Conditioning: Weight Room Orientation | Ch. 1 Bounds et al.  
Ch. 1-3 Cissik, J. |              |
| **Week 2** Lecture: Wellness Continuum  
Conditioning: Lower Body | Ch. 2 Bounds et al.  
Ch. 4-5 &10 Cissik, J. | Workout: Lower Body  
Scientific Method: create a hypothesis |
| **Week 3** Lecture: Longevity and Stress  
Conditioning: Chest & Triceps  
Research Analysis | Ch. 3 Bounds et al.  
Ch. 6&9 Cissik, J. | Workout: Chest & Triceps  
Scientific Method: Collect data |
| **Week 4** Lecture: Cardiovascular Conditioning  
Conditioning: Shoulders | Ch. 8 Cissik, J. | Workout: Shoulders |
| **Week 5** Lecture: Muscular Conditioning & Flexibility  
Conditioning: Back & Biceps  
Assessment – Principles of Training | Ch. 7 Cissik, J. | Workout: Back & Biceps  
Scientific Method: Process data |
| **Week 6** Lecture: Hypokinetic Conditions & Complementary and Alternative Medicine  
Conditioning: Push-Pull Design | Ch. 4 Bounds et al. | Workout: Push-Pull  
Scientific Method: Analyze data & evaluate the results |
| **Week 7** Lecture: Nutrition Fundamentals & Weight Management  
Conditioning: Pyramid Design – light to heavy | Ch. 5 Bounds et al. | Workout: Pyramid (light to heavy) |
| **Week 8** Assessment 1 – Current Health Topics  
Conditioning: Pyramid Design – heavy to light | Ch. 6 Bounds et al. | Workout: Pyramid (heavy to light) |
| **Week 9** Lecture: Psychoactive Drugs – Alcohol  
Conditioning: Body Weight Design | Ch. 9 Bounds et al. | Workout: Body Weight |
| **Week 10** Lecture: Psychoactive Drugs – Nicotine, Prescription & Illicit  
Conditioning: Endurance | Ch. 9 Bounds et al. | Workout: Endurance |
| **Week 11** Lecture: Cancer  
Conditioning: Power | Ch. 11 Bounds et al. | Workout: Power |
| Week 12  | Lecture: Reproduction & Pregnancy  
*Conditioning: Movement Analysis* | Ch. 8 Bbounds et al. | Workout: Skill Analysis |
|---------|----------------------------------|----------------------|------------------------|
| Week 13 | Lecture: Sexually Transmitted Infections  
*Conditioning: Circuit Design* | Ch. 8 Bbounds et al. | Workout: Circuit |
| Week 14 | **Assessment 2 – Current Health Topics**  
*Conditioning: Supersets* | Ch. 1-9 & 11 Bbounds et al. | Workout: Supersets |
MEMORANDUM

TO: Dr. Jimmy T. Keeton, Professor and Head
   Department of Nutrition and Food Science

FROM: Dr. Richard B. Kreider, Professor and Head
      Department of Health and Kinesiology

DATE: January 31, 2013

SUBJECT: KINE 120 and KINE 223

The Undergraduate Program Committee of the Department of Nutrition and Food Sciences
recently reviewed materials for KINE 120 and KINE 223 and accepted course content related to
the basic principles of nutrition. To acknowledge this decision, please reply with approval to this
memo.

Signature
Dr. Richard B. Kreider
Department Head of Health and Kinesiology

Signature
Dr. Jimmy T. Keeton
Department Head of Nutrition and Food Sciences
Texas A&M University
Departmental Request for a New Course
Undergraduate • Graduate • Professional
• Submit original form and attach a course syllabus.

Form Instructions

1. Request submitted by (Department or Program Name): Department of Health and Kinesiology

2. Course prefix, number and complete title of course: KINE 120 The Science of Basic Health and Fitness

3. Catalog course description (not to exceed 50 words): Overview of the human body; scientific fundamentals of stress, fitness, nutrition, disease, and drug use; interdisciplinary focus on wellness and longevity; integrated physical activity experiences centering on principles and applications of the scientific basis of conditioning; not open to students who have taken KINE 223.

4. Prerequisite(s): None

Cross-listed with: NA

Stacked with: NA

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

5. Is this a variable credit course? □ Yes □ No

If yes, from _______ to _______

6. Is this a repeatable course? □ Yes □ No

If yes, this course may be taken _______ times.

