Core Curriculum and General Education Outcomes Alignment Study

Office of Undergraduate Studies
Office of Institutional Research and Assessment
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This report assesses the alignment between the Auburn University Core Curriculum and the general education outcomes that the University identified in 2008. The assessment is based on semi-structured interviews with 24 directors of Core Curriculum programs. As understood by these program directors, certain Core programs are closely aligned with a single general education outcome. For example, Core Science courses primarily address scientific literacy, while Core Fine Arts courses focus on aesthetic appreciation and engagement. Other Core programs address two or more outcomes: English Composition is well aligned with information literacy, analytical skills and critical thinking, and effective communication. Most Core programs are not formally assessing the extent to which students are achieving the intended general education outcomes. However, existing grading practices suggest opportunities for embedded assessment in the future. The most frequent concern expressed during the interviews is related to large class sizes in Core Curriculum courses.
# Core Curriculum and General Education Outcomes Alignment Study

## Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Introduction</strong></td>
<td>4</td>
</tr>
<tr>
<td><strong>English Composition</strong></td>
<td>6</td>
</tr>
<tr>
<td>Summary</td>
<td>6</td>
</tr>
<tr>
<td>Core English Composition Courses at Auburn University</td>
<td>7</td>
</tr>
<tr>
<td>English Composition and General Education Outcomes</td>
<td>9</td>
</tr>
<tr>
<td>Assessment</td>
<td>12</td>
</tr>
<tr>
<td>Suggestions</td>
<td>12</td>
</tr>
<tr>
<td><strong>World Literature</strong></td>
<td>16</td>
</tr>
<tr>
<td>Summary</td>
<td>16</td>
</tr>
<tr>
<td>World Literature Core Courses at Auburn University</td>
<td>17</td>
</tr>
<tr>
<td>World Literature and General Education Outcomes</td>
<td>19</td>
</tr>
<tr>
<td>Assessment</td>
<td>22</td>
</tr>
<tr>
<td>Suggestions</td>
<td>23</td>
</tr>
<tr>
<td><strong>Philosophy</strong></td>
<td>26</td>
</tr>
<tr>
<td>Summary</td>
<td>26</td>
</tr>
<tr>
<td>Philosophy Core Courses at Auburn University</td>
<td>27</td>
</tr>
<tr>
<td>Philosophy Courses and General Education Outcomes</td>
<td>29</td>
</tr>
<tr>
<td>Assessment</td>
<td>35</td>
</tr>
<tr>
<td>Suggestions</td>
<td>36</td>
</tr>
<tr>
<td><strong>Fine Arts</strong></td>
<td>38</td>
</tr>
<tr>
<td>Summary</td>
<td>38</td>
</tr>
<tr>
<td>Fine Arts Courses at Auburn University</td>
<td>40</td>
</tr>
<tr>
<td>Fine Arts Courses and General Education Outcomes</td>
<td>44</td>
</tr>
<tr>
<td>Assessment</td>
<td>55</td>
</tr>
<tr>
<td>Suggestions</td>
<td>57</td>
</tr>
<tr>
<td><strong>Mathematics</strong></td>
<td>61</td>
</tr>
<tr>
<td>Summary</td>
<td>61</td>
</tr>
<tr>
<td>Mathematics Core Courses at Auburn University</td>
<td>62</td>
</tr>
<tr>
<td>Mathematics Courses and General Education Outcomes</td>
<td>64</td>
</tr>
<tr>
<td>Assessment</td>
<td>69</td>
</tr>
<tr>
<td>Suggestions</td>
<td>70</td>
</tr>
<tr>
<td><strong>Science</strong></td>
<td>72</td>
</tr>
<tr>
<td>Summary</td>
<td>72</td>
</tr>
<tr>
<td>Science Courses at Auburn University</td>
<td>74</td>
</tr>
<tr>
<td>Science Courses and General Education Outcomes</td>
<td>82</td>
</tr>
<tr>
<td>Assessment</td>
<td>97</td>
</tr>
<tr>
<td>Suggestions</td>
<td>100</td>
</tr>
<tr>
<td><strong>History</strong></td>
<td>104</td>
</tr>
</tbody>
</table>

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Introduction

In 2008, the Auburn University Senate approved seven general education outcomes that all bachelor’s degree recipients should attain, no matter what their academic major or career plans:

- analytical skills and critical thinking
- effective communication
- information literacy
- informed and engaged citizenship
- intercultural knowledge and diversity awareness
- scientific literacy
- aesthetic appreciation and engagement.

This action was taken, in part, because the accrediting standards of the Southern Association of Colleges and Schools place significant emphasis on student learning outcomes, in particular on college-level general education competencies. Comprehensive Standard 3.5.1 states: “The institution identifies college-level general education competencies and the extent to which graduates have attained them” (Principles of Accreditation: Foundations for Quality Enhancement, p. 27).

Auburn University’s first means of ensuring that undergraduate students attain these general education outcomes is its Core Curriculum, a selection of special courses in the sciences, social sciences, humanities and fine arts that compose 41 semester-hours of each student’s degree program. The current Core Curriculum was implemented in 1991.

Because of the time elapsed between the implementation of the Core Curriculum and the formal identification of expected learning outcomes for general education, this Alignment Study was carried out to help the Core Curriculum Oversight Committee explore how those general education outcomes are being addressed in existing Core Curriculum courses. The study addresses the following questions:

- What do key stakeholders (program directors and faculty teaching Core courses) mean when they refer to Auburn University’s general education outcomes? For example, scientific literacy can refer to (a) knowledge of philosophical and historical foundations of modern science; (b) understanding of the scientific method; (d) demonstrating the ability to apply scientific method across different situations; (e) ability to conduct an experiment; (f) understanding of broad scientific issues and concepts, etc. (see Draft CCOC Goals and Outcomes, March 2008). Which of these dimensions are emphasized in existing Core science courses?
- To what extent are different aspects of the general education outcomes addressed by different subject areas of the Core? For instance, students might be exposed to understanding of the scientific method but have limited opportunities to conduct experiments.
- What are the activities and assignments that allow students to practice, receive feedback, and improve their attainment of each general education outcome?
- What methods are being used to assess the extent to which students achieve the seven general education outcomes? If no formal assessment has been implemented at this point, what direct evidence of student achievement—for example, assignments in class (papers, exams, etc.)—can serve as the basis of future assessments?
What changes would faculty suggest in the Core Curriculum? Why?

Students may progress toward the University’s expected general education outcomes through course work in their majors and in elective courses, as well as through co-curricular experiences. However, the Core Curriculum bears special responsibility for helping students reach the University’s general education goals. For that reason, alignment between Core courses and the University’s general education outcomes is an urgent need, not merely in theory but especially in planning, pedagogy and assessment. This alignment study does much to uncover the extent to which long-standing Core courses implicitly align with the newer intended outcomes and thus provides one basis for a more explicit and intentional alignment process as part of general education reform.

Taking into account that the study was (a) aimed at participants’ understanding of general education outcomes; (b) explored faculty opinions and ideas on possible changes in Core Curriculum; and (c) the number of participants was rather small (24), the qualitative interview was chosen as the method of analysis. The Interview Guide developed for the purposes of this study is presented in Appendix A. The Consent Form signed by each participant of the study is provided in Appendix B.

The study also provides institutional data on Core Curriculum courses: (a) student enrollments in Core courses; (b) median class section enrollments; (c) breakdown of Core instructors by faculty rank for the 2007-2008 academic year; as well as (d) a description of the Core courses actually taken by recent Auburn University Bachelor’s degree recipients.

This report is organized by Core Curriculum areas: English Composition, World Literature, Philosophy, Fine Arts, Mathematics, Science, History, and Social Sciences. The interviewees’ perceptions of the extent to which courses in their subject areas are aligned with general education outcomes are presented in a table at the end of each section.
Summary

Auburn University’s Core Curriculum English Composition requirement is satisfied by completing six semester hours or two courses in a sequence (ENGL 1100 and ENGL 1120 or ENGL 1107 and ENGL 1127 for honors students). In the 2007-2008 academic year, 264 sections of English Composition were taught. The median number of students per section was 25 in ENGL 1100 and 24 in ENGL 1120. Students who demonstrate proficiency through high scores on standardized tests can place out of English Composition courses. Fewer students meet the requirements for placing out of ENGL 1120. Therefore, the number of students taking ENGL 1120 is greater than the number of students taking ENGL 1100.

Effective writing, information literacy, analytical and critical thinking, effective critique of an argument, and constructing an effective argument are the general educational outcomes emphasized by English Composition course sequence:

- Each course presumes work on four essays plus a final. The goal of writing assignments is to enhance organization, the writing process (pre-writing, writing and revision), paragraphing, and sentence structure.
- Information literacy is emphasized in ENGL 1120. Within this course, students have at least three library sessions. During these sessions, librarians help students to use existing databases and locate sources to complete research papers.
- In English Composition, students also learn to construct an effective argument. In their writing assignments, students have to come up with an idea or a claim. The claim students make should be argumentative (i.e., it should not be a statement that everyone would agree with). And the counterargument should be brought in.
- Effective critiquing of an argument and analytical and critical reading are emphasized in identifying ethical, pathetic and logical appeals in reading assignments.

Each section of ENGL 1120 takes up one of the following themes: business; cultural diversity; health and medicine; liberal arts; science and technology; or sustainability. Instructors tailor reading and writing assignments to the theme of the course. Depending on the theme of the section in which they enroll, students may have some opportunity to advance their understanding of other AU general education outcomes, such as informed and engaged citizenship, intercultural knowledge and diversity awareness, or scientific literacy.

English faculty assess portfolios of student work from ENGL 1120 in order to determine the extent to which students achieve educational outcomes associated with the English Composition sequence. A scoring rubric delineates specific outcomes under each objective of the course. Because student essays vary so much in assignment and theme, both across classes and within one student’s portfolio, analysis of these portfolios is complicated.

The interviewee suggested that English composition class sizes should be reduced from about 25 to fewer than 20 students per class. More collaboration among Core courses also seemed attractive.
Core English Composition Courses at Auburn University

Auburn University’s Core Curriculum English Composition requirement is satisfied by completing six semester hours in a sequence. The following courses are included:

- **English Composition I** ................................................................. ENGL 1100
- **Honors English Composition I** .................................................. ENGL 1107
- **English Composition II** ............................................................... ENGL 1120
- **Honors English Composition II** ................................................ ENGL 1127

**Graph 1.1 Core English Composition Courses: Number of Students and Number of Sections (2007-2008 academic year)**

In the 2007-2008 academic year, 264 sections of English Composition were offered. Enrollment in ENGL 1120, the second course in the sequence, is greater than in ENGL 1100, which could be due to the fact that some of the students who took the second course placed out of the prerequisite course:

*Interview (English Composition)*: There are quite a few students who are placed out of 1100. Fewer students place out of 1120. To give you an idea, only students with ACT of 35 or 36 can place out of 1120. The best of the best... There are lesser requirements for placing out of 1100. You have to have 30 on ACT to get out of 1100. The majority of students take both of these. A select few who are particularly well placed and qualified can get out of one of those. Roughly about a quarter to 1/3 of students get out of 1100. That number is less than 10% for 1120.

Virtually all standard English Composition classes are taught by instructors (56%, 147 classes) and graduate teaching assistants (42%, 11 classes). Honors English Compositions are taught primarily by Associate Professors.

**Graph 1.2 Instructors of Core English Composition Courses by Number of Students and Number of Sections (2007-2008 academic year)**
Graph 1.3 Core English Composition Courses: Section Sizes (2007-2008 academic year)

In 2007-2008, class sizes varied from 16 to 26 for ENGL 1100 and from 13 to 26 for ENGL 1120. The middle 50% of ENGL 1100 classes enroll 24 to 25 students, and the middle 50% of ENGL 1120 classes enroll from 23 to 25 students. The Honors English Composition classes have fewer enrolled students per class.

Using data from students who received baccalaureate degrees in summer 2006 through spring 2008, this report analyzes how Core English Composition courses figure in students’ course-taking patterns and how students perform in those courses. We included all AP, transfer credits as well as successful completions of Core English Composition courses at Auburn – where “successful” means that the student received a grade of “C” or higher. If a student took the same course several times, we selected a record with the highest grade earned.

Graph 1.4 Successful completions of English Composition Courses by Recent Graduates

Observations:

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• AP credits account for 11% of credits earned in Core English Composition I. Transfer credits account for 35% of credits in Core English Composition I and 34% of credits in Core English Composition II.
• Students usually complete English Composition during their freshman year: 96% of successful completions of English Composition I and 79% of successful completion of English Composition II were taken by students in their freshman year.

Overview of Courses
• English Composition I (ENGL 1100) LEC. 3. English Composition Core. Intensive study of and practice in effective expository and argumentative writing.
• Honors Writing Seminar I (ENGL 1107). LEC. 3. English Composition Core. Topics in writing for students in Honors.
• English Composition II (ENGL 1120). LEC. 3. English Composition core. Emphasis on research.
• Honors Writing Seminar II (ENGL 1127). LEC. 3. English Composition core. Emphasis on research.

English Composition and General Education Outcomes
In English Composition, the goal is for students to acquire a set of writing skills they will need in order to write well in subsequent classes. The culminating experience of English Composition is the final paper in ENGL 1120, in which students have to make an argument demonstrating their analytical, communication, writing skills, and information literacy:

  Interview: In the last major paper in that course sequence, we want them to make an extended, well-researched argument... so that they can independently do it for another course if they wanted to. That is where they get a lot of analytical skills, communication skills, writing skills, and information literacy.

The classes in this sequence presume little lecturing and require students to do most of the work: “The majority of the course is writing about readings or working on their own thesis organization or working on drafts, doing editing, etc. There is almost no lecturing. If there is, it is short with small bits of information given about certain ideas or proofreading.”

ENGL 1100 and ENGL 1120 are similar in structure, but different in the complexity of writing students do: “For example, we work on conventions and grammar usage in 1100. Much more of that is assumed and challenged in 1120.” ENGL 1120 also places more emphasis on information literacy or library research. Information literacy is one of the objectives of ENGL 1120, introduced in special sessions at the library:

  ENGL 1120: Objectives, Requirements and Grading (Objective # 3): To develop the student’s ability to locate appropriate scholarly sources of information, engage meaningfully and critically with those sources, use them to develop and support an extended argument, and document them correctly according to the documentation style appropriate to the field or task.

  Interview: We have worked closely with the librarians to develop an information literacy curriculum. We developed a program presuming more activities carried out by a librarian as a facilitator rather than a lecturer. Library staff members meet with teachers from our department and develop instructional materials...

The number of library sessions was recently increased in ENGL 1120: “We went from two required library sessions to a minimum of three, and what we are really encouraging our teachers to do it to have four library sessions: one for each paper.” The library sessions are geared towards skills students need to learn in each essay: “start with something basic in Essay 1 then add a second thing on Essay 2, and then
a third thing on Essay 3, and Essay 4 is where they are writing a big research paper.” In these library sessions, the librarian is rather a helper than an instructor: “a student is taking over a process.”

In English Composition courses, students get considerable practice in reading analytically and critically, critiquing an argument effectively, and constructing an effective argument. One of the ways to teach students to read analytically, while constructing and critiquing arguments, is by looking at appeals that originally came from Aristotle:

_Interview:_ According to Aristotle, there are three appeals: ethical appeal (appealing to people’s ethical stands); pathetic appeal (which is appealing to emotion), and logical appeals (using statistics and facts). Ethical appeal is where the credibility comes in. When you say “someone who looked deeply into this issue” that is an ethical appeal.

Students learn to read analytically and critically by identifying ethical, pathetic, and logical appeals in their reading assignments:

_Interview:_ One of our textbooks has a whole unit on SUVs and whether they are good or bad for the environment, whether we should be concerned about this. Someone might take one of these articles and say: the authors spend the first paragraph talking about how they worked for the EPA (Environmental Protection Agency) for many years. That is an ethical appeal because it shows their credibility. The article might end with some sort of statement like “If we do not clean up this environment it is going to harm our children in the future.” That is an emotional appeal. A logical appeal would be “according to such and such study such and such SUVs will have such and such impact.” Students should be able to identify those appeals in somebody else’s work and be able to integrate them into their own writing.

In English Composition, students also learn to distinguish between statements that can be argued and those that cannot. For example, in their writing assignments they have to come up with an idea or a claim. And, an instructor emphasizes that such idea or claim should have an argumentative element to it:

_Interview:_ We start from day one telling students that, whatever your thesis or claim is, it must be contentious, it cannot be the statement that everyone would agree with; you have to have some type of argumentative element to it, may be, even a problem to solve. And you have to approach all of your writing this way. Example: “That car is red” is not an argumentative statement, but what might be argumentative is “people who buy red cars drive too fast.”

Some materials students consider in English Composition are notably argumentative, such as Michael Moore’s film critiquing the American health care industry, _Sicko_. Students in some English Composition classes get to write essays on this film.

Bringing up a counterargument is another important aspect of writing taught in English Composition classes:

_Interview:_ You make an argument, and then you have to bring up the other side and refute the other side. One of the things that we found in our earlier assessment is that students had really struggled with bringing up others’ arguments. They referred to what they thought were good sources: all agreed with them. This is not an effective argument, this is preaching to the converted, really. As part of your research project you have to find sources that do not agree with you, you have to bring them in your writing and then you have to say why your conclusion is more effective, more appropriate.

Mathematics applications are not addressed in English Composition classes. However, selecting and using techniques and methods to solve open-ended, ill-defined or multi-step problems does apply to English Composition:
Interview: I would argue that a lot of what they write about in these courses is difficult open-ended problems. What do we do about the fact that SUVs are so pervasive and potentially so damaging to the environment? That is not an easy problem to solve. Can we narrow this problem down to a smaller issue that might be easier to address like “would better catalytic converters help SUVs”?

Of course, effective communication is the major general education goal of ENGL 1100 and ENGL 1120:

Interview: COMP 1 is intended to help students enhance their primary skills in the writing process: pre-writing, writing, and revision. In both semesters we have four major papers plus a small final. In COMP 1 there are four essays roughly between 3 and 6 pages. The goal of those essays is to enhance things like organization, writing process (pre-writing, writing, and revision), paragraphing, sentence-level things (grammar and mechanics), and thesis or a claim.

As for oral communication, most English Composition sections include at least two oral communication activities: “one is discussion about readings and another is participation in editing/revision groups.” Some instructors have students do presentations in front of class, for example, and students sometimes present their final paper in ENGL 1120 or make informal/“daily” kinds of presentations in class.

When students consider themes that have social, ethical, legal and economic implications, English Composition may foster informed and engaged citizenship. In ENGL 1100, some faculty members take an approach where they “start with a student as self and move to a student as part of the community, emphasizing the idea of local and national citizenship”:

Interview: Papers go from self to them as a part of the community. The first paper might be a narrative about something they have learned growing up. The second paper might be writing something about their family. The third one might be writing about something in the local community. The fourth paper might be about something of national importance.

Starting in Fall 2008, each class of ENGL 1120 has one of the following themes: business, cultural diversity, health and medicine, liberal arts, science and technology, or sustainability. The following extract from ENGL 1120 Objectives, Requirements and Grading provides details on the themes:

Course Themes for ENGL 1120 (ENGL 1120: Objectives, Requirements and Grading):

Each section of ENGL 1120 will be assigned a theme. Instructors are expected to tailor course content to the theme of the course. The themes are not intended to imply disciplinary knowledge of a given field; rather they denote the subject matter that will be used to focus students’ discussion and writing. The themes were devised as a way to reflect students’ academic interests, but they were also intended to allow for discussions of the major social, ethical, legal, and economic implications of these fields. Although many of the themes refer to academic disciplines, the revised curriculum primarily concentrates on argumentative writing, so students and instructors do not need a strong background in any of the themes in order to take those courses, nor must they intend to major in those disciplines.

During 2008-09 students will have a choice of six themes from which they can choose (see listing below). These themes broadly cover major subject areas represented by Auburn University’s twelve colleges as well as reflecting two of Auburn’s interdisciplinary initiatives (cultural diversity and sustainability): Business; Cultural Diversity; Health and Medicine; Liberal Arts; Science and Technology; and Sustainability.

Students who enroll in sections that stress the sustainability theme are exposed to issues that informed and engaged citizens should consider. Students in a section with the theme of cultural diversity (about 10% of students taking ENGL 1120 are in sections that have that theme) are obviously exposed to issues of intercultural knowledge and diversity awareness to a greater extent than students taking the rest of
the themes. **Intercultural knowledge and diversity awareness** is also reflected in exposure to texts of different kinds: “It would be really tough to go through ENGL 1100 and ENGL 1120 and not to read at least some stuff that gets you thinking about how diversity plays a part in our society.”

Students use technology when they write papers for English Composition, and some students enroll in sections of ENGL 1120 that take Science and Technology as their theme. In these two ways, English Composition may contribute something to the development of students’ **scientific literacy**:

*Interview:* We have really encouraged the use of technology with writing. We now have four dedicated computer labs for Composition instruction. It especially encourages them to use Microsoft Word to enhance revision, proofreading, but also for research. Again, we have themes in 1120, we have science and technology theme.

**Aesthetic appreciation and engagement** is covered marginally in English Composition sequence: “Aesthetics isn't really stressed in the course. It is more focused on in World Lit. How does a piece of non-fiction prose artistically beautiful, and how it can be used to extend the beauty of the text. In World Literature they do more of that.”

**Assessment**

Portfolio assessment in ENGL 1120 was designed to measure the extent to which students achieve the intended educational outcomes of English Composition sequence. The scoring rubric used for portfolio assessment (see below) delineates specific outcomes under each objective. Faculty members collect portfolios (four major essays and a final) from the 1st, 4th, and 7th person on their class rolls. The portfolios from two years are kept in hard copies.

Using the scoring rubric to evaluate these portfolios turns to be very complicated: “These portfolios are diverse enough both comparing one class’s work to another class’s work and comparing different essays of one student.” It is also difficult to handle that amount of information. Another problem is with the rubric itself: “elements of the portfolio employ tone and voice…” How many elements would be sufficient to state that they do employ the tone and voice? The interviewee expressed concerns about the portfolio project: “I wish I had better news about assessment. We are thinking about it, we are working on it; we just have not gotten the tool that we think would work best.”

Despite the challenges of using student work to guide course revisions, ENGL 1120 was recently redesigned, using as guidance feedback from faculty members (what works in this curriculum and what does not; what would you like to see changed; etc.) and web sites for Composition classes at other universities.

**Suggestions**

A concern was expressed about class sizes. The current median class sizes of ENGL 1100 and ENGL 1120 are 25 and 24. Following guidelines from College Composition and Communication Conference, the interviewee suggested that there should be fewer than 20 students in English Composition classes. Another suggestion was to hire more instructors who would teach only Composition: “Those who have literature training are less interested in Composition.”

Regarding the Core Curriculum, the interviewee suggested that there should be more communication among faculty who teach different Core courses:

*Interview:* The fact that I know hardly anything about speech and communication and what they do is a problem, because a lot of things we are talking about (critical thinking, effective
communication) are also done in Speech Communication, but I do not know how. We know they are doing a lot of writing in History. How can we support that? I would like to see more collaboration.

Another comment was related to lack of an upper-level writing requirement. In the late 1990s, Auburn University switched from having a junior-level writing course to having a second freshman-year writing course. Such change was necessary to satisfy the articulation agreement (community colleges are not allowed to teach junior-level courses). However, it also had certain negative consequences. For example, prior to this change, students in Science and Engineering could take Technical Writing as a Core course. They do not have such opportunity now, though this course is still offered for elective credit.
Portfolio Assessment Chart, ENGL 1120

<table>
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<th>ENGL 1120 Learning Objectives</th>
<th>1=lowest, 5=highest</th>
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<tr>
<td><strong>Objective #1:</strong> To develop a student’s ability to construct and critique arguments, with particular attention to writing extended essays that articulate a clear, argumentative thesis statement and that fully and effectively develop and support that thesis in a manner appropriate for the student’s rhetorical objectives and intended audience. This will also include developing the student’s ability to identify and employ counterarguments that could be raised against the essay’s thesis and to respond to those counterarguments effectively.</td>
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<tr>
<td>1. The portfolio states a clear and argumentative thesis or claim. &amp; 1 2 3 4 5</td>
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<tr>
<td>2. The portfolio makes use of evidence appropriate to the theses or claim. &amp; 1 2 3 4 5</td>
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<tr>
<td>3. The portfolio demonstrates an ability to identify and employ counterarguments that could be raised against the essay’s thesis and to respond to those counterarguments effectively. &amp; 1 2 3 4 5</td>
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<td><strong>Objective #2:</strong> To build on prior knowledge to develop the student’s ability to understand and use writing to support inquiry, learning, and critical reading and thinking, with more attention to integrating ideas from other writers. It will also further develop the student’s ability to employ a voice, tone, and level of formality appropriate to the reader’s expectations and understanding and demonstrate the level of competency in grammar and usage necessary to engage with an academic audience.</td>
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<tr>
<td>1. Elements of the portfolio employ a voice, tone, and level of formality appropriate to the reader’s expectations and understanding &amp; 1 2 3 4 5</td>
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<tr>
<td>2. The portfolio demonstrates the level of competency in grammar and usage necessary to engage with an academic audience &amp; 1 2 3 4 5</td>
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<td><strong>Objective #3:</strong> To develop the student’s ability locate appropriate scholarly sources of information, engage meaningfully and critically with those sources, use them to develop and support an extended argument, and document them correctly according to the documentation style appropriate to the field or task.</td>
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<tr>
<td>1. Elements of the portfolio employ sources that were contextually appropriate for the assignment and audience &amp; 1 2 3 4 5</td>
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<tr>
<td>2. Elements of the portfolio integrate sources into the text smoothly and appropriately &amp; 1 2 3 4 5</td>
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<tr>
<td>3. Elements of the portfolio contain internal citations that are correctly formatted according to the assignment requirements &amp; 1 2 3 4 5</td>
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<tr>
<td>4. Elements of the portfolio contain a Works Cited or References page that is correctly formatted according to the assignment requirements. &amp; 1 2 3 4 5</td>
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<td><strong>Objective #4:</strong> To build upon prior knowledge to develop student’s ability to use technology reflectively for a variety of writing tasks, including word processing, online and visual communication, virtual and physical research methods, and document design.</td>
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<tr>
<td>1. The portfolio demonstrates the effective use of technology as integral to writing process, including brainstorming, drafting, peer review, proofreading, and collaboration &amp; 1 2 3 4 5</td>
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<tr>
<td>2. The portfolio demonstrates the effective use of technology to conduct research in general and disciplinary-specific databases and web-based sites &amp; 1 2 3 4 5</td>
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<td>3. The portfolio demonstrates the ability to use technology to accomplish basic elements of document design (e.g., page numbers, use of headers and footers, footnotes, graphics, etc.) &amp; 1 2 3 4 5</td>
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**Sources:** ENGL 1120: Objectives, Requirements and Grading & Portfolio Assessment Chart ENGL 1120
### Table 1 English Composition and General Education Outcomes

**Using the following scale, can you identify to what extent the following college-level General Education Outcomes apply to the courses you oversee?**

- 1 = is a central focus of the course
- 2 = not central but covered with a fair amount of depth
- 3 = covered marginally
- 4 = not covered at all

<table>
<thead>
<tr>
<th>General Education Goals</th>
<th>General Education Outcomes: Students will...</th>
<th>ENGL 1100</th>
<th>ENGL 1120</th>
<th>Assignment / Class activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information Literacy</td>
<td>Demonstrate information literacy</td>
<td>3</td>
<td>1</td>
<td>Library research</td>
</tr>
<tr>
<td>Analytical Skills and Critical Thinking</td>
<td>Read analytically and critically</td>
<td>1</td>
<td>1</td>
<td>Analysis of ethical, pathetic appeal, and logical appeals</td>
</tr>
<tr>
<td></td>
<td>Critique an argument effectively</td>
<td>2</td>
<td>1</td>
<td>Distinguishing between argumentative and non-argumentative statements</td>
</tr>
<tr>
<td></td>
<td>Construct an effective argument</td>
<td>2</td>
<td>1</td>
<td>Bringing up a counterargument in the paper</td>
</tr>
<tr>
<td></td>
<td>Apply simple mathematical methods to the solution of real-world problems</td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select and use techniques and methods to solve open-ended, ill-defined or multi-step problems</td>
<td>2</td>
<td>1</td>
<td>Writing a paper on a controversial topic could be analogous to solving a problem</td>
</tr>
<tr>
<td>Effective Communication</td>
<td>Write effectively</td>
<td>1</td>
<td>1</td>
<td>In both semesters students have four major papers plus a small final. Within each of these papers students do pre-writing, writing, and revision</td>
</tr>
<tr>
<td></td>
<td>Demonstrate effective oral communication skills</td>
<td>2</td>
<td>2</td>
<td>Discussion about readings Participation in editing/revision groups In-class presentations</td>
</tr>
<tr>
<td>Informed and Engaged Citizenship</td>
<td>Be informed and engaged citizens of the United States and the world</td>
<td>2</td>
<td>2</td>
<td>Exposure to themes that have social, ethical, legal and economic implications</td>
</tr>
<tr>
<td>Intercultural Knowledge and Diversity Awareness</td>
<td>Understand and appreciate the diversity of and within societies of the United States and the world</td>
<td>3</td>
<td>3</td>
<td>Exposure to diverse texts</td>
</tr>
<tr>
<td>Scientific Literacy</td>
<td>Understand and appreciate methods and issues of science and technology</td>
<td>3</td>
<td>2</td>
<td>Use of technology with writing</td>
</tr>
<tr>
<td>Aesthetic Appreciation and Engagement</td>
<td>Understand and appreciate the arts and aesthetics as ways of knowing and engaging with the world</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>
Core Curriculum Alignment Study
World Literature

Summary
World Literature core requirements are satisfied by completing two courses in a sequence (ENGL 2200 and ENGL 2210). Based on 2007-2008 academic year data, there were 124 ENGL 2200 sections taught (54% of all student enrollments across both courses) and 106 ENGL 2210 sections (46% of all student enrollments across both courses). According to the course coordinator, because students do not have to complete the sequence in successive semesters, more students take ENGL 2210 later in their academic career. The median class size for both courses is 29 students. World Literature sections are taught primarily by instructors (70%) and graduate teaching assistants (17%).