Will this course be repeated within the same semester? □ Yes □ No

7. This course will be:

   a. required for students enrolled in the following degree program(s) (e.g., B.A. in history)

   b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)

   undergraduate • graduate • academics

8. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments. Attach approval letters.

9. Prefix Course # Title (excluding punctuation):

<table>
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<tr>
<th>KINE</th>
<th>SCI</th>
<th>BASIC</th>
<th>HLTH &amp; FITNESS</th>
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Lect. Lab SCH CIP and Fund Code Admin. Unit Acad. Year FICE Code
0 1 0 1 0 1 5 0 1 0 0 0 0 0 0 1 0 4 1 4 0 2 1 4 - 1 5 0 0 3 6 3 2

Approval recommended by:

Frank Thomas
Department Head or Program Chair (Type Name & Sign) Date

Richard Kreider
Department Head or Program Chair (Type Name & Sign) Date

Submitted to Coordinating Board by:

Associate Director, Curricular Services

Date

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra.williams@tamu.edu
Curricular Services — 3/10

RECEIVED MAR 2 1 2013

CURRICULAR SERVICES
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): Health and Kinesiology

2. Course prefix and number: KINE 223
   Texas Common Course Number:  

3. Complete course title: Introduction to the Science of Health and Fitness
   Semester credit hours: 3

4. 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

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

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

7. Number of class sections per semester: approximately 25 sections

8. Number of students per semester: approximately 750 students
   New Course

9. Historic annual enrollment for the last three years: NA

   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: [Signature]
       Course Instructor
       Date: 3-19-13

14. Department Head
       [Signature]
       Date: 3-19-13

15. College Dean/Designee
       [Signature]
       Date: 3/19/13

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?

As a Life Science course, KINE 223 exceeds the foundational component objectives and provides an interdisciplinary learning experience. Objectives focus on the natural phenomena of longevity and human disease. Discussion centers on the basic scientific principles of health and disease and its impact on the human experience. Additional dialogue examines the impact of wellness choices on society and the role of personal and social responsibility. Students investigate the scientific method, discuss current research, and analyze controversial health recommendations. The course incorporates a fitness experiment and research analysis to describe, explain, and predict natural phenomena. In addition to intellectual and practical knowledge, the course incorporates applied skills such as demonstrating proper exercise form and technique, incorporating appropriate goal setting strategies, and examining the application of scientific principles and investigative methods to assess health-related performance.

KINE 223 is a 3-credit hour class and differs from the 1-credit hour KINE 120 by including several domains of integrative learning. The course features team teaching from the various disciplines of health and kinesiology. Instructional faculty collaborate with junior faculty (Ph.D. candidates) to offer experiential course work. Students participate in field based experiences, self assessments, & reflective communication to practice and to apply the lecture content.

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 develop critical thinking skills to analyze and to evaluate health recommendations and training methods. Teaching methods incorporate lecture discussion of current research in health and conditioning, basic scientific principles of health and disease, kinesthetic lessons, experiential course work, and integrative learning experiences. In a written report, the learner identifies a controversial health recommendation, analyzes the current scientific research, identifies the benefits and drawbacks of the treatment and synthesizes implications based on their findings. Student dialogue regarding controversial health recommendations fosters curiosity and inquiry, allowing students to become an advocate for their wellness. Other assessments include a video analysis to evaluate training methods, a fitness experiment to examine data, and performance reports based on direct and indirect assessments of health-related fitness.

Communication (to include effective development, interpretation and expression of ideas through written, oral and visual communication):
Texas A&M University

Core Curriculum

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

Students enhance communication skills by connecting with peers in a weekly kinesthetic lesson, demonstrating principles of training, discussing wellness choices, and generating discussion regarding scientific principles of health and disease. During video analysis, students utilize oral and visual communication skills to offer feedback concerning safety and technique of a training method. Formal written assessments include a written report interpreting data from a class experiment, a written critique expressing ideas surrounding a health recommendation, and written performance reports evaluating performance and creating plans for improvement.