Goals for World Literature courses include introducing students to ancient through modern literary texts, improving students’ reading and writing skills and helping them develop an appreciation for diverse cultures through literary works. Students are required to complete assigned readings and write a minimum of two papers in each section.

Information Literacy is not perceived as a central focus of World Literature courses. However, Analytical Skills and Critical Thinking are viewed as a central focus of both courses. Students are expected to read major literary works both analytically and critically in order to participate in class discussions. Paper assignments and oral discussions ask student to develop and effectively support individual arguments. Students are not asked to apply mathematical methods. However, they are asked to demonstrate open-ended problem solving skills in World Literature courses.

Effective Communication is identified as a central focus of both World Literature courses. Students must complete a minimum of two written assignments. Close attention is given to students’ writing techniques, as they interpret literary texts and demonstrate knowledge of cultural works. Students in most sections are also evaluated on oral communication skills through their participation in class discussions. Almost all Instructors encourage students to participate orally through responding to questions presented.

Informed and Engaged Citizenship is not considered to be an integral aspect of the World Literature sequence. Intercultural Knowledge and Diversity Awareness and Aesthetic Appreciation and Engagement are viewed as a central focus of both courses. These outcomes determine the course readings, paper assignments and class discussions. Students are expected to understand some of the implications of cultural and historical events as they relate to literature. Students also discuss literary texts as works of art.

Scientific Literacy is not perceived to be a central focus of World Literature.

Student achievement of the goals for World Literature courses is assessed in the fall and spring semesters using a standard assessment method. Random samples of student writing from both ENGL 2200 and 2210 are collected and evaluated to identify a basic level of competence. Using a common rubric, members of a faculty committee evaluate the samples to determine how well students are demonstrating mastery of the goals for the course sequence. No suggestions were given regarding the Core Curriculum or General Education Outcomes.
**World Literature Core Courses at Auburn University**

Auburn University’s World Literature requirement is satisfied by completing six semester hours in a sequence. The following courses are included in the core:

- **World Literature I** .............................................................. ENGL 2200
- **Honors World Literature I** .................................................. ENGL 2207
- **World Literature II** ............................................................. ENGL 2210
- **Honors World Literature II** .................................................. ENGL 2217

**Graph 2.1** World Literature Core Courses: Number of Students and Number of Sections (2007-2008 academic year)

<table>
<thead>
<tr>
<th>Standard Courses</th>
<th>Honors Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 2200</td>
<td>ENGL 2210</td>
</tr>
<tr>
<td>124</td>
<td>2,954</td>
</tr>
</tbody>
</table>

**Graph 2.2** Instructors of World Literature Core Courses by Number of Students and Number of Sections (2007-2008 academic year, primary instructors of record for UNIV courses)

<table>
<thead>
<tr>
<th>Standard Courses</th>
<th>Honors Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professor</td>
<td>Associate Professor</td>
</tr>
<tr>
<td>7</td>
<td>3,464</td>
</tr>
<tr>
<td>Associate Professor</td>
<td>Professor</td>
</tr>
<tr>
<td>204</td>
<td>14</td>
</tr>
<tr>
<td>Assistant Professor</td>
<td></td>
</tr>
<tr>
<td>161</td>
<td>4,517</td>
</tr>
<tr>
<td>Instructor</td>
<td></td>
</tr>
<tr>
<td>GTA</td>
<td></td>
</tr>
<tr>
<td>41</td>
<td>1,106</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Professor</th>
<th>Associate Professor</th>
<th>Assistant Professor</th>
</tr>
</thead>
<tbody>
<tr>
<td>38</td>
<td>53</td>
<td>4</td>
</tr>
<tr>
<td>Associate Professor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assistant Professor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Professor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Graph 2.3 World Literature Core: Section Sizes (2007-2008 academic year)

Using data from students who received baccalaureate degrees in summer 2006 through spring 2008, this report analyzes how Core World Literature courses figure in students’ course-taking patterns and how students perform in those courses. We included all transfer credits as well as successful completions of Core World Literature courses at Auburn – where “successful” means that the student received a grade of “D” or higher. If a student took the same course several times, we selected a record with the highest grade earned.

Graph 2.4 Successful completions of World Literature Courses by Recent Graduates

Observations:

- Transfer credits account for 27% of credits in World Literature I and 35% of credits in World Literature II.
- Students usually complete World Literature during their sophomore year: 52% of successful completions of World Literature I and 47% of successful completion of World Literature II were taken by students in their sophomore year.
• Grades in World Literature II vary depending upon the timing of taking the course: students taking this course later typically have a higher grade.

Overview of Courses
World Literature courses enable students to develop critical thinking, reading, and writing skills through close study of selected literary texts. The courses are intended to help students gain an appreciation of literary works from diverse cultures and their historical value.

• **ENGL 2200 World Literature** introduces students to culturally diverse readings in world literature from the ancient period to c. 1600.
• **ENGL 2210 World Literature** introduces students to culturally diverse readings in world literature from c. 1600 to the present.

World Literature and General Education Outcomes
The World Literature course sequence focuses on introducing students to significant literary texts and discussing their cultural context, while improving reading and writing skills. According to the course coordinator, general goals for the courses include “the ability to write more effectively; to be able to speak about literary works; and to learn about diverse cultures.” Whereas English Composition courses emphasizes student writing, World Literature courses build on students’ reading and writing abilities to enhance their knowledge of classical and modern literary works.

Classes in the World Literature sequence do not emphasize **Information Literacy** as much as the Composition courses do. Information literacy is cited as only covered marginally in ENGL 2200/2210. However, students in some sections are asked to complete assigned papers where they compare works from different authors, locating supporting arguments and using proper citation.

**Reading analytically and critically and critiquing an argument effectively** are identified as a central focus of both courses. Both ENGL 2200 and 2210 encourage students to use critical thinking skills to analyze and interpret literary works, as stated in department outcomes consistent across both courses:

**ENGL 2200/2210 Objectives:** To develop students' ability to read literary texts carefully and closely; to help students gain a good understanding of the texts they read.

**Interview (World Literature):** We have set goals we check for in our own assessment of the program: that students who complete the sequence will demonstrate the ability to read literary texts analytically and critically; and also that they will demonstrate the ability to communicate those same skills in writing.

ENGL 2200 examines ancient, medieval and Renaissance texts such as Homer’s *Iliad and Odyssey*, Virgil’s *Aeneid*, or Shakespeare’s *Merchant of Venice*. The course emphasizes the significance of literary forms and contexts. Class discussions, papers and exams give them a chance to respond critically to the texts they have read and to observe their global, political, religious and philosophical implications.

ENGL 2210 requires students read modern texts, including authors such as Moliere, Wordsworth, Emerson, Poe, Dostoevsky and George Elliot. Both writing assignments and class discussions require students to employ critical thinking skills such as abstracting, synthesizing, and identifying literary structures. While different instructors assign different texts, in general ENGL 2210 exposes students to

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modernist writings and their influences; topics such as industry, technology, cultural influences, individualism and social bias are discussed. In many sections, students are given regular reading quizzes to see whether they can recognize literary elements such as language, form and cultural influences that give meaning to a text. An example of a critical thinking short-answer quiz where students must critique an author’s argument is provided:\footnote{Himmelwright, C. (2008, fall). \textit{Rumi questions}. ENGL 2210: Auburn University.}

\textbf{“I Come Before Dawn”}

1. The poem starts with a quote from Muhammad. Describe the poet’s reaction to that quote?
2. What contrast does the poet seem to be setting up? What is seen as torturous? What is the “spring garden”?
3. Why must everyone be “bound and dragged”? Where is “here”?
4. How is this idea connected to children and school?
5. What two types are on the “path”? What difference do you see between the two?
6. Any similarities between the two?

Students are regularly asked to \textbf{construct arguments}. Students must be prepared to provide thoughtful answers to questions about an author’s intended meaning or about the cultural relevance and literary implications of a text they have read. Students demonstrate this skill orally through class discussions and in writing through papers, quizzes and essay exams. A sample exam question where students must construct an argument is provided\footnote{Himmelwright, C. (2008, fall). \textit{08 Final}. ENGL 2210: Auburn University.}:

\textbf{Essay}: Choose one of the topics below to write an essay. You may either compare or/and contrast two works OR develop this idea with one work. Using a work that you have not already written upon will prove more mastery of the subject. This essay should be organized formally. It should have an introduction (with a thesis), paragraphs of support, and a conclusion. (35 points)

\textit{*High scoring essays will...}  
- Craft a clear and specific thesis from the general topic. (You have lots of room within these topics–make it your own!)  
- Provide good support to back up the thesis. (Don’t summarize, but provide strong proof.)  
- Use smooth transitions between paragraphs.

1. \textbf{Time} proves to be a significant factor in many of the works read. Consider the role time plays in the work(s) read, or in one work. Often we see instances in which a character or characters are faced with the limits of time. At other times characters must deal with time that is unlimited or won’t seem to end. What role do you see time playing in the work(s)? Compare two works or develop a strong claim in regards to one work.

2. Issues concerning \textbf{knowledge} have been found in many of the works read. Choose two works in which you might consider the role of knowledge. A. You might consider the works’ view of knowledge. Is it seen as a positive or negative thing? Are those who gain knowledge able to bring some positive result from gaining it? OR–B. You might consider how knowledge is gained. Is it through education or “book-learning” or is it through experience? What difference do you think this makes, according to the text? OR–C. You might also consider what connections, if any, are made between knowledge and power.
Students are not asked to **apply simple mathematical methods** in World Literature classes, however, they are asked to **use techniques and methods to solve open-ended, ill-defined or multi-step problems**. According to the course coordinator, by formulating a thesis statement and identifying appropriate support students are solving problems of this kind.

Department objectives in the World Literature sequence reflect the General Education outcomes for effective **written and oral communication**\(^4\):

**ENGL 2200/2210 Objectives**: To develop students' ability to write well-supported and persuasive interpretations of literary texts; to develop students' ability to speak persuasively about their analyses and interpretations of literary texts.

In ENGL 2200 and 2210, students must demonstrate the ability to express ideas, opinions and arguments in writing through response essays and research papers. Students are also asked to draw literary connections between differing texts and to generalize about the texts they have read. According to the course coordinator, “Students who complete the sequence will demonstrate the ability to read literary texts analytically and critically; and also that they will demonstrate the ability to communicate those same skills in writing.” A sample writing assignment from ENGL 2200 that also asks students to demonstrate Information Literacy and Analytical Skills and Critical Thinking outcomes is provided\(^5\):

**ENGL 2200 Essay Two**

**General Guidelines & Due Dates:**

- Papers should be 5-6 pages long. (10-12 inch point type, 1" margins, and double-spaced.)
- Papers should be your own work with the text.
- You are not required to do research, but if you do CITE it. (Keep in mind that even if you get an idea from another text, it should be cited.)
- Your paper will be worth 20% of your final grade.
- **Thesis due date: November 14th** (or before)
- **Due Date:** November 21st

Your goal is to dig deeper into a work or works that we have read so far this semester. You may choose from the following options. Keep in mind that the stronger essay will succeed at the following. Strong essays will:

- Be as specific as possible (both in thesis and in support).
- Avoid summaries.
- Go beyond the classroom discussion of the texts.
- Illustrate critical engagement with the text/ or texts.
- Exhibit strong transitions between ideas.
- Avoid careless proofreading mistakes.

**Topic Choices:**

1. Violence is found in most of the works read this semester. Comparing two texts, consider the role violence plays. First, you might consider whether it seems to play a positive or negative role. Then try to formulate a claim concerning the specific role you think it plays in these works. The strong paper will have some basis for comparison. Keep in mind too, the more specific the claim, the stronger the

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paper. (If you would prefer to simply work with one text here, you are free to do so.)

2. Supernatural beings are found throughout medieval texts. Choosing two works compare the role that supernatural beings play. Negative or positive? Are they used to reveal something to the character(s) or the reader? Formulate a claim concerning their role. The strong paper will have some basis for comparison. Keep in mind, the more specific the claim, the stronger the paper. (If you would prefer working with one text, you may do so. *But you may not use Beowulf as your sole text.*

3. In many of the works read, we have found characters who travel. Often this journey is a physical one; however, we also see journeying in both spiritual and psychological realms. Choosing one character, formulate a claim that considers the nature or the role of the journey. What does it reveal to the reader or to the character him or herself? You might also consider what it reveals concerning the culture itself. Again, the more specific the claim, the stronger the paper. (If you would like to compare two characters, you may do so, but be sure you have a strong basis of comparison.)

4. How might Machiavelli’s views be seen in some of the other rulers or characters we have read about? Do they succeed by using some of his tactics? Or fail? Choose one of the characters from the works we’ve read (since the beginning of the semester—do not choose a text you’ve already written on) and compare him or her to the model given by Machiavelli.

5. Interpret the extra poem of Rumi’s attached to this sheet. Formulate your own claim as to its meaning; keep in mind what we know about Rumi. Support your claim.

Similarly, students must also demonstrate the ability to discuss interpretations of literary texts by effectively communicating ideas and opinions individually or in small group discussions. Class participation is required in most sections, and students must be prepared to respond to questions clearly and formulate logical arguments. Students may also be asked to work in groups and give class presentations:

*Interview (World Literature):* [Class presentations are not required by the department, but certainly some instructors require presentations in the course. I think a lot of teachers try to gain that ability to communicate through active participation in class, and I think that others feel that with a presentation it works them up to a heightened level of doing that. So there’s a little bit of both.

According to the course coordinator, the outcome students will be informed and engaged citizens of the United States and the world was not rated as a central focus in World Literature courses; however, it was later indicated that “gaining some knowledge about other cultures via world literature does make students more engaged citizens, or at least more informed.” Both courses strongly emphasize intercultural knowledge and diversity awareness. Much of the intercultural knowledge students gain is derived from reading texts that span geographically and chronologically diverse cultures. Students develop a greater understanding of how cultures shape and are shaped by literary works through studying values, perceptions, and societies.

Students understand and appreciate the arts and aesthetics as ways of knowing and engaging with the world in ENGL 2200 and 2210. Students interpret literary works as artistic representations of cultures, religions and ideologies.

**Assessment**

World Literature courses are assessed in fall and spring semesters using a standard method. One paper and one final exam essay from each section across both ENGL 2200 and 2210 are collected and evaluated to

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identify the extent to which representative students are attain course goals. Using a common rubric, faculty evaluate these work samples on their ability to develop, support and organize an argument, their ability to communicate ideas and opinions and their ability to demonstrate understanding of diverse literary texts. This process was cited by the course coordinator as the most effective means of assessment for World Literature. A possible expansion of the assessment was also identified:

*Interview (World Literature):* Well, they go through and check for some of the outcomes I mentioned. This would be kind of what they would get [hands over assessment form]. Just this charted explanation of these outcomes we are looking for in both the exam and the paper and mark whether it’s excellent, satisfactory, needs work, unable to evaluate or if the student was not asked to do those particular things. If we could find some way to learn how much or to what degree, those things are hard to figure out ways to measure. But, I think that this works fairly well with what we’ve got. That’s one of the things the committee does every year, is try to figure out if there’s a way to make it a little more pointed to reveal more.

An example of the rubric used to assess World Literature is presented:

<table>
<thead>
<tr>
<th>Intended Educational Outcome</th>
<th>Excellent</th>
<th>Satisfactory</th>
<th>Needs Work</th>
<th>Unable to evaluate</th>
<th>Not asked of student</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Students completing the WL sequence will demonstrate the ability to read literary texts critically and analytically.</td>
<td>Exam</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Paper</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Students completing the WL sequence will demonstrate the ability to communicate their literary interpretations and analyses in writing at a level commensurate with a sophomore-level course.</td>
<td>Exam</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Paper</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Students completing the WL sequence will demonstrate knowledge of literary and cultural contexts of the works studied.</td>
<td>Exam</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Paper</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

**Suggestions**

No suggestions were given by the course coordinator for the World Literature courses.

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| General Education Goals | General Education Outcomes: 
Students will... | ENGL 2200 | ENGL 2210 | Assignment / Class activity |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Information Literacy</td>
<td>Demonstrate information literacy</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Analytical Skills and Critical Thinking</td>
<td>Read analytically and critically</td>
<td>1</td>
<td>1</td>
<td>• Assigned readings of cultural texts (ancient through contemporary); • Essay or short answer exams; • In-class discussions; • Two required written assignments (2400 words total); • Reading quizzes.</td>
</tr>
<tr>
<td></td>
<td>Critique an argument effectively</td>
<td>2</td>
<td>2</td>
<td>• Essay or short answer exams; • Two required written assignments (2400 words total); • In-class discussions.</td>
</tr>
<tr>
<td></td>
<td>Construct an effective argument</td>
<td>1</td>
<td>1</td>
<td>• Essay or short answer exams; • In-class discussions; • Two required written assignments (2400 words total); • In-class writing assignments.</td>
</tr>
<tr>
<td></td>
<td>Apply simple mathematical methods to the solution of real-world problems</td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select and use techniques and methods to solve open-ended, ill-defined or multi-step problems</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Effective Communication</td>
<td>Write effectively</td>
<td>1</td>
<td>1</td>
<td>• Essay or short answer exams; • Two required written assignments (2400 words total).</td>
</tr>
<tr>
<td></td>
<td>Demonstrate effective oral communication skills</td>
<td>1</td>
<td>1</td>
<td>• In-class discussions.</td>
</tr>
<tr>
<td>Informed and Engaged Citizenship</td>
<td>Be informed and engaged citizens of the United States and the world</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Intercultural Knowledge and Diversity Awareness</td>
<td>Understand and appreciate the diversity of and within societies of the United States and the world</td>
<td>1</td>
<td>1</td>
<td>• Assigned readings of cultural texts; • Essay or short answer exams; • Two required written assignments (2400 words total); • In-class discussions.</td>
</tr>
<tr>
<td>Scientific Literacy</td>
<td>Understand and appreciate methods and issues of science and technology</td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>---------------------</td>
<td>------------------------------------------------------------------------</td>
<td>---</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>Aesthetic Appreciation and Engagement</td>
<td>Understand and appreciate the arts and aesthetics as ways of knowing and engaging with the world</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Assigned readings of cultural texts (ancient through contemporary);</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Essay or short answer exams;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- In-class discussions;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Two required paper assignments (2400 words total).</td>
<td></td>
<td></td>
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</tbody>
</table>
Summary

Auburn University’s Core Curriculum Philosophy requirement is satisfied by completing one of four courses offered in the Department of Philosophy. Based on 2007-2008 academic year data, Introduction to Ethics is the most commonly taken of these courses, with 1,324 student enrollments (38.7% of all student enrollment across the four courses). Over half of the Core courses in Philosophy (59.5%) and students (61.5%) are taught by Instructors. The median class size is between 26-30 students, with the Ethics and the Health Sciences and Business Ethics courses enrolling more students per class and Introduction to Logic enrolling fewer students per class. Information Literacy is covered marginally among the Philosophy courses. Analytical Skills and Critical Thinking is viewed as the primary goal for all Philosophy core courses. Each course places a strong emphasis on developing skills necessary for understanding arguments, properly structuring arguments and evaluating the validity of evidence. The courses also highlight the importance of understanding broader philosophical thought as it relates to argumentative form through asking students to construct arguments. Specific activities that reflect these outcomes include research papers, in-class writing assignments and classroom discussions.

Effective written communication is seen as essential to developing students’ argumentative skills. Students must demonstrate the ability to assess and construct philosophical arguments in writing through completing research and response paper assignments. Written paper assignments are consistently found throughout all Philosophy Core courses. Although oral communication is not perceived to be as important as writing, it is still covered with a fair amount of depth. Oral communication takes place through class discussions and is encouraged by all Instructors.

According to the program director, the ability to distinguish appropriate from inappropriate arguments is considered to be the foundation of Informed and Engaged Citizenship. Students examine foundations of philosophical thought as well as contemporary issues such as euthanasia, abortion and patients’ liberties. Core Philosophy courses do not generally emphasize Intercultural Knowledge and Diversity Awareness, according to the program director. Students in the Logic course discuss Scientific Literacy with a fair amount of depth; however, it is not emphasized in the remaining Ethics courses. Aesthetic Appreciation and Engagement is not addressed in any of the core Philosophy courses.

Current assessment practices within the core Philosophy courses include examining assignments and exam grade distributions. The Department of Philosophy also assesses samples of student writing each year. A common rubric is employed to assess the extent to which students understand basic methods of argumentation among writing samples from Core courses.

A suggestion was made to increase the rigor of Auburn University’s core curriculum. Rather than change the current courses offered in the core curriculum, the program director suggested comprehensive goals be explored for all core courses, so one discipline is not considered to be more demanding than another.
Philosophy Core Courses at Auburn University

Auburn University Philosophy requirement is satisfied by completing three semester hours. The following courses are included in the core:

- **Introduction to Logic** ................................................................. PHIL 1010
- **Introduction to Ethics** ............................................................... PHIL 1020
- **Ethics and the Health Sciences** ............................................. PHIL 1030
- **Business Ethics** ....................................................................... PHIL 1040

**Graph 3.1** Philosophy Core Courses: Number of Students and Number of Sections (2007-2008 academic year)

**Graph 3.2** Instructors of Philosophy Core Courses by Number of Students and Number of Sections (2007-2008 academic year)
Graph 3.3 Philosophy Core: Section Sizes (2007-2008 academic year)

Using data from students who received baccalaureate degrees in summer 2006 through spring 2008, this report analyzes how Core Philosophy courses figure in students’ course-taking patterns and how students perform in those courses. We included all transfer credits as well as successful completions of Core Philosophy courses at Auburn – where “successful” means that the student received a grade of “D” or higher. If a student took the same course several times, we selected a record with the highest grade earned.

Graph 3.4 Successful completions of World Literature Courses by Recent Graduates

Observations:

- Transfer credits account for 15% of credits in Core Philosophy.
- Students usually complete Philosophy during their sophomore year: 34% of successful completions were taken by students in their sophomore year.
- Grades in Philosophy vary depending upon the timing of taking the course: students taking this course later typically have a higher grade.
Overview of Courses
Philosophy core courses develop and enhance basic argumentation skills. Students satisfy the Core Curriculum Philosophy requirement through completing one of the four courses listed below.

- **Introduction to Logic (PHIL 1010)** focuses on developing basic logic principles and applications.
- **Introduction to Ethics (PHIL 1020)**, the most commonly taken course of the philosophy courses, discusses historical contexts of ethics and their extensions in society.
- **Ethics and Health Sciences (PHIL 1030)**, also referred to as Bio-Ethics, examines major health related issues related to ethical inquiry. Issues studied include euthanasia, abortion, and physician assisted suicide.
- **Business Ethics (PHIL 1040)** studies the application of ethical theories to issues of business commerce, management and international trade. This course is required for majors in the College of Business.

Philosophy Courses and General Education Outcomes
According to the program director, overarching goals for the Philosophy courses include teaching students basic elements of argumentation and evidence. Emphasis is placed on learning not only how to hear arguments, but also how to structure arguments.

*Interview (Philosophy):* Philosophy sort of lives and moves and has its being in argument. So, there are really two kinds of things going on. One is you’re trying to teach students the kinds of skills they need and the kinds of conceptions they need to be able to evaluate arguments. On the other hand, you don’t just want to teach them to be consumers of arguments; you also want to teach them how to be producers of arguments.

Specific outcomes for the Philosophy core courses, as identified by the program director, include developing skills necessary for identifying good and bad arguments, including a working knowledge of the fundamental parts of an argument (premises and conclusions) and of common fallacies in argumentation. Students should also become better at constructing arguments and understanding the settings in which certain kinds of dialogue with other people take place.

*Information Literacy* is covered with a fair amount of depth in the Introduction to Logic course, but only covered marginally in the remaining courses. An indicator that students effectively demonstrate this outcome includes the ability to understand the economic, legal and social issues associated with using information. Information Literacy involves asking students to collect, select, and integrate material from a variety of sources into writing assignments, using appropriate citations.

*Analytical Skills and Critical Thinking* is the primary goal of all Philosophy courses. According to the program director, each core course emphasizes elements necessary for acceptable argumentation, particularly viewing and analyzing an argument from a systematic perspective:

*Interview (Philosophy):* What we’re looking for again is appreciation of argumentative form, some sense of the ability to appraise another argument and to create an argument of your own. At the basic level in philosophy, that’s always how it’s going to go, because that’s what you’re so concerned with getting the students to understand how to do.

---

7 According to the Approved General Education Outcomes (May, 2008), Information Literate students are able to assess, access, and evaluate information effectively.
Students demonstrate their ability to read analytically and critically by completing historical and contextual philosophical readings. Topics for assigned readings in Introduction to Ethics may include relativism, egoism, subjectivism, consequentialism and Kantian ethics. Upon completing the readings students examine traditional ethical questions about human behavior as seen through philosophers such as Aristotle, Plato, Kant, Joel Feinberg and James Rachels. Students read and discuss normative theory and its relationship to the content of arguments. Students may also read works by feminist philosophers and study philosophical issues such as gender politics and sexuality from female perspectives. According to the program director, students demonstrate an appreciation for argumentative form by examining basic units of philosophical thought:

_**Interview (Philosophy):**_ That’s the trick with these intro classes, is getting students to think in the arguments, rather than, “here’s what he said and I don’t agree with that.” If you’re going to say something, you can’t just disagree; you have to disagree because of something. Like I said, it’s very hard to get them to wrap their minds around that because it just seems like the sexy part of the argument is the conclusion.

In Ethics and Health Sciences, students are assigned case studies relating to ethical issues common in healthcare settings. For example, students examine the ethical issues clinicians face when patients' culturally appropriate treatments are at odds with the clinician’s methods of therapy. An example of how students are expected to critically read and ‘map’ a philosophical article, identifying common methods of inquiry. An example of this assignment is provided:\(^8\):

**Mapping an article as a philosophy student:**
Here is a list of questions that should help you dissect an article that you read. Always figure out the topic and the thesis. Look at the beginning and end for help on this.

Some authors are more “user friendly.” For instance, it is helpful (although maybe boring) when the thesis is spelled out, explicitly, at the beginning. Then look for language that indicates the author giving EVIDENCE for the thesis. Is the person giving small arguments or trying to give a “big picture” argument? Finally, philosophers often address challenges to their views and try to respond as a way of testing, exploring, and teaching.

**Questions:**

1. What is the subject of the article? Moral theory? Is it a moral judgment about an issue? Is it a description of some event that can be evaluated morally? If it involves both – get the key facts of the event or the case that is discussed. Then make sure you summarize the arguments as follows.
2. What is the main point the author is defending? Is he/she defending or criticizing a theory, like consequentialism? Is he/she defending a particular judgment about an issue, like euthanasia?
3. What reasons does the author give in direct support of his/her view?
4. Does the author address challenges to what he/she is saying, and then try to respond to those? Often the author will play devil’s advocate in order to show that his/her thesis can withstand “common objections” – that is how you teach a person your view and defend it.
5. Are there any key examples that will help you remember the author’s view or a particular argument?

**Critiquing an argument effectively** is cited as a central focus of all of the Philosophy courses. Students are frequently asked to identify and evaluate elements of an argument, including premises, conclusions

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\(^8\) Graham, J. (2008, fall). _Reading and analyzing philosophy articles_. PHIL 1030: Auburn University.
and contexts. Students practice this skill by evaluating and weighing evidence and modes of reasoning, whether inductive or deductive. According to the program director:

*Interview (Philosophy):* The hard thing with most students in philosophy is not that most students are wholly innocent of arguments; the problem is that they have the idea that the only unit that counts in an argument is the conclusion. And in a philosophy class, what you’ve got to get them to understand is that, as odd as it sounds, the basic unit of thought in philosophy is the argument, not the conclusion. And so, knowing what someone’s conclusion is without knowing the argument, where knowing the argument means not just being able to cite the premises, but to manipulate them in various ways; that’s the trick with these intro classes, is getting students to think in the arguments.

In Business Ethics, students are asked to read case studies about corporate issues. For example, students learn about the antitrust case of the Department of Justice vs. Microsoft. Students are asked to review documents such as formal complaints, motions, decrees and briefs and to evaluate evidence supporting implications on antitrust laws. In addition, students review corporation responses in the form of press releases, press kits and statements.

Primarily, Introduction to Ethics teaches students to evaluate ethical arguments and premises. In the Honor’s sections, students are given a reading by Judith Thompson on abortion and are asked to identify what the arguments presented are, rather than to focus on the conclusion. Similarly, students in Ethics and Health Sciences learn to examine arguments by identifying structural elements such as premises, proofs, inferences and conclusions. Students must demonstrate the ability to assess the arguments of others and also construct their own arguments. A sample assignment is provided:

**Mapping an argument:**
Philosophers use arguments and examples to help shape and defend a view. Arguments can be quite complex – with sub-conclusions leading up to the “overall point.” But we will examine simple ones. Here are some questions to ask:

1. What is the argument about and what is the author trying to convince me of?
2. Are there any indicator words like “so, thus, therefore” that indicate conclusions?
3. Are there any premise indicators like “for the reason that, since, because”?
4. Are there if….then statements indicating a hypothetical, but also drawing a connection between things?
5. Do I have a sense of what the evidence is that the author is using to support the main point?

**Evaluating:**

**Premises:** Do I think the evidence is plausible? How could one challenge it – what would it be to challenge this evidence? Are there any connections made (by if….then statements) that I would challenge?

**Inference:** Even if I think the evidence is plausible – does it allow us to jump to the conclusion? Does the conclusion necessarily follow from the evidence? Defend.

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Students **construct effective arguments** through completing assignments where they must structure arguments by developing suitable and appropriate theses and using adequate evidence and language:

*Interview (Philosophy)*: In an ethics class, for instance, you’re going to get not just the bare skills and conceptions that create the space for dialogue, you’re actually going to get some of the content of that dialogue, because you are going to find out things about what different people different from you take to be crucial ethics. There, students are really pushed even harder towards the side of being producers of arguments and not just consumers of arguments. Because content matters as much as it does in those classes, and of course, in medical ethics or business ethics, the content takes a more specific focus.

Assignments that ask students to construct arguments include written research papers, an assignment that is considered to be standard across all of the Ethics courses. Depending on the Instructor, most written assignments require students to develop an argument using either an assigned or a chosen topic, while critically evaluating the value of evidence used to support a claim. An example of a written assignment asking students to demonstrate the ability to comprehend, construct and validate an argument is provided:

**Topic:** Write a brief essay critically examining the argument for moral cultural relativism that appeals to no decision procedure. Then suggest in what way we still might reasonably think that morality is relative to the culture explaining what might still need to be discussed even if this isn’t a good argument for it.

This essay will require you to say what moral cultural relativism means, summarize the argument for it and then challenge the argument. You will conclude by suggesting what is worth discussing and perhaps endorsing about the relation between culture and morality.

**Objective of assignment:** The point of this short assignment is to practice summarizing an argument for a position and critically discussing that argument. You will improve your critical thinking and writing skills. Your audience: think of yourself explaining this to someone who has read the material, but doesn’t remember it that well.

In Ethics and Health Sciences, students are asked to prepare a paragraph on the topic of integrity. Specifically, students must prepare a statement defining the values a person with integrity should possess and distinguish personal integrity from stubbornness and selfishness. The assignment instructs students to use case studies reviewed in class as support for their claim. An example of the assignment directions is provided:

**What is Integrity? Your paragraph should include:**

1. Your definition (which could be one that involves a cluster of features) of what it is to BE a person with INTEGRITY, e.g. a person of integrity is one who is whole in her values, which is to say....
2. A statement distinguishing integrity from stubbornness and selfishness (Since the person of integrity has to be someone who protects him/herself from social pressure, you should then distinguish integrity from stubbornness and selfishness (unknowingly)). I have posted under “web links” a very brief article that might help you get started.

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In Logic, students are regularly asked to apply simple mathematical methods to the solution of real world problems. The symbolic relationship between mathematics and logic explains why this outcome is covered with a fair amount of depth in the course. Although the course is primarily exam driven, students are occasionally asked to write short papers or essays:

*Interview (Philosophy):* In the logic classes, things go the way you might anticipate they would go, because that class is so formal. Most of the work in there is exam driven. That’s not true all of the time, but it’s often true. I think that more writing is on the horizon for us probably; we’re going to decide that there has to be more writing in the logic classes. When I teach logic, students do write.

The ability to argue effectively enables students to select and use techniques to solve open-ended or multi-step problems. Across all of the Philosophy core courses, students learn how to develop problem statements and communicate their arguments. Common techniques used to teach students these concepts include identifying premise and thesis statements and evaluating the validity of connections drawn between them. A basic example of this model is found below:

<table>
<thead>
<tr>
<th>Valid Argument</th>
<th>Invalid Argument</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. All whales are mammals.</td>
<td>1. All Auburn philosophy professors work on the 6th floor of Haley Center.</td>
</tr>
<tr>
<td>2. Shamu is a whale.</td>
<td>2. Guy works on the 6th floor of Haley Center.</td>
</tr>
<tr>
<td>C. Shamu is a mammal.</td>
<td>C. Guy is a philosophy professor.</td>
</tr>
</tbody>
</table>

Under the goal of Effective Communication, the ability to write effectively is cited as a central focus among all three Core Ethics courses and is covered with a fair amount of depth in Introduction to Logic. Various course assignments ask students to use writing for inquiry, learning and thinking in diverse contexts. According to the program director:

*Interview (Philosophy):* And then in the ethics classes, there’s almost always some writing. In some classes it’s a paper or more than one paper. In other classes, e.g., one of our instructors is famous for what she calls her one-minute papers, where students have to say something clear and coherent on an issue in one minute. She supplements that with longer writing assignments too and essay exams.

In the Introduction to Logic course, students are asked to complete short paper assignments where they must write a response to a philosophical question or issue. Students in some sections are also asked to present their work to the class on the chalkboard, demonstrating the idea that there are several ways students can conceptualize an ethical proof.

Students who take one of the Core Ethics courses often write longer research papers. The papers allow students to demonstrate their ability to construct effective arguments using evidence and reasoning. Students in Ethics and Health Sciences must complete several response papers on various given topics. Provided below is an example of a written assignment students must complete on the topic of moral goodness and basic guidelines for evaluation:

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Informed Essay
protesting
Students' arguments
Office
Office
14
Introduction
components
Papers
compare
benefit/harm
Topic:
discussions
Introduction
Oral
often
Graham,
(b)
(b)
•
communication
as
takes
exams
will
Please
we
Write
an
Understanding:
Reasoning:
organization
of
life
decisions).
In class we discussed several different views about
what determines what is in the individual’s interest. Present the one you think is most plausible and
compare it to its most plausible competitor and then defend why you think one is more plausible.

Papers will be evaluated with respect to the following criteria:

- Reasoning: your essay demonstrates your ability to present your defense and critically evaluate
  the position you are opposing
- Understanding: your paper demonstrates a grasp of relevant material, concepts etc.
- Thoughtfulness: your discussion shows thoughtfulness and a genuine attempt to wrestle with the
  material
- Expression: clarity of expression, including a respect for the rules of grammar and spelling, and
  thoughtful organization of the material, proper citation.

Essay exams are also assigned to evaluate students’ ability to construct evaluate, critique and construct
arguments in writing. A sample essay exam question from Ethics and Health Sciences is provided:

Essay questions: Please try to demonstrate your knowledge by walking your reader through each of the
components in the question (they will help). Here are some questions:

a) Write an essay that explains Foot’s view on euthanasia and how it would apply to the Baby K
case or the Claire case. Be sure to include detailed presentation of when, if ever, one can deny
service or hasten death.

b) Write an essay discussing the challenges to the potential and human view – and then present
and explain one other view of your choice.

c) Examine Mill’s theory of the good – and compare to the objectivist view of good.

Oral communication skills are viewed as important and covered with a fair amount of depth in the
Introduction to Ethics, Ethics and Health Sciences and Business Ethics courses. Oral communication
often takes place through open dialogue during class meetings. Course syllabi stress the importance of
informal student participation. In addition, occasional group projects and presentations offer students
an opportunity to communicate opinions and ideas candidly, while demonstrating arguments orally.

Informed and Engaged Citizenship is identified by the program director as a central focus of the
Introduction to Logic course and is covered with a fair amount of depth in the Ethics courses:

Interview (Philosophy): You might say ‘well how does a logic class help me where Informed and
Engaged Citizenship is concerned’, but it seems obvious to me that the answer to that ought to
be pretty clear. Learning how to judge what’s a good and bad argument, learning when you
need more support for something and when you don’t, and so on—all is crucial to doing what
we think of as what informed citizens of a democracy need to be able to do. So, I think that the
courses speak for themselves where argumentative skills are concerned.

Students in Ethics and Health Sciences examine issues such as euthanasia or abortion and engage in
discussions exploring the meanings and rights of individual freedoms. Through watching documentaries
such as Please Let Me Die, students argue the euthanasia question in relation to a burn victim who is
protesting unwanted medical efforts to save his life. After watching the film, students evaluate and

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form arguments for and against carrying out the patient’s wishes and discuss how these arguments impact the rights of citizens in governed society.

Guest speakers are occasionally brought in to three Ethics courses to discuss philosophical and ethical issues:

_Interview (Philosophy):_ A couple of our professors have speakers come in, in the medical ethics classes, who talk about actual ethical challenges day by day, in the field. I know that there’s a woman in town who some years ago lost her son, sort of tragic medical circumstances, and she’s come to campus a number of times and talked to classes to give students a sense of what the possibilities and limits of the medical system really are. There’s also been in something like that in Business Ethics, sometimes we’ve piggybacked on the Business School, when they’ve brought people in who’ve been willing to come and talk to Business Ethics sections.

Core Philosophy courses place only marginal emphasis on helping students develop **Intercultural Knowledge and Diversity Awareness,** except when students are asked to learn some historical foundations of philosophy. Examining ancient cultures that provide a basis for modern day philosophical theories exposes students to diverse cultures, economies and political systems.

**Scientific Literacy** is not perceived by the course director as an integral aspect of the courses. Only in some of the Introduction to Logic courses are students asked to articulate the philosophical foundations of modern science and examine hypothesis predictions and scientific reasoning.”

**Assessment**

Both formal and informal methods are currently used to assess student performance among the Philosophy core courses. Faculty use graded exams, papers and in-class discussions to evaluate students:

_Interview (Philosophy):_ I don’t know that there’s really any other way that [students] get a chance to demonstrate what they know. If they go on, they will often demonstrate what they know if they carry something into the next class or not. But yeah, those are usually the standard ways they [faculty] assess.

Some of the same student work is being used to assess the extent to which students are attaining the general education outcomes most strongly associated with these courses.

**Artifacts**

Writing assignments provide the most accessible examples of student work associated with Information Literacy, Analytical Skills and Critical Thinking, Effective Communication and Informed and Engaged Citizenship outcomes. According to the program director:

_Interview (Philosophy):_ Not so much as tests, we’ve really concentrated on papers. Now that I think about it, I’m not entirely sure why that is, but that’s what we’ve done. I suppose part of it is that, there are a lot of different ways of presenting the material, so comparing test scores, unless it’s an essay test, isn’t necessarily going to tell you a lot. I mean, it’ll tell you something, it’s not without value, but the papers—all you need to know what the assignment was and you can make an assessment.

**Department Assessment Practices**
The Department of Philosophy conducts an annual assessment of student writing samples. Using random samples from each of the core courses, a committee of faculty members uses a rubric to evaluate Core philosophy papers and also compares the samples to senior-level philosophy student papers. According to the program director:

Interview (Philosophy): At the moment, what we’re doing is the standard assessment we do yearly, we also take up papers from all the core classes, just a random selection. And what we try to do is we try to compare the papers from the core classes to each other, but then we also compare them to a random selection of papers from senior level philosophy students. That gives us an idea of what the classes are doing, relative to each other and on their own, but also in what kind of increase, at least for [Philosophy majors], in analytic ability is being shown as they move on.

The rubric used for departmental assessment identifies students’ ability to demonstrate appreciation of argumentative form, the ability to evaluate the arguments of others and properly construct individual arguments.

Suggestions

Increased rigor among the core courses was suggested by the program director. Rather than change the required courses in the current menu offered, it was suggested a comprehensive discussion of programmatic goals and intentions for each of the core courses be established:

Interview (Philosophy): I think getting people to talk a little bit more about what the core classes are supposed to be doing, not what we put in it, but what are you trying to get done? I understand that you don’t want to bedeck a student’s transcripts with a bunch of low grades from the core, but I also think that there are some disciplines where there’s genuinely introductory material, mathematics for instance. There’s a shallow end of the math pool, there’s no shallow end in philosophy. You can give people a break on how good they swim, but the water is deep.
### Table 3 Philosophy and General Education Outcomes

Using the following scale, can you identify to what extent the following college-level General Education Outcomes apply to the courses you oversee?

1 = is a central focus of the course  
2 = not central but covered with a fair amount of depth  
3 = covered marginally  
4 = not covered at all

<table>
<thead>
<tr>
<th>General Education Goals</th>
<th>General Education Outcomes: <em>Students will...</em></th>
<th>PHIL 1010</th>
<th>PHIL 1020</th>
<th>PHIL 1030</th>
<th>PHIL 1040</th>
<th>Assignment / Class activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information Literacy</td>
<td>Demonstrate information literacy</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>•Assigned readings of philosophical texts.</td>
</tr>
</tbody>
</table>
| Analytical Skills and Critical Thinking | Read analytically and critically | 2         | 1         | 1         | 1         | •Assigned readings of philosophical texts.  
|                         |                                               |           |           |           |           | •Multiple choice and essay exams.  
|                         |                                               |           |           |           |           | •Short in-class writing assignments (response papers).  
|                         |                                               |           |           |           |           | •Long writing assignments (research papers). |
|                         | Critique an argument effectively              | 1         | 1         | 1         | 1         | •Multiple choice and essay exams.  
|                         |                                               |           |           |           |           | •Short in-class writing assignments  
|                         |                                               |           |           |           |           | •Long writing assignments (research papers). |
|                         | Construct an effective argument               | 2         | 1         | 1         | 1         | •Multiple choice and essay exams.  
|                         |                                               |           |           |           |           | •Short in-class writing assignments (response papers).  
|                         |                                               |           |           |           |           | •Long writing assignments (research papers). |
|                         | Apply simple mathematical methods to the solution of real-world problems | 2         | 3         | 3         | 3         | •Multiple choice and essay exams. |
|                         | Select and use techniques and methods to solve open-ended, ill-defined or multi-step problems | 2         | 1         | 1         | 1         | •Multiple choice and essay exams.  
|                         |                                               |           |           |           |           | •Long writing assignments (research papers). |
| Effective Communication  | Write effectively                              | 2         | 1         | 1         | 1         | •Short in-class writing assignments (response papers).  
|                         | Demonstrate effective oral communication skills | 3         | 2         | 2         | 2         | •In-class discussion work.  
|                         |                                               |           |           |           |           | •Watch and respond to films.  |
| Informed and Engaged Citizenship | Be informed and engaged citizens of the United States and the world | 1         | 2         | 2         | 2         | •Short in-class writing assignments (response papers).  
| Intercultural Knowledge and Diversity Awareness | Understand and appreciate the diversity of and within societies of the United States and the world | 3         | 3         | 3         | 3         | |
| Scientific Literacy     | Understand and appreciate methods and issues of science and technology | 2         | 3         | 3         | 3         | •Multiple choice and essay exams. |
| Aesthetic Appreciation and Engagement | Understand and appreciate the arts and aesthetics as ways of knowing and engaging with the world | 4         | 4         | 4         | 4         | |

Office of Institutional Research and Assessment (OIRA)  
Office of Undergraduate Studies
Summary
Auburn University’s Core Curriculum Fine Arts requirement is satisfied by completing one of seven standard courses or one of two Honors courses. Based on 2007-2008 academic year data, The Appreciation of Music (MUSI 2730) is the most commonly taken course, with 2,597 student enrollments (58% of all enrollment in the seven standard courses). About half of Fine Arts core courses (52%) and students (54%) are taught by instructors. About 42% of classes and 39% of students are taught by tenure/tenure-track faculty. The rest are taught by graduate assistants. A typical Fine Arts core class enrolls 75-100 students, with Architecture enrolling more students per class.

Aesthetic appreciation and engagement was stated as the major goal of Fine Arts courses by all interviewees. These course leaders associated aesthetic appreciation and engagement with developing criteria for aesthetic judgment and hence with developing analytical skills and critical thinking. For example, when students listen appreciatively to a piece of music, they use criteria for aesthetic judgment (rhythm, harmony, melody, form, structure, or dynamics) to analyze it and to attribute it to a particular period of time and style. When students work on a performance project in a Theatre course, they have to make choices (costume, sound, scenic design, etc.) based on the production concept. In Architecture students learn to recognize the style, period, purpose, and culture of architectural masterpieces. And in Art History courses, students have to analyze form, material, culture, social meaning of a piece of art.

Aesthetic appreciation and engagement is not the only general education outcome reinforced by Core Fine Arts courses. In a sense, students in these courses practice skills of analytical and critical “reading” when they examine works of visual art or architecture, witness theatrical performances, or listen to music. Similarly, interviewees pointed out that production concepts, works of art and architecture, and musical compositions exhibit a type of “argument” that students can learn to critique.

With exception of Theatre, information literacy was stated as a central focus of all Core Fine Arts courses. However, information literacy was perceived differently across Fine Arts disciplines. In the Theatre interview, information literacy was defined as library research. In Music, it is addressed by a requirement to complete journal reports that presume that students are capable of finding a musical piece. Gaining information about art and understanding the meaning of architectural masterpieces was the sense given to information literacy in Art and Architecture.

Writing and oral communication skills are seldom addressed in Core Fine Arts assignments (with exception of a museum paper in Art Appreciation classes). Interviewees said that class size is the major reason for lack of writing intensive projects and in-class presentations in these courses.

Interviewees claimed that informed and engaged citizenship is a central focus of all Core Fine Arts courses and is addressed in a variety of ways: by exposure to art that has a social agenda, by learning to preserve the artistic heritage, and even by community service. Similarly, understanding and appreciating diversity is emphasized by exposure to art forms expressing different cultures.
Despite the range of general education outcomes that interviewees say the Core Fine Arts Courses address, they agreed that the primary goal is to teach aesthetic appreciation and engagement, with some emphasis on analytical and critical thinking (through reading), informed and engaged citizenship, and understanding and appreciating the diversity of and within societies.

Most current assessment practices in Fine Arts core courses are informal and are based on student feedback and instructor’s perception of student learning. At present, the extent to which students completing these courses have attained skills of aesthetic appreciation and engagement is not readily identified. However, possible sources of assessment data in the future may be found in tests given in these courses as well as in student work such as PowerPoint projects in Architecture, museum papers in Art History, journals in Music, in a written work or a sketch in Theatre.

When invited to suggest possible improvements in the Core Curriculum, Fine Arts interviewees proposed restructuring towards distribution requirements, changing a focus from subjects to general education areas, clarifying the level (sophomore or freshman) of core curriculum Fine Arts classes, reducing class sizes and adopting a multi-disciplinary and integrated approach in the Core Curriculum.
Fine Arts Courses at Auburn University

The Core Curriculum Fine Arts requirement is satisfied by completing one of the following courses:

- The Art of Architecture, Place and Culture .......................................................... ARCH 2600
- Introduction to Art History I ........................................................................ ARTS 1710
- Introduction to Art History II .................................................................... ARTS 1720
- Introduction to Art History III ................................................................. ARTS 1730
- Appreciation of Music ................................................................................. MUSI 2730
- Honors Appreciation of Music ................................................................. MUSI 2737
- Introduction to Theatre ........................................................................ THEA 1010
- Introduction to Theatre ........................................................................ THEA 2010
- Honors Introduction to Theatre ........................................................... THEA 2017

**Graph 4.1** Fine Arts Core Courses: Number of Students and Number of Sections

<table>
<thead>
<tr>
<th>Standard Courses</th>
<th>Honors Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARCH 2600</td>
<td>MUSI 2737</td>
</tr>
<tr>
<td>ARTS 1710</td>
<td>THEA 1010</td>
</tr>
<tr>
<td>ARTS 1720</td>
<td>THEA 2010</td>
</tr>
<tr>
<td>ARTS 1730</td>
<td>THEA 2017</td>
</tr>
<tr>
<td>MUSI 2730</td>
<td></td>
</tr>
<tr>
<td>THEA 2010</td>
<td></td>
</tr>
</tbody>
</table>

Based on 2007-2008 academic year data for standard courses, The Appreciation of Music is the most commonly taken Fine Arts core course: it enrolls 2,597 (58%) of students (see Graph 1). Introduction to Art History and Introduction to Theatre enroll 18% and 17% of students (815 students spread over three courses and 780 students in one course). About 7% of students are enrolled in The Art of Architecture, Place and Culture.

About a half of Fine Arts core courses (about 52%) and students (about 54%) are taught by instructors. About 42% of classes and 39% of students are taught by tenure/tenure track faculty. The rest are taught by graduate assistants. A typical Fine Arts standard core class enrolls 75-100 students, with Architecture enrolling more students per class.
Graph 4.2 Instructors of Fine Arts Core Courses by Number of Students and Number of Sections (2007-2008 academic year)

Graph 4.3 Fine Arts Core Courses: Section Sizes (2007-2008 academic year)

Using data from students who received baccalaureate degrees in summer 2006 through spring 2008, this report analyzes how Core Fine Arts courses figure in students’ course-taking patterns, how those patterns vary by college of enrollment, and how students perform in those courses. We included all AP, transfer credits as well as successful completions of Core Fine Arts courses at Auburn – where “successful” means that the student received a grade of “D” or higher. If a student took the same course several times, we selected a record with the highest grade earned. The following graphs are based on student-course records, so that students are counted once for each Core Fine Arts course they successfully took. Students take Core Fine Arts courses for a variety of reasons other than fulfilling the requirements of the Core Curriculum.
Graph 4.4 Successful Completions of Fine Arts Courses by Recent Graduates

**ARCHITECTURE**

<table>
<thead>
<tr>
<th>Grade</th>
<th>AP</th>
<th>TR</th>
<th>FR</th>
<th>SO</th>
<th>JR</th>
<th>SR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grades</td>
<td>291</td>
<td>3.55</td>
<td>3.54</td>
<td>57</td>
<td>3.51</td>
<td>3.55</td>
</tr>
<tr>
<td># Students</td>
<td>3.53</td>
<td>210</td>
<td>57</td>
<td></td>
<td></td>
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</table>

**ARTS**

<table>
<thead>
<tr>
<th>Grade</th>
<th>AP</th>
<th>TR</th>
<th>FR</th>
<th>SO</th>
<th>JR</th>
<th>SR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grades</td>
<td>536</td>
<td>3.10</td>
<td>3.06</td>
<td>196</td>
<td>3.17</td>
<td></td>
</tr>
<tr>
<td># Students</td>
<td>82</td>
<td>2.95</td>
<td>156</td>
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</table>

**MUSIC**

<table>
<thead>
<tr>
<th>Grade</th>
<th>AP</th>
<th>TR</th>
<th>FR</th>
<th>SO</th>
<th>JR</th>
<th>SR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grades</td>
<td>1,866</td>
<td>3.45</td>
<td>299</td>
<td>57</td>
<td></td>
<td></td>
</tr>
<tr>
<td># Students</td>
<td>865</td>
<td>3.31</td>
<td>69</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**THEATRE**

<table>
<thead>
<tr>
<th>Grade</th>
<th>AP</th>
<th>TR</th>
<th>FR</th>
<th>SO</th>
<th>JR</th>
<th>SR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grades</td>
<td>507</td>
<td>3.03</td>
<td>340</td>
<td>117</td>
<td>2.99</td>
<td></td>
</tr>
<tr>
<td># Students</td>
<td>137</td>
<td>2.98</td>
<td>71</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Observations:

- AP and transfer credits account for 15% of credits in Core Fine Arts’ courses: 7% of credits in Arts, 21% of credits in Music, and 12% of credits in Theatre.
- Successful completions of Core Fine Arts courses are not distributed evenly among the available options: Architecture accounts for about 8% of core Fine Arts courses, Arts for about 19%, Music for 57%, and Theatre for 16%.
- Overall, students complete Core Fine Arts courses early in their academic careers: 51% of successful Core Fine Arts completions were taken by students in their freshman year.

The following chart presents the distribution of Core course completions among the four eligible Fine Arts disciplines by students’ college of graduation.
**Graph 4.5** distributions of Core course Completions among the Fine Arts disciplines by Students’ College of Graduation

<table>
<thead>
<tr>
<th>College of Graduation</th>
<th>ARCH</th>
<th>ARTS</th>
<th>MUSI</th>
<th>THEA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coll of Arch Design and Const</td>
<td>109</td>
<td>195</td>
<td>177</td>
<td>42</td>
</tr>
<tr>
<td>Coll of Sciences &amp; Mathematics</td>
<td>48</td>
<td>72</td>
<td>382</td>
<td>74</td>
</tr>
<tr>
<td>College of Agriculture</td>
<td>20</td>
<td>26</td>
<td>205</td>
<td>36</td>
</tr>
<tr>
<td>College of Business</td>
<td>187</td>
<td>167</td>
<td>1,034</td>
<td>232</td>
</tr>
<tr>
<td>College of Education</td>
<td>28</td>
<td>63</td>
<td>420</td>
<td>164</td>
</tr>
<tr>
<td>College of Engineering</td>
<td>93</td>
<td>72</td>
<td>500</td>
<td>72</td>
</tr>
<tr>
<td>College of Human Sciences</td>
<td>30</td>
<td>165</td>
<td>228</td>
<td>73</td>
</tr>
<tr>
<td>College of Liberal Arts</td>
<td>92</td>
<td>615</td>
<td>1,111</td>
<td>446</td>
</tr>
<tr>
<td>Sch of Forestry &amp; Wildlife Sci</td>
<td>7</td>
<td>8</td>
<td>59</td>
<td>11</td>
</tr>
<tr>
<td>School of Nursing</td>
<td>21</td>
<td>102</td>
<td>11</td>
<td>22</td>
</tr>
</tbody>
</table>

**Overview of Courses**

- **The Art of Architecture, Place, and Culture (ARCH 2600).** LEC. 3. The interrelationship of art, architecture, place and culture with emphasis on the art of architecture from a global multicultural perspective. Illustrated lecture, readings, and essays.
- **Introduction to Art History I (ARTS 1710).** LEC. 3. Fine Arts Core. Introduction to major art traditions of the world, from Paleolithic times to AD/CE 1000.
- **Introduction to Art History II (ARTS 1720).** LEC. 3. Fine Arts Core. An introduction to world art, c.1000 to c.1700. Medieval, Renaissance and Baroque Europe with Islamic and non-Western art of the same time period.
- **Introduction to Art History III (ARTS 1730).** LEC. 3. Fine Arts Core. Major works of painting, sculpture and architecture from the Rococo period through the 20th century. Emphasis on styles and social, political and cultural relationships.
- **Appreciation of Music (MUSI 2730).** LEC. 3. Fine Arts Core. An orientation in the art of listening. Outstanding composers and musical composition. No previous music training required.
• **Honors Appreciation of Music (MUSI 2737).** LEC. 3. Fine Arts Core. The art and folk musics of western and non-western cultures. No previous music training required.

• **Introduction to Theatre (THEA 2010).** LEC. 3. Fine Arts Core. Appreciation of theatre arts including stage, television and film. Development of sensitive and critical sophistication as articulate, discriminating theatre-goers. Play and film viewing, play-reading, critiques and term projects.

• **Honors Introduction to the Theatre (THEA 2017).** LEC. 3. Fine Arts Core. Appreciation of theatre arts. Development of sensitivity and critical skills as theatre-goers. Play attendance, reading, critiques and term projects.

**Fine Arts Courses and General Education Outcomes**

Core Curriculum Fine Arts courses (The Art of Architecture, Place and Culture; Introduction to Art History; Appreciation of Music; and Introduction to Theatre) place emphasis on **aesthetic appreciation and engagement**, which was stated as the major goal of the course by all interviewees. Students learn what constitutes architecture, art, music, or theatre and learn how to become active members of the audience:

Students need to know what constitutes architecture and acquire a personal appreciation of what our culture values.

This course is empowering students to talk about what is good and what is bad. If they can do it on their own, we have done our job.

Students have to understand the terminology of music so they can have an intelligent discussion about what they listen to and have an educated answer of why they like a piece. Though you are not a performer, you become a good member of the audience. You would like to support the art, to go to the concert, to be comfortable, and to know how to participate. Audience members are as important as performers.

The broad goal is to help students develop criteria for aesthetic judgment. Students become an informed audience member and can not only articulate what they like and don’t like but also have criteria for making that decision... Student no longer comes to the theatre as a passive lump waiting to be entertained. Every single student who comes through with these courses really engages theatre as audience in a totally different way. They become a part of the process of making the theatre instead of waiting for it to happen. And, I think, it is pretty consistently true for all the students.

To develop aesthetic appreciation, students in Core Fine Arts classes learn criteria (e.g., period, style, purpose, and culture) for classifying and evaluating pieces of architecture, art, music or theatre. Specific activities are covered in detail in review of analytical skills and critical thinking below.
In *Honors Introduction to Theatre* (THEA 2017) students develop production reviews\textsuperscript{15} and performance projects that help to develop aesthetic judgment. With production reviews, an instructor attempts to “push [students] beyond what they like and do not like to actually look at specific production elements and to analyze the reasons of choices made by the designer, director, or actor.”\textsuperscript{16} A performance project is “an original five-to-eight minute scene that students themselves create in response to a particular play that they have read.” It “forces students to rearrange material in a different way.” For this project, students have to come up with a production concept\textsuperscript{17}, “a particular idea that is specific enough or says something about the material, but also is broad enough so that students can base their choices [of elements of costume design, sound design, scenic design, etc.] on.” Another example of activity that helps students to develop aesthetic appreciation is using listening guides (see below) in *Appreciation of Music*.