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

Students develop quantitative skills to diagnose problems with training methods and offer feedback concerning safety and technique. Each week the learner participates in a kinesthetic lesson to learn an applied skill. Teaching methods include in-class and/or video demonstrations to evaluate training methods and observe trends in performance. During a formal video analysis, the learner observes the problem, identifies a treatment and evaluates the outcome. To foster empirical skills, students participate in a fitness experiment to collect, process, analyze data, and formulate a conclusion. In addition to the fitness experiment, students collect data related to stress, health-related fitness, and nutrition, evaluate information, and formulate a plan based on their findings. Students analyze data in order to make an informed and educated conclusion.

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 apply teamwork capabilities when considering different points of view regarding controversial health recommendations, participating in weekly kinesthetic lesson to learn an applied skill, and working in small groups to evaluate training methods and performance. Tremendous cooperation and support are needed by team members to complete a thorough evaluation. Formal assessments include small groups of three to four students conducting a movement analysis and small groups collecting data for individual performance reports.

Please be aware that instructors should be prepared to submit samples/examples of student work as part of the future course recertification process.
Course Title and Number: Introduction to the Science of Health and Fitness KINE 223 – 3 credit
Term: Fall 2014
Meeting Time: TR 8:00-9:15
Location: COLS 121

Course Description: Overview of the human body systems. Interdisciplinary focus on wellness, fitness, nutrition, disease, and drug use. Integrated physical activity experiences centering on principles and applications of the scientific basis of conditioning. Students collect data related to stress, health-related fitness, and nutrition, evaluate information, and formulate a plan based on their findings. Hands-on experience with pedometers, heart rate monitors, bioelectrical impedance devices, software, and other innovative technology to monitor and evaluate diet and activity levels. Not open to students who have taken KINE 120.

Prerequisites: None. Course uses basic biology, chemistry, & physics concepts.

Course Content: 2 Lecture hours and 2 Application hours each week (3 credit course). Students participate in 1 lecture hour outside of class by accessing course website for lectures and class discussion. In addition to 1 hour of face to face lecture time, students spend 2 hours each week immersed in integrative (hands on learning).

Learning Outcomes: By the end of the semester, the student should be able to:

- Recognize the outcome of healthy and unhealthy behaviors on the human body systems.
- Discuss the impact of wellness choices on the individual and society.
- Demonstrate principles of training and explain how science forms the basis of those principles.
- Diagnose common problems with training methods and offer feedback concerning safety and technique.
- Evaluate health-related performance and formulate a plan based on their findings.
- Communicate and work effectively with team members in a fitness setting.
- Describe scientific principles of health and disease and their implication on the human experience and the physical world.
- Explore the scientific method by discussing current research in health & conditioning.
- Generate discussion regarding a current health recommendation.
- Apply critical thinking skills to analyze and evaluate health recommendations for the natural phenomena of longevity and disease.
- Incorporate the scientific method in a fitness experiment (construct a scientific hypothesis, identify a testable prediction, collect & process data, analyze data, and evaluate the results).
Class Requirements

Class Activities (10 points)
Participate in discussion, polling, application activities, & fitness training.

Research Analysis (10 points)
Identify a controversial health recommendation. Analyze current scientific research and examine the use of the scientific method. Provide a 250 word critique.

Fitness Experiment (10 points)
Examine how performance is assessed and construct a hypothesis about the fitness levels of a 199 running class at the beginning of the semester. Collect 1.5 mile run data at the start of the semester. Process the data. Run statistical analysis. Look at the data distribution and how it compares to the average population. Evaluate the results.

Performance Reports (20 points)
Based on direct and in-direct assessments of health-related fitness, generate a written report to evaluate performance and formulate a plan for maintenance or improvement.

Movement Analysis (15 points)
Demonstrate a training method. Analyze the movement through video and offer feedback concerning safety and technique.

Assessment – Principles of Training (10 points)
Questions cover principles of training and how science forms the basis of those principles.

Assessment 1 – Current Health Topics (10 points)
Questions cover the scientific method, the wellness continuum, behavior change strategies, scientific principles of fitness training, hypokinetic conditions, nutrition, weight management, complementary & alternative medicine and its impact on the human experience.

Assessment 2 – Current Health Topics (15 points)
Questions primarily focus on scientific principles of human disease, reproduction, pregnancy, sexually transmitted infections and drug use on the human body and its influence on the human experience. Additional questions cover key concepts from the semester.