Information literacy was perceived differently across the Fine Arts disciplines. In the Theatre interview, information literacy was defined as “library research and learning how to parse good information from bad information.” In Core Theatre courses, students have a seminar at the library and a “treasure hunt,” where they work in groups to find sources.

For instance, there is a scene in *The Crucible* where one of the characters brings books that supposedly help interrogators and magistrates recognize witches. So I ask students to go to the library and find one of those books, and I wait for them to come back with *Malleus Maleficarum* [Latin for *The Hammer of Witches*], one of the most famous medieval (1486) treatises on witches, a book that tells how to identify a witch, which we do have in our collection.

In *Appreciation of Music* the ability to find a piece of music is considered to be evidence of information literacy, a skill which is addressed by the requirement of listening outside of class and completing journal reports:

> If they listened to piece, they liked it, and they want to hear more. Would they be able to find it? I think a lot of them would not until they were assigned these journal reports to do some outside class hunting.

\textsuperscript{15} Since *Introduction to Theatre* (THEA 2010) has large sections, production reviews (exclusive of the dance concert) are currently done in *Honors Introduction to Theatre* (THEA 2017) only. This reflects the consensus at the moment, but Instructors are free to include production reviews in their larger sections if they so choose.

\textsuperscript{16} In spring semesters, students are asked to prepare production reviews of a dance concert, which is a more challenging task, since dance concerts are “less narratively driven with no story to fall back on.”

\textsuperscript{17} For example, the production concept for the original production of *Death of a Salesman* directed by Elia Kazan was a conflict between love and competition. “Willy Loman’s love for his family, his desire to be the provider, to be loved is in conflict with the world of the American capitalist system.” In the original stage design, the world of capitalism is represented in the background. “It is dark, it is dingy, and it looms over the Willy’s little house.”
**Journal Reports**

**Requirements:** A total of ten composition entries will make up your journal. Compositions must be a minimum of thirty minutes in length and must not be included in your text. Sources for listening may include live concerts, CDs, public radio concerts, or computer downloads. Naxos Music Library, which can be found on the AU library website, is a valuable source for classical music listening.

**List the following information at the top of your entry:**
- Title of piece (list movements if applicable)
- Length of composition
- Instrumentation (ex. Orchestra, chorus, string quartet, flute and piano, etc.)
- Composer
- Date of listening
- Source of listening (live concert, iTunes, CD, classical radio or other)

**Include in your report:**
- Paragraph 1: pertinent background information about the composer (dates, other music written, etc.)
- Paragraph 2: information about the composition (why/when it was written)
- Paragraph 3: important characteristics of the music (melody, harmony, instrumentation, dynamics, etc.)
- Paragraph 4: your general impressions (likes and dislikes of the music)

In the Core Architecture interview, information literacy was identified as learning words and concepts “as well as with visual literacy, the ability to understand the meaning of architecture.” In Art History, information literacy was associated with gaining information about art.

One of the interviewees expressed gratitude to the library staff for help with library research projects. Nancy Noe and Barbara Bishop lead seminars in the library to get students acquainted with different ways of conducting a literature search.

**Analytical skills and critical thinking** are frequently thought of in terms of deconstructing and classifying material and, therefore, can be seen in parallel to **aesthetic appreciation and engagement.** For example, in the Core Architecture course, students must assimilate a lot of material. And if students are not able to classify or categorize, they try to memorize disconnected facts. Taking into account that the number of facts is enormous, it is impossible to memorize all of them. Instead, students are expected to assimilate material by using typologies of architecture:

> Everything does not have to be memorized. If you understand the principles, you can apply those principles to the facts, cases, studies they are looking at. What we are looking at is families/typologies of architecture. They can understand the work and appreciate it. There is no necessity for memorization if they understand what Baroque is, what Romanesque is, what Renaissance is, or what Neoclassic is. They do not have to memorize that that building is an example of that work, because you can look at that building and recognize it as an example of that work.

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18 Aesthetic appreciation and engagement are associated with developing criteria for aesthetic judgment, while analytical skills and critical thinking are associated with classifying facts based on these criteria.
Students in the Core Architecture learn to classify facts not only by period/style, but also by purpose (vernacular, religious, etc.) and culture/country. Students are also pushed beyond these classifications to define the meaning of architectural masterpieces in the context of their cultural backgrounds: “Students have to understand that why they are built is much more important than how they are built.” They have to understand symbolism and recognize cultural expressions. Here is a test question that shows how students connect architectural masterpieces with their cultural backgrounds.

Correlate the following with the responses below:

1. Proclaims an equality of religious beliefs ↔ c. Pantheon
2. Proclaims the possibility of immortality for mortals ↔ a. Great Pyramid
3. Proclaims a divine celestial and terrestrial order ↔ d. Stonehenge
4. Proclaims the possibility of individual enlightenment ↔ e. Borobudur
5. Proclaims a divine purpose for mortal lives ↔ b. Parthenon

In Theatre students develop their analytical skills and critical thinking by deconstructing plays into different aspects (“levels of inquiry”) and researching these different aspects:

For example, in THEA 1010 when students read The Crucible by Arthur Miller or something like that they are given some aspect of that play to research: “What is the theology of Puritans?”, “What was the fashion on the day like?”, “What were the McCarthy hearings that were taking place at the time the play was produced?” We assign a number of topics to give them a sense of all the different levels of inquiry that a text will invite you to explore.

In Core Art History, students “are expected to discuss monuments of art history within their cultural and stylistic contexts” (ARTS 1730-002 Syllabus, available at http://stars.troy.edu/stars/CRSLISTS/Au.htm). Instructors try “to put forth a variety of interpretations” and introduce “various methodological models”:
Various methodological models are used to make students think on their own about the meanings of social messages and the implications of pieces of art. One methodological model analyzes the form and/or material. Another model analyzes the culture it is coming from. Another model might have to do with how the work speaks to gender, social meaning. These models are interconnected, and these are the ways to think about art. Some model might include more interaction with literature or philosophy... art interacts with everything else in the world.

In Core Music, students learn common musical elements such as rhythm, tempo, dynamics, or harmony so that they “can have an intelligent discussion about what they listen to and have an educated answer of why they like a piece”:

If students were to listen to a piece of music, whether it is a piece of pop or rap or classical or string quartet, can they listen to this and dissect it through analyzing the elements of that particular piece and through talking about the rhythm, harmony, melody, form, structure, or dynamics?

Students learn to define the historic period of the music piece. They learn that for each period... It becomes an application process. The melody is like this, the rhythm is like this, the harmony is like this, the instruments are like this, and then you hear a piece. Does it fit the criteria?

According to course leaders interviewed, Core Fine Arts courses help students learn to read analytically and critically, though what they read is not necessarily text. “Reading a performance” by constructing production reviews or by reading a play while working on a performance project (introduced above) fall under analytical and critical reading in Theatre:

They do have to analyze the production. It is reading of performance. The play text is the words on the page. The performance text is all the other signifiers: the choices, the visuals, the body language, and the actors, all of the different layers of communication... When you are in the theatre, you are reading the performance. I would say that production reviews would count under reading critically and analytically.

You cannot respond to a play unless you have read it analytically and critically. It is part of the process. One cannot make artistic choices without reading analytically and critically... you have to engage in that particular piece.

Art and Architecture teach students to read visual culture. One of the assignments that develops student ability to read art analytically and critically is a museum paper, a three-page analysis of a work on display:

These courses give students the knowledge base to deal with visual culture. [Students] go to our local Museum, to Montgomery, to museum in Columbus or, sometimes, Birmingham to look at works. They go places and study art and write about it.

Architecture frequently symbolizes different beliefs, and one should know the “language” to understand these symbolic representations:

House, environment, the way we dress are codes. If we cannot read these codes, we cannot understand the language...
A lot of Greek architectural masterpieces are located in nature, in spectacular settings. There is a significant veneration for the natural world and their temples are placed in these spectacular settings, so that the gods feel like as if they were home. However, Romans place their temples in their cities, symbolically saying that gods could be found in their culture.

The Greek temples face east, but the front door/entrance is on the west. Why is that? A lot of times, you have to go an extraordinary length to have that orientation. In Christianity (as well as in Egypt), West was understood as a symbolic understanding of death, and the East – life or rebirth. The altar in our churches is on the East. Greek temples were the same way.

**Example from the test:**

Correlate the following with the responses below:

1. “Entrance” to the Great Pyramids ↔ c. From the East
2. “Entrance” to the Stonehenge’s inner circle ↔ a. From the Northeast
3. “Entrance” to the sanctuary of the goddess Athena at the Parthenon ↔ c. From the East
4. “Entrance” to the Acropolis ↔ b. From the West
5. “Entrance” to a Gothic cathedral ↔ b. From the West

Similarly, music can be perceived as a language, and analytical and critical reading can be paralleled with listening to music while using the structure of a listening guide.

Music is another language, and if you do not know that language, you are missing out a lot of stuff. Students are assigned to keep journal throughout the semester which contains weekly entries about classical compositions that they have never heard. There are also pieces students listen to in class. While listening to textbook pieces, students use listening guides that are introduced throughout the textbook used in class [source of the following example: *The Enjoyment of Music*, ninth edition/shorter, by Joseph Machlis and Kristine Forney, New York: W.W. Norton & Company, 2003, p. 156]:
**Listening Guide 17/ Instrumental Music of the Baroque**

Moure: Rondeau, from *Suite de symphonies*

**Date:** 1729  
**Genre:** Dance suite (4 fanfares)  
**Form:** 5-part A-B-A-C-A

**What to listen for:**
- Fanfare like opening, which serves as ritornello (A).
- Contrasting sections (B,C) featuring different instrument groups.
- Prominent timpani part, keeping strong beat.
- Regular phrasing (4- and 8-measure ideas).
- Frequent trills in melody instruments (trumpets, violins, oboes)

<table>
<thead>
<tr>
<th>SECTION</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>0:00 A</td>
<td>Opening fanfare theme, heard twice in full orchestra; trumpets and timpani prominent (16 measures).</td>
</tr>
<tr>
<td>0:24 B</td>
<td>Short, quiet contrasting section (8 measures) featuring oboes and violins.</td>
</tr>
<tr>
<td>0:35 A</td>
<td>Return to opening theme, played once (8 measures).</td>
</tr>
<tr>
<td>0:47 C</td>
<td>Longer, contrasting section (20 measures).</td>
</tr>
<tr>
<td>1:17 A</td>
<td>Repeat of opening (16 measures).</td>
</tr>
</tbody>
</table>

When asked how Core Fine Arts courses might help students learn to **critique an argument effectively**, interviewees pointed out that an argument can be represented by a production concept, works of architecture, art, or music piece:

For instance, if I direct a production, I am making an argument. I have come up with production concept. If someone comes and sees my production and they write a production review, and they try to analyze it, they are critiquing my argument. It is a form of critiquing an argument. Production reviews are a specific outcome related to that. But a lot of that comes up during the discussion in class.

I want them to understand the argument and what makes something great. I give them standards and what are the symbolic significance, iconic significance, and experiential significance. Those are the standards that we use for critiquing the works of architecture.

When you talk about art, you can talk about its context and you can also state what this work is like: Chagall or Kandinsky. You can compare it, but if it is too much like it, then it is derivative and it does not have a meaning inside it... They can talk about balance, proportions, intention, and color choice. Students in our classes are empowered to critique art work.

In Core Theatre courses, students learn to **construct an effective argument** by creating a play or a **performance project** described above. In the Core Architecture course, students have to construct an effective argument by creating a PowerPoint presentation or a paper describing a house that would represent them:
The paper asked them to answer the question: “If you had a house what would it be?” They had to associate a house with themselves and how that house expresses them. They can humanize their worlds, their environments, and this is expressive of who they are, which is important. The PowerPoint required them to identify a structure (a house), and then talk about the qualities of that house, and then they have to describe themselves and the qualities of themselves. And, then they have to illustrate how their qualities are expressed in the house.

People’s intentions are communicated in various ways: “you can make it verbally or you can do it via an art piece. You can do it in more subtle ways, more complex ways, more questioning ways, not in a straight written form.”

Fine Arts faculty interviewed gave only a few examples of how their courses help student learn to apply simple mathematical methods. “When you look at a picture, there are proportions, geometry and scale issues.” (One can also identify Romanticism based on lack of proportions as Romanticism rejected simplicity and proportion and valued imagination and intuition.)

A performance project in Theatre is also relevant to selecting and using techniques and methods to solve open-ended, ill-defined or multi-step problems: “You are not giving them a recipe. You give them a set of criteria. They have to think creatively and find the answers.”

Finding connections between art pieces and identifying art style is another example of a multi-step problem:

Chihuly is in the textbooks, and we have his glass piece [Amber Luster Chandelier, 2003] in our museum. The students can talk about the glass work that is in our gallery. One might argue that some of the art work there is more like Brancusi [Romanian Abstract Sculptor, 1876-1957], but he used marble and other sculpture materials so the nature is closer to Brancusi, but the material is closer to Chihuly and, I think, those kind of connections are related to multi-step problems.

Another example of solving an ill-defined problem is defining a style in Architecture:

What we do explicitly and implicitly calls for them to be able to weigh skills on a scale so there should be a scale of some sort and a selection process of what goes on that scale. For example, just by looking at those images they learn to identify which is Renaissance and which is Baroque.

The Paris Panthéon was mentioned as an example of architectural style that is difficult to identify:

[Students] still consider the Panthéon [to the left, a building in the Latin Quarter in Paris] Baroque... It has Neoclassical front with Baroque dome [an early example of Neoclassicism].

The skill of effective writing is emphasized some Core Fine Arts courses, especially in Art History:
They are implementing writing initiative across campus, and we are already past that stage so we had intensive writing for years. To do that, our instructors have to do extra grading and extra work. These are courses in the core that teach them how to write and, at the same time, these are Art History courses. Students get critical feedback and assistance as the paper develops. They are also encouraged to meet with the professor. Professors go out of their ways to help these students write.

In other Core Fine Arts courses effective writing was mentioned as something that is done in class, but is not a central focus of the course: “the focus of the grade is not on the construction of their writing. They have to be able to argue something, but I am not grading it like it is a COMP class.”

I have the papers, but I do not get them to work on organization and grammar.

While Theatre is a very verbal art form, where students have to demonstrate the ability to memorize lines and have some kind of effective communication, this does not necessarily imply that students are required to articulate their own thoughts. Effective communication in the latter sense is demonstrated during class discussions where students are supposed to take a stand on their point of view. In Architecture, students are expected to prepare two PowerPoint presentations to demonstrate effective visual communication as well as written communication.

Class presentations help develop communication skills in Music. Each student selects a classical composer from a suggested list and gives an 8-10 minute presentation in class on that composer’s life and musical style.

Class size was mentioned as one of the reasons for lack of writing intensive projects and in-class presentations in some Core Fine Arts courses:

Ideally, I teach writing research papers in stages. Students have to submit their topics and bibliography, followed by a thesis statement or argument. They then submit that thesis in the form of the first two pages of the paper with discussion of their methodology, followed by a rough draft upon which they receive extensive feedback and notes for revision. I do that in History of Theatre, where I have 20-25 students, but I can’t do that in the intro course with 100+ students. I can give Intro students a writing assignment and grade them on their effort, but there is not enough instructional time to really walk them through the basics and allow them the necessary opportunities to resubmit and improve their skills. Intro students (THEA 2010) do have the opportunity to make and defend arguments, but it is usually within the bounds of class discussion.

With a class of 100 there is no time to do a lot of communication... They have to speak to each other... Soliciting opinions, but there is not much more...

Core Fine Arts courses address Informed and engaged citizenship in various ways: exposure to art that has a social agenda, learning to preserve the heritage, and even community service. For example in Theatre students are exposed to playwrights who have a social agenda:

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19 THEA 1010 (Introduction to Theatre for majors) is different from THEA 2010 (Introduction to Theatre for non-majors) in its assignments: is “a smaller section and it is more writing intensive.”
“All the plays we are reading this semester are focused on the playwrights that have social agenda. When you read about Athol Fugard’s *Master Harold...and the Boys* you need to talk about apartheid and when you talk about apartheid you make parallels to Jim Crow.”

According to one faculty member, exposing students to theatre as “a vehicle for social consciousness” is likely to foster their engagement with their community and the world. Exposing students to music also serves as a mean of engaging them with the world: “Knowledge of music is integral to being an informed and engaged citizen. Any historical event, any tragedy in the country, music is a part of it. Knowing music is part is who we are.”

In one recent section of THEA 2010, an instructor required students to provide two hours a week of community service: “Ten weeks, two hours a week they are in soup kitchens, boys and girls club, and this is all a way of contextualizing cultural things that they can then bring back to their theatre projects.”

Another example of how Core Fine Arts courses can promote informed and engaged citizenship is preserving the heritage that was mentioned as one of the “collateral” things achieved in Architecture:

“I want students to step in the gap in their own cities, in their own towns, to prevent forces of change and forces of progress from becoming negative forces by destroying their heritage. Destroying old churches, city halls, even warehouses and homes are not only acts of progress, they are also acts of violence. They are symbolic statements of rejection, as well as of hope. It is imperative that in our zeal for growth and change, we also cultivate the heritage we wish to preserve. If citizens do not value their great works of the past, it will not be preserved and passed on to other generations. A recent example is the building of the Aswan Dam in Egypt. When Nasser was building the Aswan Dam, it was going to flood a portion of the Nile Valley, where there were significant works of great architecture, particularly, the Valley of the Kings and Valley of the Queens. For Nasser that was the price of progress. Fortunately, UNESCO and the United Nations stepped in and said you cannot do that. Instead, a way was found to both build the needed dam and preserve Egypt's priceless heritage.
**Understanding and appreciating the diversity of the United States and the world** is emphasized in all Fine Arts courses by exposure to art forms expressing different social agendas and cultures. Here is one way in which diversity is covered in a Core Theatre course:

Right now diversity is something that I have been emphasizing in my choice of plays. We had a play *(Art*, by Yasmina Reza) written by a French playwright, a woman of Persian extraction. It is a comedy about metro-sexual European men. This semester we read *How I Learned to Drive* which I already described, written by a woman, who is looking at some issues that in “Red State” America are very hot button. With respect to gender diversity, we read Caryl Churchill’s *Top Girls*, which is a feminist piece from the 1980s; we read August Wilson’s play *Fences*. August Wilson is one of the most prolific African American playwrights. We sometimes read David Mamet who is approaching diversity from a different angle. David Mamet has been accused of being somewhat misogynistic. We read his play *Oleanna* [David Mamet], which is about sexual harassment at a university. His attitude is: “Political correctness be damned,” so I see it as a very reactionary play. It raises a lot of issues... There really are almost an unlimited number of ways to introduce diversity issues using dramatic literature.

To understand and appreciate diversity through Art History classes, “the emphasis on non-Western materials is germane, and students learn the materials from other cultures of the world. If they are more familiar with material, they are more engaged with that culture.”

In Architecture, students learn to:

- Understand the symbolism and recognize the cultural expressions ...
- Every culture has appropriated the obelisk. What does it mean? Is it a “Ray of the Sun,” or something else? The idea of who we are is expressed in our architecture, and one can see which culture a particular piece of architecture belongs to.

Tests in the Core Architecture course require students to be aware of diverse cultural contexts.

In Core Music, integrating the music and instruments of different countries and cultures of the world helps to increase students’ awareness of different cultures and countries of the world:

- We are so entrenched in our Western world, but there is a whole lot of music out there that is different from ours. Listening to music from other cultures and being acquainted that we are not the only music... We all know what flute is, here is an example of an Indian flute. It does not look like our flute, it gets a different sound. And, there is also a Native American flute. Different kinds of instruments create different kinds of sounds and they integrate in cultures differently. It broadens students’ minds out a little bit.

As might be expected, coverage of **methods and issues of science and technology** in Core Fine Arts courses is marginal:

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**Office of Institutional Research and Assessment (OIRA)**
**Office of Undergraduate Studies**
Except in the plays that deal with science and technology... Unless you want to include theatre technology in science and technology: how the sets are constructed, the kinds of things that are going behind the scenes...

Inside the pyramids there are granite chambers, 80 ton slabs of granite, highly polished... How did they polish granite in 2,500 BCE?

Technology has an impact on music too. Even having an easier access to music... Even technology in terms of instruments themselves...

At the same time, as indicated in a sample Art History course syllabus (ARTS 1710, available at [http://stars.troy.edu/stars/CRSLISTS/Au.htm](http://stars.troy.edu/stars/CRSLISTS/Au.htm)):

Art history’s functions are to collect and record, to preserve, to classify, and to interpret the artistic heritage or patrimony of all humankind. Art history’s activities thus variously resemble those of science (a concern for systematic classification, and the use of scientific methods for discovery, dating, and conservation).

To summarize, aesthetic appreciation and engagement is the most important goal for student learning addressed in all Fine Arts courses. Students become good members of the audience by learning the criteria for aesthetic judgment that include: cultural context, social meaning, interaction with other disciplines, and, depending upon a discipline, material, structure, rhythm, or melody. Developing criteria for aesthetic judgment is also closely related with analytical skills and critical thinking that imply classifying art, architecture, music pieces, and plays in accordance with such criteria. Informed and engaged citizenship is another important goal of Fine Arts classes. It is addressed differently depending upon the discipline: from exposure to different social agendas in Theatre to stepping in the gap in their own cities and own towns to prevent forces of progress from destroying their architectural heritage.

**Assessment**

The current practices of assessment in Core Fine Arts courses do not provide Core Curriculum Oversight Committee with the data on the extent to which students attain skills and knowledge related to general education outcomes. Some of the interviewees pointed out the challenging character of assessment in Fine Arts:

The nature of the discipline is that it is about these things that only exist in the moment of their creation and then they are gone and it is, therefore, difficult to develop an assessment tool that can be put and filed away in the box.

However, activities and assignments associated with each general education outcome in the section above and a summary of artifacts collected from students, tests administered, and some of the current assessment practices can be used to develop assessment of the extent to which students attain skills and knowledge related to general education outcomes in the future.
Artifacts

Some of the activities associated with aesthetic appreciation and engagement and analytical and critical thinking result in artifacts that can be considered for subsequent assessment of student learning in these areas. In Architecture, students have to prepare PowerPoint presentations to express themselves in terms of a house. In Art, students submit a visual analysis paper, a term paper, or museum paper, which accounts from 20% to 50% of the grade, depending on an instructor and the period studied. In Music, students keep journals of classical pieces they have listened to. In Theatre, students work on the production review and performance project. One of the outcomes of the performance project is a written work or sketch which accounts for 10% to 25% of the grade:

In Theatre, depending upon their role in production (e.g., designer, stage manager, logistical coordinator), students have to turn in written work and other supplementary materials which accounts for 20% to 25% of the grade. Since “the finished product [performance project] is often fairly weak in terms of skill sets” and students are not expected to make a perfect production in this class, these outcomes are assessed based on “the engagement with the material and solid and interesting choices made.”

Tests

Assessment in Fine Arts core courses could be also based on students’ test performance. In Architecture students take four multiple choice tests. In Art students take up to three multiple choice tests. In Music, there are three tests and a final. In Theatre, based on the readings, students take three multiple choice tests, which account for a major part of the grade. Apart from these, students are quizzed on every play that they read. (The examples of tests’ questions that can be used in assessment in Architecture are provided in sections on analytical skills and critical thinking.)

Current Assessment Practices

“Clicker” response technology is used in one of the Fine Arts courses for a formative assessment: “I use these participation exercises where they have to respond based on the presented material to make sure they are tracking that. It also lets them know that some people are, and some – are not [tracking that].”

Most assessment practices in Fine Arts core courses are rather informal and are based on student feedback and instructor’s perception of student learning: “doing something and seeing them respond to it make you realize” that you need to make changes:

If I get a critical mass of students who do not seem to be getting a concept, at some point you stop blaming the student for not being attentive, for not taking notes... Maybe, I did something wrong with the way I presented the material.

Every class meeting there is an opportunity for them to ask a question, share a concern. Then I formally ask them questions to see where they are. The last question that I gave them after mid-

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20 In Architecture, the instructor uses an interesting approach in developing and changing tests by taking questions for which 50% or more students could not find an answer before and adding them as bonus questions as long as these are valid questions. Validity of the question is identified based on its correlation with the rest of the questions on the test.

21 Tests in Music include objective and listening portions.
semester: I asked them about the direction of the class, the test, what they think is working, and what is not working, what they think in terms of improving.
I started with the journal report and it was half as detailed as it is now. And, these students were writing about the sun and the moon and stars. Even doing something and seeing them respond to it make you realize that you need to be more specific, to have more structure.

Student evaluations are sometimes mentioned as an assessment tool. In Theatre, a thoughtful student comment on an evaluation led to a change in selection of plays: “This does not happen very often, but I had a student in the class who wrote that selection of plays in class could have reflected more diversity. I take that comment seriously.”

Suggestions
A complete restructuring of the Core Curriculum was suggested by one interviewee. As of now, the Core Curriculum is “menu driven, it forces students to do series of broad survey courses that lead them to think that this is about checking off the box: I have done this, now I can move on.” It was suggested that the university should move towards distribution requirements:

I think that we will be much better served by going towards the distribution requirements. Now, to fulfill your Arts requirement, you have to take one of these four courses. Why not “you need to take a certain number of credits in Fine Arts” so that someone taking the beginning acting class can also count that, someone who wants to take Design Aesthetics, can count that, etc. That allows students to focus on areas that they are interested in as opposed to “everybody has to take this.”

One interviewee suggested that the Core Curriculum Oversight Committee might consider changing the focus of the core from subjects to general education areas. Thus, instead of having theatre, philosophy, or biology requirements one could have requirements to complete courses focusing on diversity, writing or community engagement:

Will there be courses that will be diversity courses? At Ohio State, some years ago when I was a grad student, there was a requirement that students had to take a certain number of courses that had at their core issues of diversity. If you wanted your course to count for that, you submitted your syllabus and made your argument as an instructor as to why your course should count toward fulfillment of this requirement. One such theatre course dealt with the idea of cultural hegemony and the way theatre has historically interacted with mainstream and the margins of a given moment in history, what assumptions are made about “otherness” and people who are not in the mainstream. How does the theatre either reinforce those assumptions or how can the theatre break through that? That course got flagged as something you could take to fulfill the OSU diversity requirement. At the time, some courses at Ohio State were flagged as writing options. In those cases, instructors or departments had to show that the course had a significant writing component. I think that Introduction to Theatre, even the large

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22 Not all Fine Arts interviewees are in agreement with changing the focus of the core from subjects to general education areas. For example, in the process of the original draft review one of the participants indicated: “I like the intent to focus on “general education areas”, but I think “individual subjects” is the best way to do it.”
sections, and with the institutional support of a decently funded writing center, could serve that goal. With exception of *Introduction to Art History*, core curriculum Fine Arts courses are sophomore-level courses. However, these courses are typically taken by freshmen. It has been pointed out that a sophomore class should be more challenging than a freshman class, and it is unclear whether this is an intention of Fine Arts core curriculum component:

I was pondering whether having Core Curriculum to freshmen is the best thing. It gives students an opportunity to take core classes in other schools or transfer in things. It makes sense, but at the same time I do not get the sense that core curriculum is intended as a freshman class. That is sending some kind of message to me: do they want it to be a weed out course or a challenging course? Do we want this to be a freshman course or do we want it to be a sophomore course? If it a freshman course then it should go in one direction. If it is a sophomore course, which, I think it is the intention of the academic goals here...

The most common suggestion by Fine Arts interviewees related to section sizes. Those interviewed unanimously stated that large classes impede the educational experience for both faculty and students:

The sections have got to be smaller. I know that means money, that means more instructors, I know that that means the impossible, but I think that it is far more effective teaching what we teach, accomplishing the goals that we have if we are not dealing with 100, 125, 150, 200 people in the section. We do not have graduate students to help. And the volume of the workload in that course (THEA 2010) makes the educational experience for both faculty and students less than what it could be having the talent that we have.

Interviewees pointed out that different Fine Arts subjects are interrelated. For example, students reading *The Crucible* by Arthur Miller may have to describe aspects of the play including “What was the architecture of 17th century Massachusetts like?” It has been also pointed out that Fine Arts classes could be taught in connection with other subjects such as history:

Art can “categorize the world. It is called art history, but it folds over history classes. When you think about French revolution, you can think about what happened, but you also can think about [Jacques-Louis] David, and classicists’ reaction to that.”

Music is very influenced by history. If you get into the Middle Ages and church music and Martin Luther and the Reformation….it caused a lot of chaos and was very influential. That’s just one example. So, how does music integrate into the world, into history even into the other arts. Even if you go into the other Fine Arts, arts and theater, there’s a lot of correlation there.

Interviewees expressed a disagreement about the multi-disciplinary approach. Some interviewees suggested an integration of different disciplines in one course. Others were concerned about multi-disciplinary approach in Fine Arts:

I know that with the [Human] Odyssey they are trying to integrate things. Assimilating different disciplines in one course... I think it is really good. Instead of teaching music by itself, have integration with other disciplines. The multi-discipline approach is really good.

I think each discipline should incorporate a "multi-disciplinary and integrated" approach to their discipline, rather than becoming what I see as "a committee" approach to the delivery of the
curriculum content. For example, I like incorporating historical contexts, philosophy, psychology, sociology, anthropology, civics, economics, engineering, and works of literature, art and music in my presentation of architecture, but I would like to have a central referent ("architecture") by which to demonstrate those relationships.

Thus, the suggestions from Fine Arts’ interviewees included restructuring towards distribution requirements and a focus from subjects to general education areas, clarifying the level (sophomore or freshman) of core curriculum classes, reducing class sizes and multi-disciplinary and integrated approach in core curriculum.
### Table 4 Fine Arts Courses and General Education Outcomes

Using the following scale, can you identify to what extent the following college-level General Education Outcomes apply to the courses you oversee?

1 = is a central focus of the course  
2 = not central but covered with a fair amount of depth  
3 = covered marginally  
4 = not covered at all

<table>
<thead>
<tr>
<th>General Education Goals</th>
<th>General Education Outcomes: Students will...</th>
<th>ARCH 2600</th>
<th>ARTS 1710</th>
<th>ARTS 1720</th>
<th>ARTS 1730</th>
<th>MUSI 2730</th>
<th>THEA 1010</th>
<th>THEA 2010</th>
<th>Assignment / Class activity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Information Literacy</strong></td>
<td>Demonstrate information literacy</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2.5</td>
<td>2</td>
<td>3</td>
<td>Library research in Theatre, journal reports in Music</td>
</tr>
<tr>
<td><strong>Analytical Skills and Critical Thinking</strong></td>
<td>Read analytically and critically</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>- Classifying art/music/architecture/theatre pieces by period, style, purpose, and culture</td>
</tr>
<tr>
<td></td>
<td>Critique an argument effectively</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>- PowerPoint presentation describing a house representing a student</td>
</tr>
<tr>
<td></td>
<td>Construct an effective argument</td>
<td>2.5</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>- Museum paper in Arts</td>
</tr>
<tr>
<td></td>
<td>Apply simple mathematical methods to the solution of real-world problems.</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>- Production review and performance project in Theatre</td>
</tr>
<tr>
<td></td>
<td>Select and use techniques and methods to solve open-ended, ill-defined or multi-step problems</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>- Listening structured by a guide and journal reports in Music</td>
</tr>
<tr>
<td><strong>Effective Communication</strong></td>
<td>Write effectively</td>
<td>2.5</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2.5</td>
<td>Museum paper in Arts</td>
</tr>
<tr>
<td></td>
<td>Demonstrate effective oral communication skills</td>
<td>2.5</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td><strong>Informed and Engaged Citizenship</strong></td>
<td>Be informed and engaged citizens of the United States and the world</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>Exposure to art that has social agenda</td>
</tr>
<tr>
<td><strong>Intercultural Knowledge and Diversity Awareness</strong></td>
<td>Understand and appreciate the diversity of and within societies of the United States and the world</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>Exposure to art from different cultures</td>
</tr>
<tr>
<td><strong>Scientific Literacy</strong></td>
<td>Understand and appreciate methods and issues of science and technology</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>2.5</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td><strong>Aesthetic Appreciation and Engagement</strong></td>
<td>Understand and appreciate the arts and aesthetics as ways of knowing and engaging with the world</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>Same as Analytical Skills and Critical Thinking</td>
</tr>
</tbody>
</table>
Core Curriculum Alignment Study
Mathematics

Summary
Auburn University’s Core Curriculum Mathematics requirement is satisfied by completing one course. Seven different course options of either three or four hours may be used to satisfy the Core requirement. Entering freshmen must complete a mathematics placement test during summer orientation to determine what Core mathematics course they should enroll in. Students who do not score high enough to place into the Core mathematics course required by their major, are advised to complete preparatory coursework before they enroll in more advanced mathematics courses. Based on 2007-2008 academic year data, Calculus I (MATH 1610) is the most commonly taken Core mathematics course, with 2,065 student enrollments (30% of all enrollments across the core courses). Business Calculus (MATH 1680) also maintains high student enrollment, 1,332 students (20% of all enrollment across the six core mathematics courses) as this course is required of all student majors in the College of Business. Over half (63%) of the students are taught by Graduate Teaching Assistants, and the remaining students taught by Instructors (24%) and professorial faculty (12%). The median class size for all core mathematics sections is approximately 30 students.

Information Literacy is not addressed in core mathematics courses. Analytical Skills and Critical Thinking outcomes are emphasized, particularly asking students to read analytically and critically, apply simple mathematical methods to the solution of real-world problems. To practice and improve their skills, students in all mathematics core courses complete problems on the blackboard, solve homework problems, and take exams. In some sections, students are also assigned presentations and must complete group work, contributing to their effective communication skills. Although students are not given specific assignments where they must speak and write effectively, they still practice these skills when solving problems in class. Informed and Engaged Citizenship and Intercultural Diversity and Awareness are not covered in the mathematics courses. However, mathematics faculty members represent a very diverse body of instructors. Scientific Literacy is not emphasized in any of the mathematics core courses. Aesthetic Appreciation and Engagement is perceived as appreciating the elegance found in both traditional and modern applications of mathematics.

Mathematics courses are not formally assessed aside from semester student evaluations. However, in fall 2008, the Department of Mathematics began tracking students’ grades to determine how students may perform in subsequent mathematics courses. The goal of this assessment is to determine if the material presented in Pre-Calculus courses is retained in later mathematics courses.

Suggestions for the Core Curriculum Oversight Committee included increased exposure to mathematics, particularly in conjunction with communication skills.
Mathematics Core Courses at Auburn University

Auburn University Mathematics requirement is satisfied by completing three or four semester hours. The following courses are included in the core:

- **Finite Mathematics and Applications** ................................................................. MATH 1100
- **Pre-Calculus Algebra** ..................................................................................................... MATH 1120
- **Pre-Calculus Trigonometry** ............................................................................................. MATH 1130
- **Pre-Calculus Algebra and Trigonometry** ........................................................................... MATH 1150
- **Calculus I** ......................................................................................................................... MATH 1610
- **Calculus with Business Applications I** ............................................................................... MATH 1680
- **Calculus for Engineering and Science I** ............................................................................... MATH 1710

**Graph 5.1** Mathematics Core Courses: Number of Students and Number of Sections (2007-2008 academic year)

**Graph 5.2** Instructors of Mathematics Core Courses by Number of Students and Number of Sections (2007-2008 academic year)
Using data from students who received baccalaureate degrees in summer 2006 through spring 2008, this report analyzes how Core Mathematics courses figure in students’ course-taking patterns and how students perform in those courses. We included all AP, transfer credits as well as successful completions of Core Mathematics courses at Auburn – where “successful” means that the student received a grade of “D” or higher. If a student took the same course several times, we selected a record with the highest grade earned.

**Graph 5.4 Successful Completions of Mathematics Courses by Recent Graduates**

**Observations:**
- AP and transfer credits account for 38% of credits in Mathematics.
- Students usually complete Mathematics during their freshman year: 68% of successful completions were taken by students in their freshman year.
- Grades in Mathematics vary depending upon the timing of taking the course: students taking this course earlier typically have a higher grade.

**Overview of Courses**
The content of specific mathematics core courses is dependent on the specific course concentration; however, all mathematics core courses share a common learning goal of teaching students effective
problem-solving skills. Incoming freshmen must complete a mathematics placement exam to determine basic mathematics levels and are placed in a corresponding course according to their score. Many majors specify which Core mathematics course students are required to take. However, students often must take preparatory mathematics courses, largely because they did not attain the skills needed to complete the required mathematics course while completing their college preparatory work.

- **Finite Mathematics and Applications (MATH 1100)** provides an overview of finite mathematics and its applications. Students learn concepts such as graph theory, matrices, finite and conditional probability, descriptive and inferential statistics, voting methods and game theory.
- **Pre-Calculus Algebra (MATH 1120)** examines algebraic functions including polynomial, rational, exponential and logarithmic functions. Systems of equations and inequalities, quadratic inequalities and the binomial theorem.
- **Pre-Calculus Trigonometry (MATH 1130)** is a preparatory course for the Calculus sequence and emphasizes basic analytic and geometric properties of the trigonometric functions, Complex numbers, de Moivre’s theorem and polar coordinates.
- **Pre-Calculus Algebra and Trigonometry (MATH 1150)** is required by most Science and Engineering majors (depending on entering math placement score). The course teaches algebraic functions, Exponential Logarithmic functions, and analytic and geometric properties of trigonometric functions.
- **Calculus I (MATH 1610)** studies limits, the derivative of algebraic, trigonometric, exponential, logarithmic functions, applications of the derivative, antiderivatives, the definite integral and applications to area problems and the fundamental theorem of calculus.
- **Calculus II (MATH 1620)** studies techniques of integration, applications of the integral, parametric equations, polar coordinates. Vectors, lines and planes in space. Infinite sequences and series.
- **Calculus with Business Application (MATH 1680)** is required for students in the College of Business. Specific theories studied include differentiation and integration of exponential and logarithmic functions and applications to business\(^{23}\).

Mathematics Courses and General Education Outcomes
Mathematics core courses are responsible for providing students with a specific level of mathematics required by their discipline. All courses share an overarching goal of helping students acquire and develop problem-solving skills, as indicated by the department chair:

**Interview (Mathematics):** Typically, a major portion of the department has the philosophy that assignments be designed in such a way as to inculcate problem solving abilities more than the specific algebraic manipulations that are necessary, although that is very important and is part of the core.

Auburn University freshmen must demonstrate their mathematic literacy skills by completing the mathematics placement exam during Camp War Eagle. A student’s placement score enables the Department to determine which core course they will start in. Often, students do not score high enough

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\(^{23}\) Course descriptions obtained from the 2008-2009 Auburn Bulletin, pp. 220-221.
to enroll in the required core math for their major and have to complete one or more lower level
mathematical courses.

Interview (Mathematics): 48% of the students do not place in the first math core of their
curriculum. So 48% of the students place below, this was about three or four years ago.
So what does that mean? That means if you are an Engineering or Business student, you
have to take something to prepare for the required core course in those majors. If you’re
a Liberal Arts student, you aren’t even ready for MATH 1100. When I say 48%, that figure
is spread out across all of the different disciplines. I don’t think 48% of the Engineers
aren’t ready for Calculus, I think that that figure is probably lower. From some statistics
I’ve done this semester, it appears to me that Business students tend to not be as well
prepared.

It was also indicated that a significant number of students do come in with credit for Calculus I (and a
smaller number that come in with credit for Calculus II), and therefore test out of the Core Curriculum
mathematics requirement entirely.

Finite Mathematics can serve as the core course for Liberal Arts students and presents elementary
mathematics functions to analyze applied problems and questions. Engineering and Science students are
expected to come to Auburn prepared to take Calculus I, as this is the first core mathematics course they
must complete to satisfy their core requirement. However, students often do not test high enough to
enroll in Calculus I and must take Pre-Calculus (either MATH 1130 or MATH 1150). Pre-Calculus Algebra is
designed for students who need more of a structured mathematic review, and also serves as a core
mathematics course for select degree programs. According to the department chair, students who don’t
score high enough to enroll in Calculus I often take Finite Mathematics, Pre-Calculus Algebra or College
Algebra (MATH 1000, which is not a core course).

In addition to traditional mathematics courses, the Department of Mathematics also offers a computer
based instructional program for the Pre-Calculus courses. These online courses are designed with the
same goal of teaching problem-solving; however, students do not meet in regular course sections and
instead complete quizzes, submit homework assignments and take exams online. While these courses are
primarily self-directed, students do have the opportunity to meet with Graduate Teaching Assistants in the
lab sections to receive help.

In addition, the Department also offers the MATHEXCEL program, designed for at-risk students or students
interested in a greater understanding of the problem-solving aspects of the course. In addition to the
regular lectures, students are required to attend special workshops in which they actively participate in
learning solutions to problems under the guidance of qualified graduate students. These students appear
to typically do a full grade better than non-EXCEL students.

Interview (Mathematics): We actually have what’s called the MATHEXCEL program where
we try to address that problem and build up their problem-solving ability. But, it’s
expensive. In order to run the labs, I have to have the GTAs and undergraduate teaching
assistants there to run the labs. Students get two hours credit for it, and we have set up
versions of this EXCEL program for Pre-Calculus with Trig, for Calculus I and Calculus II, and

\[\text{http://www.auburn.edu/academic/science_math/cosam/students/academic-success/academic-skills-tutoring-mathexcel.htm}\]

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in the past year or so, we’ve added EXCEL sections for the Business Calculus course. Typically, we are only able to serve about 75 students because this is three labs of 25 students each, and that’s as much as we can fund. I see that it’s important and that it works. Those courses are really addressing that problem.

Information Literacy is not covered in any of the mathematics core courses. According to the department chair, “That’s not typically something that we do, although occasionally it’ll come up in our History of Math class.”

Students are expected to demonstrate Analytical Skills and Critical Thinking skills in almost all of the core mathematics courses, particularly students are expected to read analytically and critically. The ability to approach mathematics textbooks and analyze the quantitative concepts is necessary to comprehend lectures and complete homework assignments.

Interview (Mathematics): Read analytically and critically, to a certain extent yes, but the purpose of the course with Mathematics textbooks, theoretically what’s in the book is correct. They are not expected to read the book critically, but they are expected to read it analytically because they are supposed to understand what is written.

Students will critique an argument effectively is addressed in the Finite Math, Calculus I and Calculus II courses. In these courses, students are often assigned homework questions where they must evaluate an argument quantitatively and either complete problems or openly argue a problem in class. According to the department chair, students’ discussing mathematical arguments orally is a common approach found in many of the courses.

Interview (Mathematics): That’s one of the things that is part of my teaching style is to get this give and take where they ask questions. “Why did Mr. so-and-so do this in this part of the problem? Why did they get the answer by using this technique that is different from the way that I learned it?” which is certainly different ways of approaching problems.

Students are asked to construct arguments effectively in both Calculus I and Calculus II courses. In these courses, students are often assigned word problems where they must use methods of differentiation to compute and argue a function.

Applying simple mathematical methods to the solution of real-world problems is a central focus of all mathematics core courses. Each core course emphasizes a unique set of mathematic formulas and theories students are expected to demonstrate and apply in both homework assignments and exams. Skills such as understanding mathematical computation and estimating solutions are essential to enhancing students’ problem-solving skills. Sample exam questions from Pre-Calculus Algebra and Trigonometry that ask students to use mathematical formulas are provided25:

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From MATH 1150:

\[ f(x) = \frac{x + 4}{x - 3} \]

1. Show that the function \( f(x) = \frac{x + 4}{x - 3} \) is one-to-one and find a formula for its inverse.

2. Solve using the elimination method the following system of equations.
   \[
   \begin{align*}
   7(x - y) &= 14 \\
   2x &= y + 5
   \end{align*}
   \]

3. The terminal side of angle \( \theta \) in standard position lies on the given line in the given quadrant. Find \( \sin \theta \) and \( \cos \theta \).
   \[
   4x + y = 0; \text{ quadrant II}
   \]

Exams are also used as additional means of teaching students mathematical formulas and methods:

Interview (Mathematics): Exams are really checking to see if they have assimilated the techniques and the mathematics that they need. I have actually used the exams as a teaching tool in different ways. For example, if I want to make sure the students know something, I’ll tell them that there will be a problem like this on the exam, every student will make sure they can do the problem. Then, it’ll be on the exam and they’ll get that problem right and it’ll help their grade.

Similarly, the outcome students will select and use techniques to solve open-ended, ill-defined or multistep problems is identified as a central focus among all mathematics core courses. Basic mathematic problem solving is a central focus in lower-level courses such as Finite Math and the Pre-Calculus courses where students are often expected to apply these techniques to homework problems and exam questions. For example, students are regularly assigned word problems where they must solve a trigonometric or logarithmic function and also graph it. According to a Graduate Teaching Assistant, students often find graphing questions both difficult and time consuming. To find ways of overcoming this obstacle, instructors will often vary how they present information to students. The department chair outlined one approach often used to help students apply basic mathematical reasoning:

Interview (Mathematics): Typically, when I discuss something in my class, I will in many cases pretend I have forgotten how to do the problem. So then I recite “okay, so I forgot how to do this, so let’s approach it logically and reconstruct the solution” and reconstruct it with them. And a lot of students appreciate that, and then they’ll learn techniques for constructing solutions to problems. Although, there are still a lot of students who are used to doing things by memorizing and I try to wean them from that.

Teaching students to surmise mathematical inferences and discuss solutions using advanced mathematical techniques is often a focus of the more advanced Core mathematics courses. According to the department chair:
Interview (Mathematics): Students will select and use techniques and methods to solve open-ended, ill-defined or multi-step problems. I don’t think there’s too much of that in these lower courses. That’s a very sophisticated analytical technique, but these are things addressed in more advanced courses, where you have to use modeling to describe some process. And that also comes up a lot in out statistics courses.

Effective Communication is only covered marginally among mathematics core courses. However, although students are not evaluated on their written and oral communication skills, they are often asked to discuss and write down their method for solving homework problems. This approach is commonly used as a means of teaching and was cited as a constructive approach to student learning. Additionally, students in some courses are assigned group presentations and, according to the department chair, this method helps students better comprehend a particular problem:

Interview (Mathematics): Presentations, I do that in all my classes. I assign homework, and then the students are expected to present it on the blackboard. Several reasons, it’s rewarding for the students, especially when they do a hard problem. But something else is that if there is a problem I’ve assigned and none of the students have gotten it all the way or have barely started, if they’re willing to go to the blackboard and show me as far as they’ve gotten, I can show them what they’ve missed and I can get them over that hump. So, I use that as part of my teaching technique because it’s my way of seeing where the class is. If I just have them do homework and ask them “do you have any trouble with these problems?” some of them will not answer because they hadn’t gotten around to doing it and don’t even know if they have problems. So, by making them go to the blackboard, it helps them.

In addition to presentations, instructors are also encouraged to assign group work in many of the courses.

Informed and Engaged Citizenship is a not covered among any of the core mathematics courses. However, issues involving citizenship and its relationship to mathematic literacy are explored on a broader level. The department chair discussed the social importance of possessing mathematics skills, particularly when responding to common social situations.

Interview (Mathematics): We don’t have a course most students would take where we do something like explain to them the mathematics behind this financial debacle that’s happening in the world. I think a good citizen ought to have the ability to pick up a newspaper and understand the charts, understand polling data, and understand what the problem is with selling risk and what it means to sell risk. That’s really a very interesting financial problem and I’m sure it’s covered in some of the Economics courses. But I think that some of the concepts are simple enough that a student coming out of high school should have an orientation to that. A student should be able to understand why it is when they make their first mortgage payment, the principal doesn’t go down very much; but when they make their last payment, there’s hardly any interest. That’s something that students need to understand.
According to the department chair, students in some sections of Finite Math (1100), the Business Calculus sequence (1680-1690) and Calculus I 1610 are exposed to these topics if the instructor uses financial examples; however, not all sections do.

**Intercultural Knowledge and Diversity Awareness** is not covered in any of the core mathematics courses; however, the department chair indicated that the Department of Mathematics maintains the most diverse group of faculty on campus. Both the tenured faculty and graduate teaching assistants are globally representative, and several minority and female instructors are employed.

**Scientific Literacy** is identified as covered marginally among mathematics core courses. **Aesthetic Appreciation and Engagement** is covered with a fair amount of depth in the Finite Math, Calculus I and Calculus II courses. Because Finite Math is, in some cases, the last mathematics course many students take, the aesthetics of mathematics is presented. In the Calculus courses, aesthetics may involve looking at how students perceive advanced integrated mathematical theories or even simple, commonly found applications of mathematical formulas.

**Interview (Mathematics):** It’s presented through an elegant solution or an elegant problem. 1710 [Calculus for Engineering and Science] is a good place because it’s where the Physics and the Calculus interact, and you can talk about an elliptical orbit, and you can use the calculus to prove that an elliptical orbit is the path of a planet in an inverse square force relationship. And you can also do that with some Calculus. You can do a standard mirror problem; this is a standard problem in calculus. If you have a parabolic mirror and you assume the sun is at infinity with parallel rays of light, a parabolic mirror will focus those rays into its focal point. And you can prove, using some calculus, that it does that. To me, there’s some certain aesthetics and beauty in that.

**Interview (Mathematics):** 1100 [Finite Math] too; one of the things that’s sometimes done in that course are things like, you’ve gone to the grocery store and you’ve seen these barcode readers. Well, there’s some mathematics involved in that, and there’s some elegance in, if you think about it, think about all the stuff you’ve seen at a grocery store and then think about this bunch of black and white stripes that tells the computer everything they need to know about that particular item. And so, understanding how the computer does that, how those black and white stripes convert to that information have a certain elegance. You can take a whole lot of information and shrink it into a little packet; there is an aesthetic quality to that ability.

**Assessment**

Mathematics core courses do not employ a formal means of assessment aside from the mandated student evaluations. Students’ exam grades are often used as evidence that students are attaining the individual course outcomes, in addition to individually evaluating students during class. According to the department chair, the ability to accomplish this kind of evaluation is largely attributed to the manageable class sizes:
Interview (Mathematics): When I have my students do presentations on the blackboard, I’m really assessing the individual student and I can see how they are progressing. And as long as we keep the classes at a reasonable size we can do that. One thing I’m proud of is that for the 1610 Calculus I—we have well over 1,000 students taking that in the fall, and they are all taught in small classes of on the order of 30 students. And you can do that, you have students present stuff on the blackboard, you can have students ask questions.

Potential assessment plans identified by the department chair include tracking student performance in order to determine how students will perform in subsequent mathematics courses. This assessment began in fall 2008 using an online version of the Pre-Calculus Algebra course. Student grades will be tracked in the remaining mathematics courses they complete to determine whether or not the prerequisite material was learned. This type of assessment approach was used by the department several years ago to determine the score distribution for the placement exam.

Suggestions
Greater exposure to mathematics was suggested by the department chair regarding the core curriculum, including a focused integration of mathematics and communication. “More math, but ideally, this math should be interlaced with communication skills. Because you want to be able to communicate the mathematics, but you want to be able to understand someone else’s mathematics.”

The department chair also addressed the issue of numeric literacy and social problems associated with it:

Interview (Mathematics): A general suggestion is that in a technologically, scientific culture, our students are incredibly naive and ignorant. It’s not an insulting thing to tell someone you don’t know some things because they haven’t been taught it; it doesn’t mean they can’t know it. I think that that needs to be done. If a person is illiterate, they tend to be embarrassed about it, but there are a lot of problems that address illiteracy. But there’s a numeracy problem, there’s numerical illiteracy. People laugh at their inability to balance their checkbook, but that really isn’t as funny. You should really address that the same way you address language illiteracy problems. I think that our country as a whole is not addressing that problem as seriously as it needs to.
Table 5: Mathematics Courses and General Education Outcomes

Using the following scale, can you identify to what extent the following college-level General Education Outcomes apply to the courses you oversee?

1 = is a central focus of the course  
2 = not central but covered with a fair amount of depth  
3 = covered marginally  
4 = not covered at all

<table>
<thead>
<tr>
<th>General Education Goals</th>
<th>General Education Outcomes:</th>
<th>MATH 1100</th>
<th>MATH 1120</th>
<th>MATH 1130</th>
<th>MATH 1150</th>
<th>MATH 1610</th>
<th>MATH 1680</th>
<th>MATH 1710</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information Literacy</td>
<td>Students will demonstrate information literacy</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
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<tr>
<td></td>
<td>Students will read analytically and critically</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Students will critique an argument effectively</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Students will construct an effective argument</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Students will apply simple mathematical methods to the solution of real-world problems</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Students will select and use techniques and methods to solve open-ended, ill-defined or multi-step problems</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Analytical Skills and Critical Thinking</td>
<td>Students will write effectively</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Students will demonstrate effective oral communication skills</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Effective Communication</td>
<td>Students will be informed and engaged citizens of the United States and the world</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Informed and Engaged Citizenship</td>
<td>Students will understand and appreciate the diversity of and within societies of the United States and the world</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Intercultural Knowledge and Diversity Awareness</td>
<td>Students will understand and appreciate the arts and aesthetics as ways of knowing and engaging with the world</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>2</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Scientific Literacy</td>
<td>Students will understand and appreciate the diversity of and within societies of the United States and the world</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Aesthetic Appreciation and Engagement</td>
<td>Students will understand and appreciate the arts and aesthetics as ways of knowing and engaging with the world</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>2</td>
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</tr>
</tbody>
</table>
Summary

Auburn University's Core Curriculum science requirement is satisfied by completing eight semester hours in a sequence; Concepts of Science (SCMH 1010) may be paired with most other Core science courses to form a sequence. During the 2008-2009 academic year, Core Biology classes produced the largest share student credit hours (35%), followed by Chemistry (28%) and Physics (22%). Geology classes produced 9% of student credit hours and Concepts of Science about 7%.\textsuperscript{26} In Biology, Chemistry and Physics, special sequences are designed for students who intend to major in science-intensive fields. Scientific literacy is the primary goal of Core science courses. According to interviewees, students who reach this general education goal have learned major issues of science; understood the theory, concepts and methods of one area of science; and shown themselves able to conduct an experiment. Core courses for non-science majors generally place more emphasis on broader issues of science, while courses for science majors focus on developing foundations for subsequent science courses. Core science courses also introduce a basic understanding of key steps of scientific research: problem statement, hypothesis, observation, data collection, and hypothesis testing.

By exposing students to the issues of global warming and environmental protection, Core science courses emphasize citizenship in not just a nation, but in a global context. While being a central focus of courses for non-science majors, informed and engaged citizenship is addressed to a lesser extent in Core science courses for majors. Depending upon how the term is understood, coverage of information literacy in Core science courses varies from \textit{not covered at all} to being \textit{a central focus of a course}. Some interviewees used the definitions outlined in \textit{Auburn University Approved CCOC Goals and Outcomes} (May 2008). However, more commonly interviewees understood information literacy to mean “knowing the concepts and terminology of science.”

According to interviewees, in Core science classes students develop analytical skills and critical thinking by looking at ways scientists arrive at their conclusions; by approaching solutions in different ways; by learning about famous scientific experiments; and by leaning systems of scientific classification and the evidence and reasoning upon which they rest. Core science courses generally do not teach students how to read analytically and critically, but rather expect them to be able to do that before they begin college. Interviewees had different opinions on the ways critiquing and constructing arguments is approached in Core science courses but, in most cases, stated that it is either covered marginally or not covered at all. Mathematics is applied in all science classes. Mathematics applications frequently involve graphs and

\textsuperscript{26} Analysis of Core science sections and section sizes is complicated by the way these courses are presented in BANNER. In Physics and Concepts of Science, lab sections are presented as base courses. In all other Core science courses, lectures are presented as base courses and labs as supplements. In Chemistry, lab sections are recorded as separately graded components of the course, while for all other Core science courses, they are not. Uniform presentation of such information for Core science courses in BANNER would be a significant improvement.

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simple statistical analysis. However, in several courses students have to use math to express a problem, manipulate, and solve it. Many examples of multi-step problems were provided during the interviews. However, it was frequently pointed out that in Core science classes students seldom encounter open-ended or ill-defined problems and do not select methods of approach to the problems they do encounter. Instead, methods are usually prescribed, and problems are not open-ended or ill-defined. With few exceptions (lab reports in Chemistry and Geology and debates in Concepts of Science recitation sections), effective communication is not covered in Core science courses. Intercultural knowledge and diversity awareness is covered marginally or not at all in Core science courses, though a student might learn something about cultural diversity by completing one exercise that was cited: contrasting the effects of developing and developed countries on the environment. Aesthetic appreciation and engagement is not covered in Core science courses.

Overall, the agreed upon general education outcomes of Core science courses are: scientific literacy, global citizenship, mathematics applications, and solving multi-step problems. Global citizenship is covered with more depth in Core science classes for non-majors. And it has been suggested that placing more emphasis on global citizenship in classes for majors could be a positive change.

Current assessment practices are frequently informal and based on the feedback from teaching assistants and students. The most common artifacts of Core science classes are laboratory reports that have to be completed in most lab sections. The exceptions are courses where labs are focused on discussions or problem solving rather than on conducting experiments. The major part of the grade in all science courses comes from tests, exams, and quizzes. An interesting example of assessment was provided during one of the interviews. Students take the test before and after the lecture. Test questions are different in the pre- and post-test (randomly selected from the list of questions on the topic). This assessment practice not only allows estimating the effect of a lecture on student learning, but also gives the instructor an idea about the questions students have most trouble with prior to the lecture.

Many interviewees commented on large class sizes and consequent lack of individualization. To counteract the lack of individualization, instructors sometimes have students work in small groups and discuss things with each other and then come to the whole class. Another common way to keep students “awake and engaged” in large classes is by using clickers.