Grading Scale
90-100 = A
80-89 = B
70-79 = C
60-69 = D
Below 60 = F

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

"An Aggie does not lie, cheat, or steal, or tolerate those who do."
Americans with Disabilities Act (ADA)

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

ATTENTION STUDENTS:
1. It is the responsibility of the student to inform his/her instructor if they have a condition that may impair or influence participation in an activity class (e.g. physical handicap, use of medication, etc.).
2. Should you become unable to participate in or complete the skill evaluation in this activity class, alternative methods of evaluation may be provided at the instructor’s discretion.
3. The courses in which you have elected to participate are either required as part of your major or elected. Regardless of the case, you must realize that there is a certain assumption of risk, which you engender when you participate in activity classes such as these. You must be aware of the assumption.

ATTENDANCE POLICY

Attendance is a critical component of all KINESIOLOGY classes and is essential to learning a skill. Additionally due to the skill progressions found in teaching activities, it is crucial, for safety reasons, to require regular attendance.

For classes that meet two times a week for the full semester:
A student shall be allowed 2 unexcused absences without penalty. For each unexcused absence beyond the first two unexcused absences, 15 points will be deducted from the final grade.

PLEASE NOTE: A student will automatically fail upon receiving the 4th unexcused absence. Excused absences, as defined in Rule 7 of the Texas A&M University Student Rules http://student-rules.tamu.edu/rule07 will not result in any point deduction; however, written documentation will be required to receive an excused absence.

One point will be deducted from the final grade for each tardy up to 10 minutes. After 10 minutes, the student is considered absent.

Updated 04/13
Sample of KINE 223 (3 credit) Course Topics, Calendar of Activities, & Major Assignment Dates


<table>
<thead>
<tr>
<th>Lecture/Applied Skill</th>
<th>Assigned Reading</th>
<th>Integrative Learning Experience</th>
</tr>
</thead>
</table>
| **Week 1** Lecture Topics: Wellness Continuum, & Scientific Inquiry | Ch. 1  Bounds et al.  
Ch. 1-3  Cissik, J. |                                                     |
| Weight Room Orientation                                    |                                           |                                                     |
| **Week 2** Lecture Topics: Behavior Change & Goal Setting Strategies, Create a Hypothesis | Ch. 2  Bounds et al.  
Ch. 10  Cissik, J. | Measuring heart rate & blood pressure |
| Applied Skill: Lower Body                                  |                                           |                                                     |
| **Week 3** Lecture Topics: Stress, Coping Mechanisms, Collect Data | Ch. 6&9  Cissik, J. | Field Based Learning -  
Analyzing heart rate & blood pressure pre & post guided relaxation activities |
| Applied Skill: Chest & Triceps                             |                                           |                                                     |
| **Week 4** Lecture Topics: Analyzing longevity blue zones, Data cont..., Exam 1 | Ch. 3  Bounds et al.  
Ch. 8  Cissik, J. | Assessing performance -  
1 mile walk |
| Applied Skill: Shoulders                                   |                                           |                                                     |
| **Week 5** Lecture Topics: Cardiovascular & Muscular Conditioning, Process Data | Ch.7  Cissik, J. | Assessing performance -  
muscular strength & endurance |
| Applied Skill: Back & Biceps                               |                                           |                                                     |
| **Week 6** Lecture Topics: Flexibility Training, Analyze data & evaluate the results | Ch. 5  Cissik, J. | Assessing performance -  
hamstring & low back flexibility |
<p>| Applied Skill: Push-Pull Design                            |                                           |                                                     |
| <strong>Week 7</strong> Lecture Topics: Hypokinetic Conditions          | Ch. 4  Bounds et al. | Assessing Back Health |
| Training Method: Pyramid Design (light to heavy)           |                                           |                                                     |</p>
<table>
<thead>
<tr>
<th>Week</th>
<th>Lecture Topics:</th>
<th>Training Method:</th>
<th>Ch.</th>
<th>Chapter Authors</th>
<th>Reading Material</th>
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<tbody>
<tr>
<td>8</td>
<td>Nutrition Fundamentals, Bioenergetics,</td>
<td>Pyramid Design (heavy to light)</td>
<td>5</td>
<td>Bounds et al.</td>
<td>Interpreting Dietary Intake &amp; Physical Activity</td>
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<td>9</td>
<td>Scientific Principles of Lifetime Weight Management, Body Composition</td>
<td>Body Weight Design</td>
<td>6</td>
<td>Bounds et al.</td>
<td><strong>Field Based Learning</strong> – Supermarket Visit Exploring Food Labels &amp; Dietary Recommendations</td>
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<tr>
<td>10</td>
<td>Eating Disorders, Exam 2</td>
<td>Endurance</td>
<td>7</td>
<td>Bounds et al.</td>
<td>Assessing Body Composition</td>
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<td>11</td>
<td>Psychoactive Drugs Nicotine, Alcohol, Prescription &amp; Illicit Drugs</td>
<td>Power</td>
<td>9</td>
<td>Bounds et al.</td>
<td>Creating Resource Materials related to Psychoactive Drugs</td>
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<tr>
<td>12</td>
<td>Human Diseases (Communicable Diseases)</td>
<td>Circuit Design</td>
<td>11</td>
<td>Bounds et al. (pgs. 388-395)</td>
<td>Interpreting Vaccine Recommendations</td>
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<tr>
<td>13</td>
<td>Human Diseases cont... (Non-Communicable Diseases)</td>
<td></td>
<td>11</td>
<td>Bounds et al. (pgs. 396-412)</td>
<td>Reflective Analysis of Family Health Portrait</td>
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<td></td>
<td><strong>Applied Skill: Movement Analysis</strong></td>
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<td>14</td>
<td>Reproduction, Pregnancy, &amp; Sexually Transmitted Infections</td>
<td>Supersets</td>
<td>8</td>
<td>Bounds et al.</td>
<td>Creating Dialogue concerning Sexual Health Decisions</td>
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<tr>
<td>15</td>
<td><strong>Final Exam</strong></td>
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MEMORANDUM