In some Core science courses (e.g., Concepts of Science) traditional lab sections were replaces with so-called recitations. It was suggested that instead of replacing the hands-on experience in traditional labs, one should keep it and add a recitation to it. Other suggestions from science core faculty members included: developing core electives; introducing scientific ethics; emphasizing interdisciplinary approaches (both within science and of science with other areas); and introducing a foreign language requirement.
Science Courses at Auburn University

Auburn University’s Core Curriculum Science requirement is satisfied by completing eight semester hours in a sequence. The following courses are included in the Core (lab sections excluded):

- Introductory to Biology .............. BIOL 1000
- A Survey of Life .................. BIOL 1010
- Principles of Biology .............. BIOL 1020
- Organismal Biology .............. BIOL 1030
- Principles of Biology Honors ...... BIOL 1027
- Organismal Biology Honors ...... BIOL 1037
- Survey of Chemistry I .......... CHEM 1010
- Survey of Chemistry II ......... CHEM 1020
- Fundamentals of Chemistry I ..... CHEM 1030
- Fundamentals of Chemistry II ... CHEM 1040
- General Chemistry I .......... CHEM 1110
- General Chemistry II ......... CHEM 1120
- Honors General Chemistry I ...... CHEM 1117
- Honors General Chemistry II ..... CHEM 1127
- Physical Geology .......... GEOL 1100
- Historical Geology .......... GEOL 1110
- Foundations of Physics .......... PHYS 1000
- Astronomy ................ PHYS 1150
- General Physics I ........ PHYS 1500
- General Physics II .......... PHYS 1510
- Engineering Physics I .......... PHYS 1600
- Engineering Physics II .......... PHYS 1610
- Honors Physics I ........ PHYS 1607
- Honors Physics II .......... PHYS 1617
- Concepts of Science .......... SCMH 1010
- Honors Concepts of Science ..... SCMH 1017

**Graph 6.1.1** Standard Core Science Courses: Number of Students and Number of Sections (2007-2008 academic year)

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In 2007-2008, among standard Core science courses Biology classes produced the most student credit hours (35%; 20,220 SCH), followed by Chemistry (28%; 16,112 SCH) and Physics (22%; 12,796 SCH). Geology classes produced 9% (5,376 SCH), and Concepts of Science produced about 7% (3,904 SCH).

**Graph 6.1.2 Honors Core Science Courses: Number of Students and Number of Sections (2007-2008 academic year)**

**Graph 6.2 Instructors of Core science courses by Number of Students and Number of Lecture Sections (2007-2008 academic year)**
Instructors produce the most student credit hours (34%, 20,148 SCH) and teach about 27% of lecture sections (28). In 2007-08, Instructors taught 11 courses in Biology, 11 courses in Chemistry and 6 courses in Geology. Lecture class sections in Physics and Concepts of Science were taught by tenure/tenure track faculty members.27

**Graph 6.3.1 Standard Core Science Courses: Lecture Section Sizes (2007-2008 academic year)**

**Graph 6.3.2 Standard Core Science Courses: Lab Section Sizes (2007-2008 academic year)**

27 The information on Physics and Concepts of Science labs is not available in BANNER, and it is likely that the information on these courses is based on labs as opposed to lectures. Therefore, the graphs on instructors and section sizes should be interpreted with caution.

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Graph 6.3.3 Honors Core Science Courses: Section Sizes (2007-2008 academic year)

Lecture

<table>
<thead>
<tr>
<th>Course</th>
<th>Section Size</th>
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<tbody>
<tr>
<td>BIOL 1027</td>
<td>63</td>
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<tr>
<td>BIOL 1037</td>
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<tr>
<td>CHEM 1117</td>
<td>64</td>
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<td>CHEM 1127</td>
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<td>PHYS 1607</td>
<td>24</td>
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<tr>
<td>PHYS 1617</td>
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Lab

<table>
<thead>
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<th>Course</th>
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<tr>
<td>BIOL 1001</td>
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</tr>
<tr>
<td>BIOL 1011</td>
<td>17.5</td>
</tr>
<tr>
<td>BIOL 1021</td>
<td>30.5</td>
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<td>BIOL 1031</td>
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<tr>
<td>CHEM 1011</td>
<td>23</td>
</tr>
<tr>
<td>CHEM 1021</td>
<td>12</td>
</tr>
</tbody>
</table>
Using data from students who received baccalaureate degrees in summer 2006 through spring 2008, this report analyzes how Core science courses figure in students' course-taking patterns, how those patterns vary by college of enrollment, and how students perform in those courses. We included all AP, transfer credits as well as successful completions of Core Science courses at Auburn — where “successful” means that the student received a grade of “D” or higher. If a student took the same course several times, we selected a record with the highest grade earned. The following graphs are based on student-course records, so that students are counted once for each Core Science course they successfully took. Students take Core Science courses for a variety of reasons other than fulfilling the requirements of the Core Curriculum.

**Graph 6.4 Successful completions of Science Core Courses by Recent Graduates**

![Biology](image1)

![Chemistry](image2)

![Geology](image3)

![Physics](image4)

![Concepts of Science](image5)
Observations:

- AP and transfer credits account for a share of Core Science credits earned, and in some cases that share is substantial: about 30% in Biology, 28% in Chemistry, and 16% in Physics, but only 2% in Geology.
- Successful completions of Core Science courses are not distributed evenly among the available options: Biology accounts for about 39% of core Science credits (8,408 course-student records), Chemistry for 23% (5,033 course-student records), Physics for 22% (4,804 course-student records), Geology for 10% (2,101 course-student records), and Concepts of Science for 5% (1,147 course-student records).
- Overall, students complete Core Science courses early in their academic careers: 39% of successful Core Science completions were taken by students in their freshman year, 33% in their sophomore year, 16% in their junior year, and 12% in their senior year. However, the shares of students taking Core Science courses in the earlier years of study vary by subject. For example, successful completions during the freshman year were relatively high in Biology (47% of all completions, 2,788 student-course records) and Chemistry (48%, 1,750 student-course records), while lower shares of freshman-year completion occurred in Geology (40%, 817 student-course records), Concepts of Science (33%, 378 student-course records) and were lowest of all in Physics (21%, 848 student-course records).

As the following chart makes plain, the distribution of Core course completions among the five eligible natural sciences varies markedly by students’ college of enrollment. Of course, students take many Core Science courses to meet college- and major-level requirements.

**Graph 6.5 Distribution of Core Course Completions by Students’ College of Enrollment**

![Graph of Core Course Completions by College]

Office of Undergraduate Studies
Office of Institutional Research and Assessment (OIRA)
Overview of Courses

- **Introduction to Biology (BIOL 1000).** Introduction to biological principles relevant to human society. Designed for non-science majors. Credit will not be given for both BIOL 1000 and BIOL 1020 or BIOL 1027. **Introduction to Biology Laboratory (BIOL 1001).** Laboratory course for BIOL 1000.

- **A Survey of Life (BIOL 1010).** Emphasis on contrasting strategies employed by organisms to meet similar biological needs. Credit will not be given for both BIOL 1010 and BIOL 1030 or BIOL 1037. **A Survey of Life Laboratory (BIOL 1011).** Laboratory course for BIOL 1010.

- **Principles of Biology (BIOL 1020).** Introduction to the physical, chemical, and biological principles common to all organisms. Credit will not be given for both BIOL 1020 and BIOL 1000 or BIOL 1027. **Principles of Biology Laboratory (BIOL 1021).** Laboratory Course for BIOL 1020.

- **Honors Biology (BIOL 1027).** Introduction to the physical, chemical, and biological principles common to all organisms. Credit will not be given for both BIOL 1027 and BIOL 1000 or BIOL 1020.

- **Organismal Biology (BIOL 1030).** Principles and fundamentals of biology at the organismal level. Credit will not be given for both BIOL 1030 and BIOL 1010 or BIOL 1037. **Organismal Biology Laboratory (BIOL 1031).** Laboratory Course by BIOL 1030.

- **Honors Organismal Biology (BIOL 1037).** Principles and fundamentals of biology at the organismal level. Credit will not be given for both BIOL 1037 and BIOL 1010 or BIOL 1030.

- **Survey of Chemistry I (CHEM 1010).** Survey of important topics from general and organic chemistry. Atomic and bonding theory, chemical reactions and stoichiometry, gas laws, solutions, acids and bases, hydrocarbons, alcohols, ethers and amines. **Survey of Chemistry I Lab (CHEM 1011).** Laboratory experiments emphasizing course material in CHEM 1010.

- **Survey of Chemistry II (CHEM 1020).** Survey of important topics from organic and biochemistry. Aldehydes and ketones, carboxylic acids, carbohydrates, lipids, proteins, enzymes, extracellular fluids, metabolism, nucleic acids, radioactivity. **Survey of Chemistry II Lab (CHEM 1021).** LAB. 3. Laboratory experiments emphasizing course material in CHEM 1020.

- **Fundamentals Chemistry I (CHEM 1030).** Atomic and molecular theory, chemical equations, stoichiometry, gas laws, thermochemistry, bonding, electronic structure, molecular geometries, solids, liquids, properties of solutions, problem-solving techniques. Credit will not be given for both CHEM 1030 and CHEM 1110 or CHEM 1117. **Fundamentals of Chemistry I Lab (CHEM 1031).** Laboratory experiments emphasizing course material in CHEM 1030. Credit will not be given for both CHEM 1031 and CHEM 1111 or CHEM 1118.

- **Fundamental Chemistry II (CHEM 1040).** Chemical kinetics; chemical equilibrium; acids and bases; calculations of pH; equilibrium constants and thermodynamical properties; electrochemistry; descriptive chemistry. Credit will not be given for both CHEM 1040 and CHEM 1120 or CHEM 1127. **Fundamentals of Chemistry II Lab (CHEM 1041).** Laboratory experiments emphasizing course material in CHEM 1040. Credit will not be given for both CHEM 1041 and CHEM 1121 or CHEM 1128.

- **General Chemistry I (CHEM 1110).** Chemical principles for chemistry and related majors. Atomic and molecular theory, periodicity, chemical reactions, stoichiometry, gases, thermochemistry, bonding, molecular geometries, liquids, solids, and solutions. Credit will not be given for both CHEM 1110 and CHEM 1030 or CHEM 1117. **General Chemistry I Lab (CHEM 1111).** Laboratory experiments emphasizing course material in CHEM 1110. Credit will not be given for both CHEM 1111 and CHEM 1031 or CHEM 1118.
• **Honors General Chemistry I (CHEM 1117).** General chemistry for students in the honors program. Topics similar to CHEM 1110, but covered in more depth. Credit will not be given for both CHEM 1117 and CHEM 1030 or CHEM 1110. **Honors General Chemistry I Lab (CHEM 1118).** Laboratory experiments emphasizing course material in CHEM 1117. Credit will not be given for both CHEM 1118 and CHEM 1031 or CHEM 1111.

• **General Chemistry II (CHEM 1120).** Continuation of CHEM 1110. Chemical kinetics, chemical equilibrium, acids and bases, thermodynamics, electrochemistry, representative element and transition metal chemistry. Credit will not be given for both CHEM 1120 and CHEM 1040 or CHEM 1127. **General Chemistry II Lab (CHEM 1121).** Laboratory experiments emphasizing course material in CHEM 1120. Credit will not be given for both CHEM 1121 and CHEM 1041 or CHEM 1128.

• **Honors General Chemistry II (CHEM 1127).** General chemistry for students in the honors program. Topics similar to CHEM 1120, but covered in more depth. Credit will not be given for both CHEM 1127 and CHEM 1040 or CHEM 1120. **Honors General Chemistry II Lab (CHEM 1128).** Laboratory experiments emphasizing course material in CHEM 1127. Credit will not be given for both CHEM 1128 and CHEM 1041 or CHEM 1121.

• **Physical Geology (GEOL 1100).** General physical geology. Survey of the important minerals and rocks. Origin and classification of geologic structures, earthquakes, and landforms. Study of geologic maps. Credit will not be given for both GEOL 1100 and GEOL 3150. **Physical Geology Laboratory (GEOL 1101).** Examination of rocks and minerals and use of geologic and topographic maps; Problems in structural geology, earthquakes, and landforms.

• **Historical Geology (GEOL 1110).** Physical and biological history of the Earth, with emphasis on the evolution of life forms. **Historical Geology Laboratory (GEOL 1111).** Examination of rock, fossil, and related data sets bearing on the geological development of the earth with emphasis on North America.

• **Foundations of Physics (PHYS 1000).** Newton’s Laws, momentum and energy, solids, liquids, gases, plasma, thermodynamics, electricity, magnetism, light, atomic and nuclear physics. Students who have previous credit in any higher-numbered math course may not receive credit.

• **Astronomy (PHYS 1150).** Open to non-science majors. Earth, the solar system, stars, neutron stars, black holes, supernova, galaxies, the expanding universe, and modern cosmological theories.

• **General Physics I (PHYS 1500).** Introduction to Newton’s Laws, gravitation and cosmology, concept of conservation laws, solids and fluids, thermodynamics.

• **General Physics II (PHYS 1510).** Science Core. Electricity and magnetism, AC circuits, waves nuclear physics, radioactivity and particle physics.

• **Engineering Physics I (PHYS 1600).** Introduction to Newton’s Laws, gravitation, cosmology, conservation of energy, momentum and angular momentum, special relativity, and fluids using introductory calculus.

• **Honors Physics I (PHYS 1607).** Honors version of PHYS 1600. Recommended for Physics majors.

• **Engineering Physics II (PHYS 1610).** Thermodynamics, electricity and magnetism, simple AC circuits, waves, and geometric optics.

• **Honors Physics II (PHYS 1617).** Honors version of PHYS 1610 recommended for Physics majors.

• **Concepts of Science (SCMH 1010).** Science Core. Interdisciplinary course which presents major scientific concepts and stresses the interactions between the sciences and the humanities. Credit will not be given for both SCMH 1010 and either BIOL 1000 or BIOL 1020.
Science Courses and General Education Outcomes

As anticipated, helping students to achieve scientific literacy is the major goal of almost all Core science courses. It was frequently defined in terms of learning major issues of science; understanding the theory, concepts and methods of one area of science; and demonstrating the ability to conduct an experiment. To an extent, courses intended for science majors emphasize different aspects of scientific literacy than those intended for non-science majors. For example, the course in Biology for majors deals with large body of scientific information and concepts but does not cover broader issues of science like genetic engineering or the controversy over genetically modified foods, while Biology for non-majors and Concepts of Science place emphasis on a broad understanding of scientific concepts and methods:

Most of our students would take only two science classes, and it is really important for us that students have a positive experience and gain a better understanding of biology and how it relates to their lives. The course provides a broad understanding of science, but also covers the information that is relevant to students’ lives and information that they can actually use. That is important to us (BIOL 1000 and BIOL 1010).

The objective of the course is pretty broad. It can be stated simply: to give students in the course an understanding of how science works, the purpose of science in our world, and understanding of some scientific concepts, for example, what is meant by genetic engineering. Our students will become voters in our society. These students can become informed voters (SCMH 1010).

Broader issues of science are also emphasized in Physical and Historical Geology (courses taken by both science and non-science majors):

Scientific literacy (that is, having an awareness of the history of the Earth) is a primary goal. Students should have a sense of the long history of the earth. That entails lots of things: the rocks themselves, biology, oceanology, and the atmospherics. The earth is conceived now as a system, a big system not just involving the rocks that geologists look at, but biosphere, hydrosphere, and atmosphere (GEOL 1110).

What do we intend for them to learn? We want them understand and appreciate methods and issues of earth science and its related technologies, for example, petroleum technology and mineral resources and technologies of extracting resources out of the earth. In terms of appreciating methods, we teach the scientific method like all the other science courses (GEOL 1100).

28 In some areas separate Core courses for majors are not developed. For example, students majoring in Geology take the same core class as non-majors. However, faculty members are concerned about this fact: “We’ve talked about developing an intro class for our majors. We haven’t done that, because we don’t have the resources to teach additional classes.”

29 A faculty member teaching BIOL 1020 and BIOL 1030 (Biology for majors) indicated that in his classes, scientific literacy “is close to being a central focus of the course, but is not quite there” since courses in Biology for majors do not place emphasis on a broad understanding of science as do courses for non-majors.

30 In Physical Geology and Historical Geology, one of the broad objectives associated with scientific literacy is student appreciation for geologic time (to appreciate the vastness of the time that is sometimes called “deep time”): “The term “geologic instantaneous” in our daily lives may mean human generations.”
Some instructors of Core courses for majors stated that by introducing applied problems they address the broad issues of science and its impact on everyday life. In one interview, two such examples taken from Chemistry were mentioned: one on the relationship of carbon dioxide in the atmosphere and lake water and another on gasoline and diesel enthalpy.

*Interview (Chemistry):* Most of Chemistry instructors demonstrate how chemistry affects life by including certain problems. For example, there is a relationship between the amount of CO₂ in the atmosphere and CO₂ in lake water, and I will ask them: given a certain amount of carbon dioxide in the atmosphere, how much should be in the lake, neglecting pH? Adding pH would make it more difficult.

*Interview (Chemistry):* We are trying to include problems that are of interest to students. We are talking about enthalpy which is the energy of chemical reaction. Gasoline has enthalpy of this reaction, and diesel has an enthalpy of this reaction. How do the two energies compare? Why is the diesel car more energy efficient than a gasoline car? You can use these types of problems on exams to assess whether they learned the concept of enthalpy but also to teach them scientific literacy, where later on they have to make a decision on whether to buy a diesel car or a gasoline car they understand at least some of the basis behind it.

Overall, Core courses for science majors tend to place more emphasis on developing foundations for subsequent science courses and teaching students the major concepts of a particular area of science:

*Interview (Biology for majors):* The purpose of this course is for students to develop a fundamental understanding of concepts of modern biology. Those concepts include cells, genetics, molecular biology and evolution. And, if achieved, this objective will provide the foundation necessary for subsequent courses in biological sciences. The way we look at our intro courses is largely that they’re providing the groundwork for their future biology classes.

*Interview (Chemistry):* Students learn to understand the theory of chemistry, understand the reactivity, and know what the acid is and what the base is. One can take chapters one-by-one, and in each chapter there would be a chemical concept that you are trying to teach: understanding the catalysis, reaction kinetics, etc.

*Interview (Chemistry):* In Chemistry there is a certain amount of material that has to be retained from semester to semester, because a lot of what we do is based on the previous semester, on the assumption of previous understanding. If a student takes an earlier course and gets by somehow they will be at a disadvantage later on because they will not be able to do well in the department courses. These Core courses are extremely important in terms of building the background they will be able to use in more advanced courses.

*Interview (Physical Geology):* Science has its own language. Even within sciences they have their own language, like physics and chemistry. We have our language, too. Students have to eventually memorize certain things so that we can communicate.

Core science courses also introduce a basic understanding of key steps of scientific research (problem statement, hypothesis, observation, data collection, hypothesis testing). Relevant questions from tests are sometimes quite general, and instructors tend to put the description of the process of scientific research into a daily life context:
Example from a test (Biology for majors): 3. In the scientific method, after you form a hypothesis, what is the next step?

A. design an experiment   B. draw a conclusion
C. publish your results   D. collect data

(Interview, Physics): I try not to emphasize words like hypothesis vs. theory, or observation vs. fact, but rather put them in a daily life context. I think that scientists pretty much think the way everybody else does. Everybody has had the experience of a non-working flashlight. Most would say the batteries do not work. That is the hypothesis. You test the hypothesis by changing the batteries. If it works, then the batteries were the problem but if it doesn’t, you go to the lamp and change your hypothesis.

In courses for majors and some courses for non-majors students have to demonstrate the ability to conduct and interpret the results of experiments: balancing chemical reactions, performing dissections, testing minerals, etc. In Core courses the results are known in advance, and the purpose of the experiments is not to understand natural phenomena better, but to learn how to gather data and interpret the results:

Interview (Biology for majors): They learn what a control is, why it is necessary, what happens if you don’t have one. They learn about collecting enough data instead of just relying on one or two bits of information, getting several data points together so that if they do go on to be involved in designing an experiment, then they have gotten an understanding of how it is done and should be able to at least get started.

During the interviews, many examples of experiments carried out in Core Curriculum science labs were mentioned (see also the section below on selecting and using techniques and methods to solve open-ended, ill-defined or multi-step problems). In one Biology class for majors, students conduct an experiment with Daphnia, or water fleas. They measure the effect of different concentrations of alcohol and caffeine on the Daphnia’s heartbeats. Each group of students enters their data, and the averages for the whole class are estimated. Students are expected to report their own data along with the class data. In a Biology lab for non-majors, students dissect pellets regurgitated by barn owls and look for the bones of animals to see what effect the owl has on its environment. Like other predatory species, barn owls are lowering the number of other species: “the more mice it eats, the more rats, the higher the effect it has on the number of those organisms in the environment.” In Historical and Physical Geology labs students have to identify different minerals:

Interview (Historical Geology): Students experiment with Calcite: they have to recognize this mineral among others. Of all the minerals they study, this is the one that fizzes [when exposed to HCl], that’s how one can recognize it.

Interview (Physical Geology): In the labs we have mineral kits. They apply different tests to those minerals. The glass plate is used to test the hardness of the mineral. You can take some minerals that are softer than the glass and they will powder, whereas other minerals, like a diamond, would scratch it. This kit is called an Intro Level Geology Lab Kit.

Overall, while courses for both majors and non-majors emphasize scientific literacy, they concentrate on different aspects of it: non-major courses are more likely to cover broad science concepts and issues, while science courses for majors build the foundation for the future science courses and provide the introduction to scientific methods and basic principles of conducting experiments. Another difference
between science courses for majors and those for non-majors is in the emphasis placed on informed and engaged citizenship. A comparison of courses in Table 1 shows that informed and engaged citizenship is a central focus of some science courses but is only marginal in others (see, for example, ratings for BIOL 1000 and 1010 as compared to ratings for BIOL 1030 and 1040). In one of the interviews, science for non-majors was referred to as a “citizenship type” science, where “the purpose is to expose students to general information about an area of science”.

In Core science courses, informed and engaged citizenship is frequently addressed in a global perspective rather than a national one.

*Interview (Physical Geology):* We want them to be informed and engaged citizens of not just the nation, but the entire earth. We try to get them to understand that our system is a global thing; that it is not just one nation. Pulling out the energy and mineral resources affects the environment.

*Interview (Biology for non-majors):* In the environmental part of the course, we just cover the topics that we think are important to shaping current environmental policy and the future of the planet. We talk about all the things they hear on the news like pollution and global warming. It allows them to make informed decisions, to have basic background information on what those topics are.

Some sections of Biology for non-majors expose students to environmental issues through a *garbage bag project:* students sort through sterilized garbage bags to determine the human effect on the environment and define what could be recycled and what could be hazardous. As a result of this activity, students have an opportunity to gain a better understanding of their personal effect on the environment and to learn and commit themselves to practicing responsible recycling practices.

In Concepts of Science, several lectures and recitations are devoted to global warming and energy. In Historical Geology, students gain an understanding of the effect of carbon dioxide (CO₂) on the atmosphere:

*Interview (Historical Geology):* In the history of the earth, there were not always these kinds of rocks and there was an abundance of CO₂ in the atmosphere. Over 80% of the atmosphere was carbon dioxide. With the CO₂ being a greenhouse gas, over time that would have made the earth very hot, so hot that the oceans would have boiled away and we would have a climate like Venus. The CO₂ that was so dominant in the atmosphere went into these rocks. As we drill for oil, and as we use oil, as a byproduct we produce CO₂ in the atmosphere. Again, that is going to heat things up too much. It is a delicate balance.

In Historical Geology, the analysis of the effect of carbon dioxide on the atmosphere is followed by a discussion of economic and climate implications of extracting earth materials. By studying Geology, students can learn that the economic value of a mineral or energy deposit depends on the cost of pulling it out of the ground as well as its environmental impacts:

*Interview (Historical Geology):* The disadvantages are really becoming clear now with climate change and global warming. It is economically important for the U.S. to produce its own petroleum, but at the same time the more that we produce the more potential it has for increasing global warming. Both the resources and climate evolution are part of geology. If they understand the implications of the history, then they will know we should not be messing around with our planet.
Interview (Physical Geology): We teach them that for something to be considered an ore mineral, they have to be able to extract it from the Earth and still make a profit. It has to have economic value like gold, which to extract it is a very expensive, energy consuming, and environmentally harmful process. It actually uses arsenic and other poisonous types of materials on a large (acres-sized) scale. If you cannot make a profit, then there is no point in taking it out of the earth. It is supply and demand. When you think of gold, three years ago it was $400 per oz. and today it is worth over $900 per oz. Old gold deposits that were not profitable then now are profitable. Gold companies are hiring geologists to go out and find new mines and exploit old abandoned ones... Then you have energy: if you have to heat rocks, like oil shale and sands, to get the petroleum out, then you have to purchase gas or coal and burn it, which produces carbon dioxide that affects global climate, and the cycle continues...

Other examples mentioned in the interview on Historical Geology include landfills (“Where do we put them?”) and water resources (“Where do we pump out water? What are the implications of pumping too much water out of the ground as far as contaminating the aquifers?). In Physics students are getting information about energy’s role in the economy and in global climate change.

One of the interviewees teaching a class for science majors suggested that introducing “citizenship type” topics in the science classes for majors could be a positive change:

This is one of the areas that I think we have to try to do more, but we would have to cut out things in order to do that. We would have to talk about ecology and repercussions, things like global warming and extinction rights, etc. It is the area where we could change.

Interviewees disagreed on the meaning of information literacy. Some interviewees referred to the definitions from Auburn University Approved CCOC Goals and Outcomes (May 2008), suggesting that information literate students will be able to:

1. Determine the nature and extent of information needed
2. Access information effectively and efficiently
3. Evaluate information critically
4. Use information to accomplish a specific purpose
5. Understand the economic, legal, and social issues associated with using information

Others suggested different definitions of the term, e.g., “understanding how to cope with information,” “knowing the concepts and terminolgy of science”. Depending upon how the term is defined, the coverage of information literacy in Core science courses varies from not covered at all to being a central focus of the course: “It just depends on how I interpret this word. If I interpret “demonstrate information literacy” as using the library, then it would be a 4. If we use information about science then we would have 1 or 2.”

Assuming that information literacy means understanding the key concepts of a field and applying that information to new settings (or using it to accomplish a specific purpose), it is generally a central focus of Core science courses:

Interview (Biology for non-majors): Information literacy is obviously something that is important because we want them to understand the information that we are covering during the courses and be able to apply that information.
Interview (Chemistry): Information literacy presumes understanding how chemistry relates to their environment. This is just chemical concepts. If they do not understand what an atomic orbital is, they do not understand chemistry.

Interview (Historical Geology): I think the one I circled here is “use information to accomplish a specific purpose.” For example, we are using information to interpret where the rock was deposited to figure out how these certain rocks form.

Core science courses seldom emphasize the economic, legal, and social issues associated with using information: “Understand the economic, legal, and social issues: there are marginal areas where we get into that.”

Some interviewees did not see much difference between scientific literacy and information literacy: “We want them to understand the information, of course. But how does that differ from, for example, scientific literacy?”

In terms of keeping up with the volume of information that students have to deal with in Core science courses, information literacy is identifiable in the courses, but rather marginally:

Interview (Biology for majors): How to use information? This is something I try to work with my students from the very first day by teaching them separating exposure to information by sleep (research shows that spreading out your study time, an hour or two a day instead of cramming the night before, increases retention). I try to teach them general skills about coping with information. So in that respect it’s not covered, it’s not central, but it’s identifiable in courses.

Critical evaluation of information can be reflected in learning the scientific method: “we want them to be thinking people, therefore, we go through the how we know what we know.” Here is how one professor described information literacy as the ability to evaluate information critically:

Interview (Physical Geology): We want students to be information literate. We want them to be able to know where to go to find information related to geology and the earth and our environment. One of the things we try to get them to appreciate is that the scientific method is even applicable to reading a newspaper article: seeing the source of the material, considering the observations that are used to come up with a thesis that is presented within the article. We like for them to begin thinking scientifically and applying it more in their everyday lives. The scientific method is a great way to synthesize and develop effective arguments.

“How we know what we know” has been also stated as one of the ways to develop analytical skills and critical thinking. Many Core science courses emphasize “How we know what we know” by looking at ways “scientists arrived at those conclusions, the reasoning process, provide a scaffold to that”:

Interview (Historical Geology): We spend, along with most textbooks, time covering the 4½ billion years and we do not start on day one and talk about the origin of the earth. It is the fourth week now, and I have not talked about the origin of the earth yet. We spend a lot of time talking about how we know. We spend at least the first month talking about how we know what we know. How do you determine the history, the written history of the science?

Interview (Concepts of Science): How did scientists discover the sun was in the center of the solar system? Galileo basically made some observations from the phases of Venus, and that led him to start along the path of figuring out the solar system.
Core Science courses also help students learn “how we know what we know” by describing and explaining famous scientific experiments. For example, in Biology students consider three competing models of DNA replication:

**Meselson-Stahl experiment (models of DNA replication)**
During the 1950s there were three models of DNA replication: conservative, dispersive, and semi-conservative. In 1958, Meselson and Stahl demonstrated the validity of the semi-conservative model by using an experiment with the DNA containing nitrogen of different density: $^{15}$N and $^{14}$N. Three replication models are covered in Biology class. Following the Meselson-Stahl experiment, students are asked to make predictions based on each of three models and DNA containing different density nitrogen (i.e., (1) all DNA is $^{15}$N, (2) half of DNA is $^{15}$N and half is $^{14}$N, and (3) most DNA is $^{14}$N but some $^{15}$N remains). By following the logic of this experiment students learn the reasoning process behind the proof of a semi-conservative model.

Different ways of solving problems in Chemistry or Physics also allow students to learn “how we know what we know”:

**Interview (Chemistry):** If you know two different ways of solving the problem, you understand that there is not just a single direction approach. You can achieve your goal in different ways. People can get full credit for solving a problem in the way that is different from the way I taught them as the best way. If they show a logical development to get to the answer and the answer is right... but writing down a correct answer does not give you any points. You need to show logical development.