TO:         Dr. Jimmy T. Keeton, Professor and Head Department of Nutrition and Food Science
FROM:       Dr. Richard B. Kreider, Professor and Head Department of Health and Kinesiology
DATE:       January 31, 2013
SUBJECT:    KINE 120 and KINE 223

The Undergraduate Program Committee of the Department of Nutrition and Food Sciences recently reviewed materials for KINE 120 and KINE 223 and accepted course content related to the basic principles of nutrition. To acknowledge this decision, please reply with approval to this memo.

Signature
Dr. Richard B. Kreider
Department Head of Health and Kinesiology

Signature
Dr. Jimmy T. Keeton
Department Head of Nutrition and Food Sciences
Texas A&M University
Departmental Request for a New Course
Undergraduate • Graduate • Professional
• Submit original form and attach a course syllabus.

Form Instructions

1. Request submitted by (Department or Program Name): Department of Health and Kinesiology

2. Course prefix, number and complete title of course: KINE 223 Introduction to the Science of Health and Fitness

3. Catalog course description (not to exceed 50 words): Overview of the human body systems: interdisciplinary focus on wellness, fitness, nutrition, disease, drug use; integrated physical activity centering on principles and applications of conditioning; collect data, evaluate information, formulate plans based on findings; experience with pedometers, heart rate monitors, bioelectrical impedance devices, software, and other technology

4. Prerequisite(s): none

Cross-listed with: NA

Stacked with: NA

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

5. Is this a variable credit course? ☐ Yes ☒ No

If yes, from _______ to _______

6. Is this a repeatable course? ☐ Yes ☒ No

If yes, this course may be taken _______ times.

Will this course be repeated within the same semester? ☐ Yes ☒ No

7. This course will be:
   a. required for students enrolled in the following degree program(s) (e.g., B.A. in history)
   b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)

undergraduate general academics

8. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments.

Attach approval letters.

9. Prefix Course Title (excluding punctuation)

<table>
<thead>
<tr>
<th>KINE</th>
<th>2</th>
<th>2</th>
<th>3</th>
<th>INTRO</th>
<th>SCI</th>
<th>HLTH &amp; FITNESS</th>
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<td>SCH</td>
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<td>3</td>
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</table>

Approval recommended by:

Frank Thomas Date 7/19/13

George Cunningham Chair, College Review Committee Date

Richard Kreider Date 3/14/13

George Cunningham Dean of College Date

Submitted to Coordinating Board by:

Chair, GC or UCC Date 3/19/13

Associate Director, Curricular Services Date

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra.williams@ TAMU.edu

Curricular Services - 3/10