**Interview (Physics):** Students learn to solve problems, be open to problems. They gain the ability to acquire information: verbal statements, reading, or watching something move. They need to decide what is critical and what is not, and they can express that information: what concepts/principles are involved? And, then they can apply that principle to a problem to get a solution. They have to be able to take all of this stuff and decide what is important and what is not. When they are done they can check themselves. They can solve problems in multiple ways. They can reduce a problem to a simpler problem...

Students also develop analytical skills and critical thinking by learning structures and “reasoning about what is needed for these structures.” For example, in Core Biology for majors students learn the process of DNA replication not only through memorization, but also through reasoning about what’s needed for this biological structure: “Name like ‘helicases’ means nothing unless you know what it does.” Another example from Biology for majors is the comparison of alpha and beta glucose. Students have to identify the differences between these molecules. Then an instructor provides examples such as their clothes (Beta glucose) or paper (Alpha glucose): “This subtle difference makes the difference in whether or not your cloth is going to stay or the bacteria is going to eat it, and it will dissolve. It demonstrates how a little difference in shape can make a big difference in what a molecule does.” In Biology for non-majors students also work on structures in human anatomy lab and in the classifications of organisms (as well as understanding how organisms are related). In Physical Geology students learn to classify and characterize different kinds of rocks and to understand how they form:

**Interview (Physical Geology):** They first learn to identify the minerals and then learn to identify the minerals within the rock. Sometimes you can scratch it (hardness test)... Sphalerite is zinc
sulfide and it gives off a rotten egg smell when scratched. Magnetic properties are another criterion. They do about five labs where they identify rocks and minerals...

Even in Core Science courses, students can reinforce their ability to read analytically and critically by “going through lab assignments” or by reading and understanding textbooks, lecture notes, and problems. Scientists believe that Core science courses approach analytical and critical reading in a way that differs from other Core courses:

Interview (Historical Geology): As far as reading critically, it’s not identifying the writer’s purpose; analyzing the writer’s tone, voice, and style. We don’t really go there. But “analyzing major points to make a thesis” would come up in textbook reading or even in a lecture.

Interview (Chemistry): We give word problems. From those word problems students must extract the information. They have to read analytically to come up with what does this word mean in terms of words that follow. One of the things that we have to teach is to teach students to read problems, dissect them into information.

Interview (Physics): When I read history, it is enough to recognize words. If I read physics I have to conceptualize. I think they become better readers. Students read a chapter a week; it is rarely less than 50 pages a week. I want to emphasize that we are not just recognizing words; we are reading it, extracting what it means. And then we go and practice by solving problems. And, that is the core of the course. If you cannot solve the problem you have to read it again, you have to understand it. The reading skills are very important.

Several interviewees also pointed out that Core science courses generally do not teach students how to read for information, but rather expect them to be able to do that already. One interviewee stated that “a very important part of the scientific method is not to swallow everything you read” but instead to evaluate information critically (see also critical evaluation of information under information literacy).

By analyzing classification schemes and critiquing each other during discussions in the labs, students in environmental part of Biology for non-majors learn to critique an argument: “We go through the class reasoning why our classification scheme is the way it is.” In Concepts of Science students critique each others’ arguments during recitation sections:

Interview (Concepts of Science): I think in the lab we are trying to get them to do that. One of the topics is global warming. Global warming ten years ago had a lot of people saying “yes, it is real” and a lot saying “no, it’s not.” Today I believe that most scientists believe that the human impact on global warming is real. You may still have students in the classroom who think that it is garbage and they can burn all the fuel all they want and it won’t have an impact on climate. So they would have a different opinion. They won’t have to defend their opinion, but they may offer their opinion on global warming.

In Physics students sometimes are asked to exchange their works with a neighbor in class and to “look at somebody else’s work and evaluate it: is it correct or not correct, good question or bad question, etc.” This exercise may provide practice in critiquing an argument.

Another example of how students in Core science courses learn to critique arguments comes from the case of Percival Lowell, considered in Physical Geology. In 1906 Lowell, an astronomer, suggested there were canals on Mars. Students are asked to evaluate the observations his hypothesis was based on:
Interview (Physical Geology): In the early 1900s Percival Lowell was looking through a telescope at Mars and thought there were canals. He had actually mapped the surface of Mars. He actually sketched a diagram of what Martians looked like. And, of course, with space travel and better resolutions in telescopes, it became very clear that they are not canals but different features (impact features, etc.). So we talk about his hypothesis. He collected the data from his telescope. He made observations and developed a hypothesis. But, it fell flat on its face... They read about the data he collected and they think about that data and critique/evaluate whether or not his observations actually were logical. That’s what we have them do: to look at a set of observations and to think about a proposed hypothesis and whether or not you agree with that hypothesis.

In Biology for majors, lab reports give students practice in constructing an effective argument. However, the lab report is structured and students are “forced to provide an effective argument: they have to include short answers to an existing report rather than actually prepare a long formal lab report”. In Biology for non-majors students also have in-class discussions: “if they get into a discussion with somebody, they may be able to understand the discussion and present their viewpoint based on the information they get in class.” For extra credit in Historical Geology, students may write a paper that argues for or against a controversial thesis.

All Core Science courses help students learn how to apply simple mathematical methods to the solution of real world problems. “They would not have to do advanced statistics or something like that, but it [mathematics]is something that they have to understand,” said one interviewee. Students constructing graphs and simple statistical analysis in Biology labs for majors, analyze genetics problems in Biology labs for non-majors, carry out radiocarbon dating in Historical Geology, study plate tectonics in Concepts of Science and Physical Geology, and learn how to map and plot in Historical and Physical Geology. All of these activities require the application of simple mathematical methods in real-world situations:

*Interview (Biology for majors):* They calculated the mean, median, mode, and range for the class. This week’s lab consisted of students graphing color changes at different temperatures over different time points to illustrate the effect of temperature on enzymes’ activity. In the second class they have a series consisting of a plant physiology lab where they have to take two differently treated seeds, give them time to germinate, and then compare the results. They’ve done a series where they measure the limp of plant parts under different treatments and get the averages.

<table>
<thead>
<tr>
<th>Test (Biology for non-majors):</th>
<th>If mom has type O blood and the child has type AB blood, then dad could have type ____ blood.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. type AB blood</td>
<td>B. type O blood</td>
</tr>
<tr>
<td>C. type B blood</td>
<td>D. none of these, a type O mom can’t have a type AB child!</td>
</tr>
</tbody>
</table>

*Interview (Biology for non-majors):* In the lecture we work genetics problems, too... For students it is fun. It is something that they can sit down and work out: this person is going to have these genes which are going to determine this trait. It is stuff that we go over: traits, height for example. For example, your brother and sister are taller or shorter than you... this is the reason. This is pretty interesting for them. Another example is determining blood type of a child’s father. They work on the problem to determine which one of these three potential fathers is
actually the father or could possibly be the father. By applying simple mathematics, they look at possible alleles and which alleles could possibly create that blood type.

**Interview (Historical Geology):** To a non-science major radiocarbon dating can seem pretty intimidating. What I try to have them do in class is have them work some examples where we just use the idea of half-life. They’re given simple fractions. It’s simple math like \( \frac{1}{2} \) and \( \frac{1}{2} \) to get \( \frac{1}{4} \). They then figure out the proportion between the original material and the produced material.

**Interview (Chemistry):** In algebra we can come up with third or fourth order equations which cannot be solved trivially. We come up with approximate solutions to those mathematical problems. There is a lot of mathematical tools that we teach... Application of mathematics to the scientific problems, I think, is one of the outcomes that we not only assess, but also, if they do not have that ability, they cannot pass our courses.

**Interview (Concepts of Science):** One of the examples is plate tectonics, the movement of the continents. How far will these two continents move apart in the next 1000 years based on their present rate of movement? How far it may take light from a distant galaxy to reach the earth, knowing the speed of light and the distance? Sometimes we ask them to use Einstein’s relativity equations to solve a problem involving, say, change in length with the speed of light. In those cases, we give them the equations so they don’t have to memorize them but should have learned how to use them.

**Interview (Physics):** You cannot work a problem if you do not apply mathematical method to the solution. We push their calculus skills a little further than they are so that they could deal with physics. The physics is ideas, but if you have to manipulate the idea, you have to express it, and this is called an equation. And, then you have to be able to solve that equation...

**Interview (Physical Geology):** We do all of these things: perform calculations, simple algebra and arithmetic, and statistical methods to solve problems. We do calculations of plate movements at the scale of the earth as well as the volume changes of a mineral. We have methods of evaluating the validity of the age of rocks by measuring isotopes. We talk about analytical uncertainties in the measurements you make. We work with maps (we call them verbal scales or graphical scales) and plots. One of the more common things we have them do is plot pressure and temperature. We talk about the limitations of statistical methods and mathematical methods.

Students in Core Chemistry courses get focused practice in selecting and using techniques and methods to solve open-ended, ill-defined or multi-step problems: an instructor provides students with “a small amount of data, from which it will take, probably, 2 to 5 independent steps to get to a final answer.”

Here are some other examples of such problems that were offered:

**Interview (Chemistry):** Elemental analysis has determined that the percentage of carbon, hydrogen and oxygen in the compound is this ratio: 20% carbon, 50% hydrogen, and 30% oxygen. From that data, can you determine what the element ratios, the molecular formula of this material is? Given a molecular weight, what is the molecular formula?

**Test (CHEM 1110):** 3. (a) How many grams of \( \text{H}_3\text{PO}_4 \) do I need to make 455 ml of a 3.50 M solution? (b) If I take 15.0 ml from a 5.00M stock solution of \( \text{H}_2\text{SO}_4 \) and dilute it to 1.55 liters, what is the concentration of the new solution?
Test (CHEM 1120): 3. Nitrogen reacts with hydrogen to give ammonia according to the equation \( \text{N}_2(g) + 3\text{H}_2(g) \rightleftharpoons 2\text{NH}_3(g) \). An equilibrium mixture in a 2.0-L flask of the above substances at 1000\(^\circ\)C was found to contain 0.45 mol. of nitrogen, 0.63 mol. of hydrogen and 0.024 mol. of ammonia. Calculate the equilibrium constant (including units) for the system. At that temperature which side of the equation is favored?

In Chemistry students are also taught what approximations to theory they can make to arrive to answers to problems: “All scientists have to make approximations. Theories are much too complicated and self exonerated. Especially in CHEM 1040 we teach methods of approximation.”

Selecting and using techniques and methods to solve open-ended, ill-defined or multi-step problems is also covered with a fair amount of depth in Core Biology for non-majors, as well as in Core Geology courses. Examples from tests in Biology were provided during interviews:

**Interview (Biology for non-majors):** By giving students the atomic number and the charge of the atom, I want to know how many protons the atom has, how many electrons the atom has. If I tell them the atomic mass I want to know how many neutrons the element has.

| Test (Biology for non-majors): Use the information below to answer the next 4 questions: An iron atom (Fe-) has an atomic # of 26, a negative charge, and an atomic mass of 51. |
|---|---|---|---|---|
| 13. The number of electrons in this atom could be which of the following? |
| A. 25 | B. 27 |
| C. 26 | D. none of the above |
| 14. How many neutrons would this atom have? |
| A. 26 | B. 27 |
| C. 25 | D. cannot be determined from the information above |
| 15. How many protons would this atom have? |
| A. 25 | B. 26 |
| C. 27 | D. cannot be determined from the information above |
| 16. The above atom would be an example of a/an: |
| A. ionic bond | B. polar covalent molecule |
| C. ion | D. organic molecule |

Other examples from Biology for non-majors include solving genetics problems and determining blood type. Defining genotypes of parents allows students to determine their children could potentially have sickle cell anemia. In Historical Geology students apply the principle of actualism (the idea that the modern day setting is the key to the past) to solve a multi-step problem:

**A principle of actualism in Historical Geology**

During one of the activities in Historical Geology class students have to analyze Figure 1 and Figure 2 below.
Students are looking at a, b, and c as the environments in which rocks form. Then they are asked how they are formed. (They are formed by the coastline moving position one way or another.) By considering a complex of characteristics, students are able to identify rocks that go under a (grains, shells, bigger pieces of rocks), b (mud), and c (limestone). Next, they have to decide which way the coastline is moving. Finally, they have to take it a step further and decide why that is happening (e.g. melting glaciers). (The description of this exercise is available at http://www.auburn.edu/~lewisrd/transgr.htm.)

Several other examples were mentioned during the Physical Geology interview: identifying the source of an earthquake by the way the earthquake waves are read at seismic stations located around the earth (“Students are fascinated with things that can kill you”); estimating impacts of meteorites or asteroids; assessing volcanic hazards; measuring groundwater pollution; etc.

*Interview (Physical Geology)*: We do exercises with earthquakes. You can identify the epicenter, or source, of the earthquake by the predictable way that the earthquake waves are read at seismic stations located around the earth. There are three different types of waves that are generated. S-waves are compressional waves and are the fastest so they arrive first at a recording station. S(shear)-waves arrive next and then the slowest, L(Land)-waves, arrive last. So we give students arrival times for an earthquake event measured from at least three seismic stations and they have to plot the differences in their arrival times on a chart that correlates to distance from the source. They then transfer their distances to a map and use triangulation to determine a solution and its associated errors.

*Interview (Physical Geology)*: They do exercises with volcanic hazards and climate problems. We do exercises talking about impacts of meteorites or asteroids that affect the earth. There’s a good record of these on earth of the past and some fairly large ones that are related to extinction events.

*Interview (Physical Geology)*: I think the exercise on groundwater pollution is a good example. We give them a set water chemical analyses keyed to about 15 different lakes on a single quadrangle map in Florida. Some water samples are contaminated and others are not. The surface elevation of each lake is shown on their map, so they can contour the elevation of the groundwater surface and then determine the direction of groundwater flow. Then they plot and contour the water chemical data, which identifies a contaminant plume, which is sourced from an industrial facility that is identified on the topo map. We have taught them many practical
applications related to the processes of how groundwater flows, and at the same time they really enjoy doing it.

Such problems are “by definition, ill-defined,” according to the Physical Geology interview. Although solving multi-step, ill-defined problems is not a central focus of the core Geology course at the moment (it is covered with the fair amount of depth), it could become a central focus in the future:

Interview (Physical Geology): There are multi-steps to solving geological problems but there are also multi-interpreted problems. In other words, we may not be able to produce one or solve one particular problem but we can offer multiple explanations/interpretations. There are so many different data sources we’re looking at: we’ve got paleo-biological, paleo-climatic, and paleo-magnetic data; information on paleo- and active-plate-tectonic movements, information from rock records that indicate their tectonic settings; and isotopic timing information. There are just so many different sets of data we must look at. In fact, one thing we teach is called a multiple working hypothesis. For instance (not particularly in this class), we are teaching students how to study rocks in the field in order to generate a geologic map, which is the most basic type of information that we have. In the first outcrop you come across, you may find a certain rock type and you identify it. Then, you walk fifteen feet and see a totally different rock. You identify this rock and then start developing a hypothesis of how it got there. The next rock is totally different from the others and it’s telling you a different path. We also make them aware that not all rocks and structures are exposed at the surface, but rather are buried beneath surficial deposits or soils. So every step you take in this process is giving you information to solve a larger problem but we have to identify them one step at a time. So it is a truly multi-step process by nature.

By solving problems in Physics students “learn to think.” One of the examples mentioned during the interview was related to the parachute effect on free fall: the rate of free fall depends on the design of the parachute, the speed of the object when the parachute opens, etc. While solving problems students “need to decide what is critical and what is not, what concepts/principles are involved, learn to solve problems multiple ways…”

Despite the fact that students have to solve multi-step problems in almost all Core science courses, interviewed faculty members (aside from Chemistry) did not consider it a central focus of their courses. Interviewees frequently pointed out ways in which course problems were not particularly open-ended or ill-defined side or ways in which students were not particularly asked to consider method selection. Instead, methods are usually prescribed (students “use specific techniques and methods and what they do usually requires several steps, but it is not something that they are going to select on their own, this is something that we select for them”), and the problems students solve in core science classes are typically not open-ended or ill-defined:

Interview (Biology for majors): We expect them to solve multi-step problems, but they are not ill-defined, and there is usually a solution that we expect them to find. They have these steps that they have to take. They are going to use enzymes and measure how effective those enzymes are going to be at different temperatures or different pHs. Then they go through step where they are going to put the enzyme in with certain substrate and they put that test into a certain temperature and different pHs and they look at how effectively that enzyme turns that substrate into a product. We expect them to understand: this enzyme is effective under these conditions using this certain substrate.
Interview (Physics): We are a little weak on the open-ended side. That is why we are working on physics’ activities. There is a reason why we are a little weak. If you are dealing with an open-ended thing, I would have to spend an hour to solve it. So there is a limit to how open ended you can be. This might be better suited for advanced courses. I think we do an excellent job on multi-step problems, I do not think we have to deal with ill-defined problems. It is not uncommon for the authors of the textbook to put the extraneous information in there to see if your confidence level is enough that you know that. Open-ended is difficult to do in the introductory courses; it is easier to do in the upper-level courses.

While in the majority of Core science courses, methods are prescribed, in Core Chemistry students have to pick a way of solving problems:

Interview (Chemistry): They have to figure out what mathematical tools would be necessary to solve that. Is there one equation to do it or is there a dimensional analysis? Sometimes, you can solve the problem by knowing the equation, but sometimes you can apply the dimensional analysis without knowing the equation to get the answer. We all teach dimensional analysis. There are at least two different ways of solving almost every problem: one by knowing specific theory that applies to this problem and another, by just knowing how the unit cancels out. And, students have to pick between them.

By conducting experiments in Core Science labs, students may not only make gains in scientific literacy, as described earlier, but also may acquire at least some sense of how scientists select methods to solve problems. These experiments are rarely open-ended, but do provide basic knowledge of the ways to carry out experiments:

Interview (Biology for majors): They get through a basic model of how you do scientific reasoning, and they go through a series of prepared laboratory exercises that are, in some cases, a little open-ended on what the results can be, so that they learn the logic behind how you do experimenting... As we go along and talk about it (through lecture and lab manual), the instructor talks about important things such as sample size and replication of the experiment and proper controls.

Interview (Biology for non-majors): Students get to do the blood tests. It is advanced equipment, and they get to put these samples into the gel, and they get to see it spread out and they get to use the micropipettes... I would not necessarily categorize those experiments as “ill-defined,” because usually they do have a process. There is an answer that they are supposed to come up with so it depends on how you define open-ended. We have the solution that we hope they will come to.

Almost all Core Science classes cover effective communication either marginally or not at all. Exceptions are labs in Chemistry and Geology. In Geology labs, teaching assistants are required to score student ability to write effectively: teaching assistants “actually correct student English, composition, grammar, spelling, errors, etc.; they actually provide feedback.” While currently Auburn’s Core Science classes do not place much emphasis on effective communication, interviewees frequently pointed to possible opportunities for their students to gain practice in this skill – through group discussions in some lecture and lab classes or through lab reports:

Interview (Chemistry): Experimental science is expected and required to maintain a laboratory notebook. That is extremely important since you can go back to it later and use it years later and
be able to determine what they did and how they did it and to be able to repeat a certain experiment simple from the details that that scientist kept.

In Concepts of Science recitation sections graduate teaching assistants attempt to give students practice in carrying out debates:

*Interview (Concepts of Science):* Every once in a while we have a debate and divide the class into two-three different portions and have them take different views and debate different things. That is a little hard. You have to have a really good, experienced GTA to make that work, to get students engaged.

Interviews with Core Science course leaders suggest that their courses place little or no emphasis on helping students develop **intercultural knowledge and diversity awareness.** Still, a few interesting examples were mentioned. Differences among people are marginally covered in Core Biology lessons on genetics. For example, an instructor might talk about gender and what determines gender. In Historical Geology, students learn that humans are not as different from one another as they used to be: “There were many kinds of humans. Nowadays there is only one: *Homo sapiens.* In terms of diversity, we think of humans as being different races but we are all one species; we are all the same species.”

In the environmental part of the course in Biology for non-majors, students learn about the impact different countries have on the environment. In Physical Geology students can learn about the environmental regulations in the U.S. and their impact on developing countries:

*Interview (Biology for non-majors):* It would probably apply to the part of the course we talk about the differences between developing countries and developed countries. Developed countries use more resources per capita then do developing countries. Per individual they take greater toll on the environment than people in developing countries do. Someone in the U.S. would have a greater toll on the environment than someone in Bangladesh, for example. People have access to more resources, and they use more resources, and by doing so they have more impact on the environment.

*Interview (Physical Geology):* One of the things we talk about is that we ship some ore material extracted from mines in the US to developing countries for processing. It is cheaper because it allows us to avoid prohibitively expensive environmental regulations placed on U.S. companies. It is simply because our economy (at least it used to) allows us to send those problems cheaply “out of sight and out of mind”. We talk about the ethical conundrum of how this helps the economies of those third world countries but burdens their environment and public health, while at the same time it helps both our economy and environment here at home, all because we simply can afford to do it.

The controversy between creationist beliefs and science was briefly mentioned in few interviews. Instructors generally do not see students’ creationist beliefs as a challenge and refrain from displaying their personal beliefs: “science does not go there; science is limited to naturalistic explanation.” At the same time, for some students exposure to science can be viewed as an exposure to another culture: “Since the vast majority of students in the class are not scientists, they are learning another culture in terms of the science and that is an important part of the science course.” The international character of scientific culture was also mentioned as an aspect of student exposure to science: “Science is blind to origin. We talk about researchers from all over the world...”
**Aesthetic appreciation and engagement** is either not covered in science courses or covered marginally: “We do have a lot of drawings of things in science, especially biology. Microscopy, I think, could be an art in and of itself. Schematics of these are used as tools of information, not as something of appreciation.”

**Assessment**

Current assessment practices in Core science courses are frequently informal and based on a feedback from teaching assistants (“we talk with TAs about how we might do things differently”) and students: “Usually, I get a lot of feedback from the students. I ask them during the different points of the semester: tell me what you find helpful in the class or what you think is working and what is not working.” In most science classes, lab grades are based on lab reports and lecture section grades are based on tests and exams.

**Artifacts**

In most Core science courses students have to complete laboratory reports. The exceptions are courses where labs are focused on discussions or problem solving rather than wet labs or other labs requiring students to conduct experiments. For example, some Physics labs are called “physics activities,” because students have problem solving or go online or get a practice sheet for the test. In Concepts of Science, students have to prepare for discussions in the lab classes. Labs in Concepts of Science are taught by graduate teaching assistants, and artifacts may vary depending on the GTA teaching a class: either quizzes or written assignment (a summary of a project or an opinion on a particular topic or a poster that they bring in). For example, students can be writing a paper on bio-fields or bio-fuels and possible economic and environmental consequences of their use.

Here are some things interviewees said about lab reports:

*Interview (Biology for majors)*: In labs students typically measure something, report their data, make some analysis of what their results show them, and how things could be improved. A successful completion of the lab is to report what they have and what their results showed them.

*Interview (Physics)*: Students prepare lab reports and abstract on those lab reports... We force them to think about what they have done and learn to express it in a very precise and structured way.

*Interview (Chemistry)*: In laboratory reports there is an objective section where students have to write what is the point of doing these experiments in the laboratory. There is a theory part: how the numbers that are obtained in the experiment relate to the chemical reactions. And then there is a detailed mathematical analysis of the experiment and, then there is a conclusion and discussion of errors.

**Tests**

Most of the grade in Core science classes comes from quizzes and multiple-choice exams. In Biology for majors, lecture points (750 points, 75% of the overall grade) are based on four 100 point exams and a 250 point final. (The other 100 points come from other activities.) In Biology for non-majors, students generally have three lecture tests and, depending on the semester, about 6 quizzes. In Core Chemistry, quizzes and tests are also the primary tools for assessing students in lecture classes. In Core Physics, students generally
have three tests (worth 10% each) and a final (worth 20%). In Historical Geology lecture average (75% of
the grade) consists of the grade on one quiz/minor test (Exam 1, which will count for 10% of the final
score), two major exams (20% each), and the final exam (25%) (See Syllabus at
http://www.auburn.edu/~lewisrd/syllabus2009.htm ). In Physical Geology there are usually three or four
exams, including the final, that account for about 65% of the grade. In Concepts of Science lecture points
(75% of the grade) are based on two or three exams and a final.

Several faculty members expressed dissatisfaction with the current practice of basing most of students’
grades on tests and exams:

    I think the assessment comes better out of the laboratories where the class is smaller and one can
track progress and help students individually. We do not have the resources to really do anything
but these scantron exams. That is something we are not happy about.

    We are hindered by the fact that our lectures are enormous. We have 275 students in there. It
would be great if you could give essays or papers. We are able to do it in the upper-level science
class that I teach in summer, but the number of man-hours that are required to grade in the classes
of this size are astronomical. I have two classes with about 500 students in those. If I took one
minute to grade a single test it would take more than nine hours to grade.

In some Core science classes (e.g., Chemistry) there are no computer graded exams. Teams of teaching
assistants help with grading, and students get feedback on their performance on the tests. In other classes
(e.g., Geology) tests combine computer-graded elements and some type of human-scored short answer
questions:

    Interview (Chemistry): These are not computer graded exams. We have teams of teaching
assistants that help us in grading these. We go out and say: this part is correct, you did understand
this concept, and this part is correct, but here you made a mistake. And, we would either put a little
note on how it is supposed to be or provide an answer key.

    Interview (Physical Geology): Some faculty use a combination of computer scan and some type of
short answer, mostly a fill in the blank type thing.

Some professors go over exam questions during the class that follows: “When I return exams I go over
them in class question by question. I think that’s an important part of the teaching process is to not just
give them a score but to go over the test.”

In science classes for majors students frequently have part of their grade from quizzes administered with
clickers. Usually it is less than 6% of the grade.

Extra-credit opportunities

Interviewees noted that students have some extra-credit opportunities. For example, in Historical Geology
students can earn extra credit by answering supplementary web-based questions in the lab manual or by
composing a time-travel narrative. In Chemistry instructors sometimes give extra credit to students who
reworked the exam and got a problem right the second time.

Current Assessment Practices

Most current program assessment in Core science classes is based on informal feedback from students
and teachings assistants. The improvements based on feedback from teaching assistants frequently
involve revising manuals and changing quizzes. For example, faculty revised the manual for Biology for
majors to ease grading by teaching assistants. In the prior manual, students were asked to graph

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individually collected data. In the revised manual, students have to graph class average data: as a result, teaching assistants can quickly identify whether or not a student has a graphing problem. Another example from biology for majors is visualizing DNA extraction. Originally, students had to visualize DNA extraction by “going through the series of chemical preparations, taking onion root juice, separating out the DNA and along the way having to do a couple of really dangerous chemical treatments.” Students complained that they couldn’t see the change and that process took a long time. Now the DNA replication is visualized with strawberries:

*Interview (Biology for majors):* Students take strawberries and mash them up, take soapy saltwater and mash up the strawberries in that, and then strain it through cheese cloth, and alcohol. A white thread would form between the alcohol and water layer. They would then stick a long toothpick-like object, swab it around and then get a string of strawberry DNA.

In Biology for non-majors the instructor introduced and subsequently increased the number of group quizzes. (In group quizzes students discuss their answers in groups rather than answering individually.) Increasing the number of quizzes forces students to study more as they go along, and by talking to others students get a better understanding of the material.

In recitation sections of Concepts of Science, students have long discussed the Chernobyl accident. The article that was used for a discussion recently had to be replaced since it was ten years old. However, taking into account feedback from graduate teaching assistants, the topic itself was kept.

Instructors frequently look at student performance on the test to get a general idea of how many students understand and how many do not:

When I return exams I go over them in class question by question and ask why they missed one and by talking to them I tell that they weren’t thinking logically or there was some piece of information they missed. I think that’s an important part of the teaching process is to not just give them a score but to go over it.

Some instructors pointed advantages of and used clickers for formative assessment and student self-assessment:

Some of the activities we have them do is take quizzes with clickers so that they will take a quiz on something they are supposed to learn and they will get immediate feedback of how they are doing. Those are for points, but not whole lot of points so they are not high stakes and are much more of a “where do I stand now” reference point of how much I know for the test. For example, there are 1,000 points total for the class, and one clicker test is worth 5 points so it is like half-percentage point.

Students can click to answer your questions... By doing that, at least in theory, it increases your ability to get a feedback/understand how well the students are grasping the material. Of course, you do the same by giving paper quizzes, but it is more simultaneous with clickers, because you have it on your computer screen. I certainly see advantages to possibly using those.

In Engineering Physics, a Core course, some instructors use tests before and after a lecture to evaluate the effect the lecture had on student learning. This approach was incorporated in the proposal that was selected for participation in Colleagues Committed to Redesign (C2R) project on large-enrollment introductory courses (see [http://www.thencat.org](http://www.thencat.org) ). Within the framework of this project, students have “the first exposure to the material through online activities and assessments [pre-test] completed
prior to class”. This way the instructor knows in advance which topic students had most trouble with. Here is how this approach is used to assess the lectures:

[The pre-test] does not count a lot: it is only worth 5%. The computer randomly picks 10 questions from the pool of questions. If there are five learning objectives for the class, students get two questions for every learning objective. This way I can see before the class: 80% of the class missed the question on learning objective # 3. I’d better spend a lot of time on that. Then I would do a post-test [which also accounts for 5%]. This is due after I finish a chapter in class [by midnight of a day of a class].

Student evaluations as well as evaluations by other faculty members were mentioned in few interviews as a positive assessment practice:

Interview (Geology): We are evaluated by the students, and I find that assessment real helpful. It not only tells me what I’m doing wrong but helps me understand what they enjoy. Periodically we have a faculty member go and evaluate courses, like a lecture that one of us is doing. So we are getting that kind of feedback on what we are doing.

Suggestions

Large classes and class activities

Many Core interviewees commented on large class sizes and the lack of individualization of instruction. In some Core science classes instructors try to counteract the lack of individualization by having students work in small groups, discuss things with each other and then report back to the whole class:

Interview (Biology for non-majors): I found that having them work in small groups is giving them a chance to have more personal interaction whereas, if you do it as a whole class, you will have two or three students who will dominate. This also gives students a chance to self-assess as they go along.

Interview (Biology for majors): Sometimes I have students discuss with each other what the topics were in the last class before asking for questions they have. If you just ask them if they have questions, they do not want to look really stupid, and they would not ask questions. This also allows students to answer each other’s questions and to self-assess where they stand compared to other students.

Interview (Historical Geology): One of the things I do, so that they’re not just sitting there listening to a lecture, is divide them into groups and do some group exercises. There is some communication aspect involved there.

Interview (Physical Geology): In lecture, we do solve problems. I put the problem on the board and get them into small groups of four-five students each. I have a student from one of the groups who correctly solved it to explain what they did to the rest of the class. So there is a little oral presentation that some get to do.

One of the Physical Geology professors also uses student demonstrations:

Interview (Physical Geology): Another thing that one of the professors does that I find interesting is that he asks them to go home and find something with a certain element, bring it in, then hold it up in class and tell us about it. It’s a way of making them appreciate the economic, social, and cultural value of minerals. It’s a way of making them relate minerals to
everyday objects that they use... They come up with things that surprise even me. They’ll Google it and dig in and find out what makes up certain parts. I remember that one student brought in a computer chip, which is silicon, and I thought that was interesting.

In Core Biology for majors, students are sometimes asked to replicate a certain structures from memory, compare their drawing with their neighbor’s and then to discuss similarities and differences. In Biology for non-majors the instructor sometimes walks into class with a stuffed animal:

Interview (Biology for non-majors): As we go through the lecture, I will ask them a question, and hand them a stuffed animal. If they get the answer right, they get to hand or throw the stuffed animal to someone else. That person would answer the next question. That is the way to increase interaction and reiterate what I have just talked about. So that is not just me lecturing and them taking notes without thinking about what it is that we are going over. It keeps students awake.

Some instructors also use clickers to keep students awake and engaged: “I think for the large class it provides a big advantage. It also allows having students held personally accountable for doing something in a large class.” Others sometimes use clickers to get students to attend the class: “My attendance was much higher when I used clickers. I believe (I don’t have a formal statistic for this) that my grades were higher when I used clickers rather than when I didn’t.” Sometimes, both attendance and engagement were mentioned: “You must be there, and you must be engaged. I ask questions in class. They have a clicker. If they click, this is a half-credit, if they click and the response is right, it is a full credit. I may ask 1 question, or I may ask 5 questions.”

Instructors did mention some technical issues with clickers. In Biology classes, clicker system used five years ago was “a total disaster”. However, the current system (Interwrite PRS) have very few technical problems: “I have only seen three out of the thousands over the past two years that have any true technical problems.”

Challenges of science for non-majors

In one of the interviews on science for non-majors it was pointed out that many students take this course just to fulfill the Core requirement: “The course struggles a bit because many people who take this course are not interested in the course or in science. It’s a Core requirement, and they really don’t want to be in the course.”

Quarters, semesters, and curriculum implications

As a result of Auburn change from quarters to semesters, the first quarter became the first semester, and some of the instructional time was lost: “Even though we meet 15 weeks, we still lost a lot of lab hours because of holidays.” To make things balanced, in Biology for majors some of the topics have been shifted from one course to another.

Labs or recitations?

Some interviewees expressed concerns about replacing labs with recitations in Core courses, preferring, if anything, to keep the hands-on experience of traditional labs and add recitations to it:

Concepts of Science, I believe, does not have a lab but has what they call a recitation. These are not real laboratories like you would expect in a science course. Science courses should not be weakened by watering down labs, especially core science courses... It is important to not just be reading about how things are done and data sets created but actually generating those data sets.
and analyzing those data sets, charting and synthesizing those results then trying to present some type of explanation or hypothesis.

Suggestions

According to some interviewees, developing “Core electives” and allowing students to make selections with greater flexibility would improve the Auburn University Core Curriculum.

Another suggestion was to develop a course called “Science and the Citizen” which would consider questions of scientific ethics. It was also suggested that a course in epistemology could benefit the Core. The Human Odyssey, which is already an option in the Core Curriculum, involves faculty from both science and humanities; extension of this model, according to one interviewee, would be useful. Overall, the benefits of a more interdisciplinary approach were mentioned in several interviews: “I would have every department create and inquiry based interdisciplinary seminar so we might team up with math departments and come up with the set of problems. Students might come in and do the presentation.”

Some of the suggestions that arose from interviews in Science were not directly linked to Core science courses. For example, it was suggested that students should take two semesters of a foreign language: “We live in the multi-cultural world. People speak different languages. In learning the foreign language we learn the culture.”

Apart from suggestions related to core curriculum some interviewees mentioned that designing a multi-disciplinary senior thesis would benefit Auburn graduates:

I think it would be absolutely wonderful if we could design a senior thesis, and if in this senior thesis you had to cross disciplines, for example, biology of a knee and a mechanics of the engineering. Physics student might look into physics and combine it with hydrology. What impact would it have if the ocean would came up a meter?
Table 6 Science Core Courses and General Education Outcomes

Using the following scale, can you identify to what extent the following college-level General Education Outcomes apply to the courses you oversee?

1 = is a central focus of the course  
2 = not central but covered with a fair amount of depth  
3 = covered marginally  
4 = not covered at all

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<tr>
<th>General Education Goals</th>
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<td>Information Literacy</td>
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<td>Construct an effective argument</td>
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<td>Apply simple mathematical methods to the solution of real-world problems.</td>
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<td>Select and use techniques and methods to solve open-ended, ill-defined or multi-step problems</td>
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<td>Effective Communication</td>
<td>Write effectively</td>
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<td>Demonstrate effective oral communication skills</td>
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<td>Informed and Engaged Citizenship</td>
<td>Be informed and engaged citizens of the United States and the world</td>
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<tr>
<td>Intercultural Knowledge and Diversity Awareness</td>
<td>Understand and appreciate the diversity of and within societies of the United States and the world</td>
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<tr>
<td>Scientific Literacy</td>
<td>Understand and appreciate methods and issues of science and technology</td>
</tr>
<tr>
<td>Aesthetic Appreciation and Engagement</td>
<td>Understand and appreciate the arts and aesthetics as ways of knowing and engaging with the world</td>
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Core Curriculum Alignment Study

History

Summary

Auburn University's Core Curriculum History requirements are satisfied by completing a two (out of three possible) course sequence. The World History sequence (HIST 1010/1020) is a traditional survey of history; the Technology and Civilization sequence (HIST 1210/1220) examines the role of technology in the development of civilizations; and the Human Odyssey sequence (UNIV 2710/2720) examines history from an integrated perspective of both science and humanities. Based on 2007-2008 academic year data, the World History sequence is the most commonly taken of the History sequences, accounting for almost 80% of the student enrollments among all three options (Of the students enrolled in World History, 46% in HIST 1010 and 45% in HIST 1020). Over half (56%) of the History sections are taught by tenure/tenure-track faculty and approximately 40% of the remaining courses are taught by instructors (29%) and GTAs (11%). The typical World History class size is 175-200 students, Technology and Civilization class size is 29-32 students and Human Odyssey class size is about 22 students.

According to program directors and faculty, Information Literacy is emphasized in all History courses. In many courses, students are asked to access primary sources and locate information on web sites in order to synthesize information presented.

Students are regularly asked to demonstrate analytical and critical reading skills in both Technology and Civilization and Human Odyssey courses. Students must complete assigned readings in these courses to prepare for class discussions, quizzes and exams. Many of the primary source readings require students to identify arguments from theorists in a particular historical subject area, and to discuss the major ideas and implications stated in those readings. The ability to construct an argument is covered with a fair amount of depth in these same courses. Students in Human Odyssey regularly attend guest speakers, followed by discussion sessions where they construct oral arguments. Applying mathematical methods to solve problems is not addressed in any History courses, however, using techniques and methods to solve multi-step problems is addressed in Technology and Civilization and Human Odyssey courses. In some Technology and Civilization courses students make quipu, a method of recording using knotting used by Incan civilizations.

Effective communication is covered with a fair amount of depth in Technology and Civilization and Human Odyssey courses. Given the average size of sections in both sequences (less than 30 students), faculty are able to ask students to write short essays or answer essay exams. Oral discussions regularly occur in these courses, however, students are not given formal assignments where they are evaluated on their oral communication abilities.

Informed and Engaged Citizenship is identified as a central focus of all History courses. According to the program director, World History students are assigned readings and, in some sections, demonstrate their knowledge of this outcome on exams and exit interview questions. Technology and Civilization students complete assigned readings and exams, and Human Odyssey students discuss related topics in lectures and lab sessions.

Intercultural Knowledge and Diversity Awareness is identified as a central focus among all History courses. World History integrates this outcome into course lectures, readings, and reading quizzes.

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Students are often presented with allegorical questions and asked to respond during class. Similar topics are explored in Technology and Civilization courses through class discussions and reading quizzes. Human Odyssey also acknowledges this outcome by regularly asking students to discuss significant cultural events and to respond to films and documentaries.

Scientific literacy is addressed in Technology and Civilization and Human Odyssey courses, as students complete assigned readings and actively participate in class discussions. Aesthetic Appreciation and Engagement is a central focus of Human Odyssey courses. Students attend plays and lectures, discussing their historical and aesthetic values afterward.

Most History courses are not regularly assessed; however, faculty in Technology and Civilization and Human Odyssey courses regularly host informal sessions where course syllabi, topics, exams and assignments are evaluated through sharing student feedback. World History sections taught by new tenure-track faculty and instructors/GTAs receive mandatory evaluation at the end the semester. The Chair of History Department and the director of World History also visit classes taught by new tenure-track faculty and instructors/GTAs. Other World History faculty have their sections evaluated from time to time. In some sections of World History, students are given an exit interview where they provide qualitative feedback on topics and theories discussed throughout the course.

Suggestions from History program directors and faculty include: granting faculty time to discover novel ways to conceptualize World History, to develop new instructional methods and assignments, to expose students to all areas of history, rather than just one sequence, and the possible expansion of the core to expose students to additional faculty perspectives and ideas.
History Core Courses at Auburn University

Auburn University History requirement is satisfied by completing six semester hours in a sequence. The following courses are included in the core:

World History I .......................... HIST 1010
World History II .......................... HIST 1020
Technology & Civilization I ............... HIST 1210
Technology & Civilization II ............. HIST 1220
Human Odyssey I .......................... UNIV 2710
Human Odyssey II .......................... UNIV 2720

Graph 7.1 History Core Courses: Number of Students and Number of Sections (2007-2008 academic year)

Graph 7.2 Instructors of History Core Courses by Number of Students and Number of Sections (2007-2008 academic year, primary instructors of record for UNIV courses)
Graph 7.3 History Core: Section Sizes (2007-2008 academic year)

Non-Honors Courses

Honors Courses

Using data from students who received baccalaureate degrees in summer 2006 through spring 2008, this report analyzes how Core History courses figure in students’ course-taking patterns, how those patterns vary by college of enrollment, and how students perform in those courses. We included all AP, transfer credits as well as successful completions of Core History courses at Auburn—where “successful” means that the student received a grade of “D” or higher. If a student took the same course several times, we selected a record with the highest grade earned. The following graphs are based on student-course records, so that students are counted once for each Core History course they successfully took. Students take Core History courses for a variety of reasons other than fulfilling the requirements of the Core Curriculum.

Graph 7.4 Successful Completions of History Core Courses by Recent Graduates
Observations:

- AP and transfer credits account for 26% of Core History credits earned: 29% in World History and 11% in Human Odyssey.
- World History accounts for 86% of Core History credits, Technology and Civilization for 11%, and Human Odyssey for 2%.
- Overall, students complete Core History courses early in their academic careers: 71% of successful Core History completions were taken by students in their freshman year.

The following chart presents the distribution of Core course completions among the three eligible History disciplines by students’ college of graduation.

**Graph 7.5 Distribution of Core Course Completions by Students’ College of Graduation**

- Coll of Arch Design and... World History, 550 181
- Coll of Sciences &... World History, 974 74
- College of Agriculture World History, 553 46
- College of Business World History, 2,661 359
- College of Education World History, 1,221 71
- College of Engineering World History, 1,016 366
- College of Human Sciences World History, 788 70
- College of Liberal Arts World History, 3,076 316
- Sch of Forestry & Wildlife Sci World History, 147 8
- School of Nursing World History, 250 4
Overview of Courses

Core History courses provide students with knowledge of past events and perspectives that fosters a better understanding of the world and significant cultural events. The courses examined in this report contribute to several of the General Education Outcomes, primarily by enabling students to deeply appreciate the diversity of human events over time. Each course cultivates students’ ability to view the world from multiple perspectives, and establishes a foundation for informed engagement in both the local and the global societies. Course descriptions are provided:

- **WORLD HISTORY I (HIST 1010):** examines world history from early humanity to the late eighteenth century.
- **WORLD HISTORY II (HIST 1020):** exposes students to world history from the Industrial Revolution into the mid twentieth century.
- **TECHNOLOGY AND CIVILIZATION I (HIST 1210):** studies the role of technology in history from prehistoric times to the beginning of the Industrial Revolution.
- **TECHNOLOGY AND CIVILIZATION II (HIST 1220):** examines technology from the Industrial Revolution to the present day.
- **THE HUMAN ODYSSEY I (UNIV 2710):** examines the human endeavor from pre-history through the 17th century by exploring connections between the sciences and humanities.
- **THE HUMAN ODYSSEY II (UNIV 2720):** examines the human endeavor from the 18th century through the present by exploring connections between the sciences and humanities.

History Courses and General Education Outcomes

General goals and outcomes for the History core courses, as identified by the program director and instructors, include an emphasis on exposing students to historical foundations, basic concepts, theoretical perspectives and research approaches unique to each discipline. Program directors and instructors stated the major goals for the History courses as follows:

- **Interview (World History):** The first course seeks to describe and explain the formation, evolution, and growth of world civilizations from prehistory to about 1750 CE. It also aims to analyze the nature and characteristics of major civilizations through meaningful comparisons. Students should leave this course with a firm grasp of the basic processes and patterns of world history so that they may better understand the world in which they live. The second half [of the course sequence] is from the French Revolution to whatever the faculty member feels the most comfortable with; you know the end of WWII or the end of the Cold War, etc.
- **Interview (Technology and Civilization):** In addition to science and technology, we also talk about the social dimension of history, the economic dimension, religion and politics and weave all of these things together. We talk about the achievements of great civilizations and how those have influenced our own time.
- **Interview (Human Odyssey):** One of the primary goals is to cover science-humanity integration, that’s one of the main purposes. We bring into each classroom two different ways of thinking about the world, the idea is to show students that the really tough questions in life don’t really have obvious or answers you can agree upon, there’s a lot of relativity and there’s a lot of things to consider. This is definitely not a course where you learn an answer and regurgitate it.

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Because we have a scientist and a humanist teaching the course, there exist several levels of organization in the course.

**Information Literacy** is identified as a central focus of World History courses. This outcome was defined by the program director as completing assigned readings for the purpose of preparing for lectures and exams, which is the standard approach in most World History courses. Faculty in the World History program no longer use a universal textbook; instead, each faculty decides on what textbook to use and on the type of reading materials for his/her sections. Faculty members may also assign students specific readings that emphasize their particular area of historical expertise.

*Interview (World History):* In terms of reading assignments, some people ask students to read a textbook. Some people, on top of textbooks, ask students to read certain primary sources. A few of us have abandoned textbooks altogether. I assign them specific books that are relevant to the themes that I want to focus my lectures on. So, it’s different. Again, people have different ideas and different objectives, so they correspondingly assign different things.

Common themes explored in HIST 1010 include ancient civilizations, such as Greek, Roman and Chinese societies. HIST 1020 examines the French, American and Industrial Revolutions, social idealism, the development of East and West Asia, WWI and II and other significant events of the twentieth century including the Depression, Cold War, and social globalization post-WWII. In sections taught by the program director, students read books specifically related to a topic or civilization being studied.

*Interview (World History):* I assign certain books because I want students to get certain things, different things out of this class. For example, I have students read books that deal with major aspects of religious developments during some of the defining moments in World History. One example, [is] Thomas Aquinas, how important he was. He was responsible for the development of scholasticism, which was the dominant Christian theology in medieval Europe. So, I have my students read a book entitled *Guide to Thomas Aquinas*. That’s for European history. Well, you know other civilizations, like the Chinese civilization, developed different ideological and moral-ethical traditions including Confucianism. Confucianism was an enduring philosophy, as well as religion. And it’s very important, not just for China, but for the Japanese civilization, the Korean civilization, for the entire region of East Asia. Central to Confucianism was individual moral self-cultivation. So, I have my students read a book entitled *Confucian Moral Self Cultivation*. So, different objectives require different assignments. Reading these and other books help students think about different as well as similar patterns in the evolution of different civilizations.

Faculty in Technology and Civilization courses also identify Information Literacy as a central focus of both courses in their sequence. Students must demonstrate information literacy skills through completing assigned readings, including primary sources, news articles and speeches. In some sections, students must conduct web-based research. According to a course instructor, “I encourage students to go to the various web sites out there. And in the past, I’ve actually included some of the information from those web sites on quizzes.” Examples of web sites students have been asked to visit

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32 Information Literacy is defined by the Core Curriculum Oversight Committee as determining the nature and extent of information needed, accessing and evaluating information critically and effectively and using information to accomplish a specific purpose while understanding the economic, legal, and social issues associated with using information.
in past terms include the American Mathematical Society, The American Antiquarian Society, Public Broadcasting Service and the Foresight Institute.

Other faculty members in Technology and Civilization courses ask students to read and assess information from primary sources. Specifically, students must access primary documents to examine sources critically, while synthesizing the author’s argument and evaluating the evidence used to support a claim. Examples of readings assigned by one faculty member include a speech given by President Bush on stem cell research, excerpts from the Qur’an, Copernicus, Galileo and Hammurabi. According to this interviewee:

*Interview (Technology and Civilization):* I have a collection of my own primaries that I edit, my entire course in online. Sometimes, I have actually selected certain university lectures or presentations that students could go to. They had to identify a lecture, summarize it, tell me the thesis, and identify one piece of primary evidence they [the author] used to make their point. Utilizing primary sources as a means of demonstrating Information Literacy is a method often undertaken by other Technology and Civilization faculty members.

Human Odyssey courses ask students to complete primary source readings as a means of demonstrating Information Literacy. The program director in Human Odyssey indicated that Information Literacy is covered with a fair amount of depth within the course sequence. In both courses, students are assigned primary source readings including scholarly articles, ancient and modern texts, newspaper and journal articles. The program director cited the importance of developing strong information literacy skills for achieving success in the courses:

*Interview (Human Odyssey):* They are assigned and tested on over 174 primary source readings in two semesters. Each textbook is comprised of primary sources. As a psychologist, you can make the case the primary case text reading is better than textbook reading. Because, number one, it is more difficult to read and it requires more effort to read it. There is very good evidence, if it’s more difficult to read you are going to use a different encoding strategy. You are going to put it into memory differently. If you really have to work at it, and we know students who know they are going to be tested over it read differently than students who won’t be tested over it. So that encoding is going to be “elaborative rehearsal.” It’s not textbook reading, so I think you can make the case that we’re going to get better encoding and it’s going to last longer by having them read primary sources. But, there are 174 of them. It’s covering a tremendous amount of literature. There’s 174 distributed across 12 different units. We try to present six units a semester over that 15 week period. There might be two or three weeks for each of these units.

**Analytical Skills and Critical Thinking** outcomes are covered marginally or not at all in World History. Students are expected to read in order to prepare for lectures, quizzes (in some sections) and four exams over the course of the semester (exams are almost all scantron due in part to the large size of sections). However, the program director cites a more significant responsibility among the faculty who teach the courses to present the material analytically and critically:

*Interview (World History):* The one thing all instructors in World History should do is to constantly and critically think about issues of how to conceptualize World History. So, it’s at a level of conceptualization. If you think history is one thing after another, if you don’t think there are causal connections in the evolution of civilizations, then you won’t
be able to ask your students of much. Let me just give you one example: [if] you take a look at the syllabi for World History used by faculty at various US colleges, you are likely to see topics such as early civilizations in the Middle East and Africa, and then Greece, Rome, India, and China, etc. You know, it’s just sort of on Monday its China, on Wednesday its Medieval Europe. Where are the causal connections? You don’t see that and you don’t typically get that in most college World History courses,. And that’s not right. So the problem with approaches like this is fragmentation, and, correspondingly, failure to explain causal connections. So I think the critical issue is not one of making decisions about reading assignments; it is one of developing larger, meaningful framework to explain causal connections in the evolution of civilizations.

The ability to read analytically and critically is as a central focus of the Technology and Civilization and Human Odyssey sequences. In these courses, students actively examine and analyze the main points of assigned readings in order to prepare for informal class discussions, essay exams and quizzes. A respondent in Technology and Civilization cited the importance of students’ ability to demonstrate this outcome, particularly when preparing for regular course quizzes.

Interview (Technology and Civilization): I tend to have two sessions every week devoted to discussions, and I really do try to get everybody involved if possible. And I think they get better over time at engaging in discussion. Like [faculty member], I try to pay a lot of attention to the idea that they need to develop critical thinking skills. They need to learn how to take a mass of facts and see if there’s some pattern there, some generalization that they can derive from it. Or, if they’re given a generalization, have them go and look for specifics or examples that would give that generalization some root in the historical narrative. So, as they learn to manipulate those kinds of mental activities in class and articulate them to their compadres, I think they grow more skilled over time.

Human Odyssey students demonstrate analytical and critical reading skills through completing assigned readings that bridge information in both the sciences and humanities. This skill is also identified in the Human Odyssey course objectives, as students are expected to develop critical thinking skills and lean the value of indentifying and questioning assumptions and develop reading skills. A major emphasis of the sequence is teaching students to distinguish information they aren’t familiar with from information they are familiar with. Students are expected to actively discuss authors’ ideas and complete required written responses to course readings, in addition to short answer essays. According to the program director:

Interview (Human Odyssey): You’re starting to show them information that’s not correct. We are focusing on key words and concepts because typical, if people can learn those then you can have a foundation for critical thinking, you can begin to hand ideas off of it. If you don’t have the key words and concepts, you can’t do critical thinking. You’ve got to know some prep before you do critical thinking. And so, I think some courses are better at putting that in there. This particular course is a nice balance of both because we require them to read stuff, and most of the stuff they read is not a final answer, it’s an understanding.

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The ability to critique an argument effectively is covered with a fair amount of depth in the Technology and Civilization sequence. The format for the courses includes one class of lecture and two classes of discussion each week. Students are responsible for building on their analytical and critical reading skills by identifying argumentative reasoning and inferences found in course readings. Although one faculty member indicated that most students are generally weak in their abilities to comprehend readings in the first course (HIST 1210), all respondents agreed students must be able to effectively critique arguments in order to contribute to class discussions and respond to reading quizzes.

Interview (Technology and Civilization): I have a quiz (...) on Fridays. It usually has an informational section with identification questions which they have to answer. And, it often has a more general question where I ask them to summarize the general argument in the reading. So, they'll have to write a paragraph or two in order to do that.

Another interviewee emphasized the importance of critiquing arguments in order to acquire maximum points on quizzes.

Interview (Technology and Civilization): I do quizzes first thing every Tuesday. I learned from my experiences that the first few weeks’ quizzes are very rough; the average is sometimes as low as 40%. But my students learn how to read for an argument, they don’t just blow it off. Most of the people, especially fall semester especially, are straight out of high school and it’s very rough going for them. They get 15 quizzes, I throw out the bottom three grades, they total up to about 30% of the grade altogether, which is worth even more that the midterm I give. And after about the fourth week, they realize these quizzes are not going away and they will come in and they’ll either predict what questions I’m going to ask and it’s very impressive. But, it’s a hard first month.

Human Odyssey critique arguments in order to actively participate in class discussions where they must argue positions presented in primary source readings (the course is not structured around formal lectures). The program director cites students’ ability to understand the philosophical underpinnings of arguments is an important foundation for critiquing arguments studied in the course.

Interview (Human Odyssey): We also ask this a lot: “Why do you think this reading is important enough that it was included, why are we reading about this?” This is a meta-cognitive skill, helping them to appreciate why some people think this is so important and why some others don’t think it’s important. Why do we pick controversial material to discuss? We don’t have to pick controversial material like creationism and evolution, but what’s the significance of that? Why do we think this is going to help you deal with complex issues throughout the rest of your life for which there really aren’t answers. But it is important to know “what’s the argument for this side” and “what’s the argument for that side,” to appreciate better what the arguments about.

Additionally, this objective is found in the listed objectives for the course: Learn how questions are often more important that answers and foster and appreciation for the value of dialogue34.

In Technology and Civilization courses, students are often asked to construct arguments both orally and in written assignments and essay exams. Topics in HIST 1210 often include broader historical issues of

34 From Objectives of the Human Odyssey Program. (fall, 2008). Department of History: Auburn University.
technology in the development of cultures. Topics in 1220 emphasize sociological and economical impacts of the Industrial Revolution, nuclear energy, communication and modern technological development. An example of an essay exam question from HISIT 1210 is provided:

**Sample Essay Question**
If you were to choose one technology that you thought most defined twentieth-century western civilization, what technology would that be? Using information from the lectures and the readings, trace that technology through the century. What important social, economic, and political changes did that technology cause? Why did that technology cause those changes? You must be specific.

Effectively constructing an argument is a central focus of the Human Odyssey courses. Students learn to argue from evidence using a clear structure, sources of support and distinguish between beliefs and thoughts. Developing these skills is necessary for forming individual responses to course topics, many of which are often viewed by students as controversial in nature. Because the course is closely integrated with the Littleton-Franklin Lecture Series, students critique and respond to arguments presented by diverse speakers, authors and researchers. Following each speaker, students and faculty engage in class discussions (lab sessions) where they discuss ideas and theories presented.

*Interview (Human Odyssey):* The first Littleton lecture stirred a tremendous amount of discussion because, for the first lecture, this Kenneth Miller came and talked about teaching intelligent design along with evolution. Parents objected to it because it’s then religion in the classroom. So it’s just a major issue, so for a whole week students talked about creationism and their objections to evolution and they’ve never talked about it in this context and why it might be separate, why you might want to teach it in a philosophy class, why evolution is not intelligent design, what is science, so a lightening rod. And to say that students have strong feelings about this, but then there are easily students who come from different backgrounds who don’t have this negativity about Darwinism.

**Applying simple mathematical methods to the solution of real-world problems** is not addressed in World History or Human Odyssey courses. Technology and Civilization courses do not regularly ask students to demonstrate this outcome, with the exception of some sections of HIST 1210 that examine and demonstrate the Indian Numbering System.

In Technology and Civilization courses, students are occasionally asked to **select and use techniques and methods to solve problems**. Students learn the importance of textile engineering in the development of certain civilizations by studying the technological significance to both ancient and contemporary cultures. For example, students examine the historical and social significance of *quipu* to the Incan culture and are asked to create one.

*Interview (Technology and Civilization):* Just this week, we made *quipu*, something I do every year. Every year I try different things, I held them responsible for knotting a number so that fellow students could read it. *Quipu* is a memory device used by the Incan civilization. It’s a record keeping without writing. My emphasis is, in addition to learning about these societies, is that they learn to distinguish elements of

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36 The Indian Numbering System is a traditional system of measurement that served as a basis for modern mathematical development.
interpretation. That’s almost an equally primary goal that at every week and at every class I hammer home the fact that evidence does not change, interpretations change all the time. And that students gain that sophistication so that they can apply that lesson to the world around them. So, that’s a really important goal that what we teach and how we teach it is the foundation for what we do.

![Figure 1 Examples of Quipu](image)

In other sections of Technology and Civilization, students examine technological and scientific concepts such as biotechnology, nanotechnology and textile chemistry and discuss their importance in the overall development of civilizations.

Human Odyssey courses take a broader approach to this outcome. Rather than ask students to complete specific assignments, students discuss the cultural tendency to want to solve multi-step or open ended problems. Because the courses take a more philosophical, students examine historical and contemporary issues and discuss the construct of ambiguity. According to the program director, “we want them to learn to deal with ambiguity and understand it is okay to not have all the answers.”

**Effective Communication** is not emphasized in the World History sequence. Reasons why students are not expected to demonstrate written or oral communication skills lies in the class sizes, which average 175 students in HIST 1010 and 200 student in HIST 1020. Students are not expected to write beyond essay or short answer exams. The program director explains class size and other external factor prevent faculty from asking students to complete more assignments:

_**Interview (World History):** _I can tell you right away nobody is doing papers. It’s just impossible, I mean, what are you going to do when you have 200 students (in one section) or 400 students (in two sections) and teach another class at the same time? On top of teaching we all have other responsibilities like research and service. It’s simply humanly impossible, given the resources that this University is confronted with even under normal circumstances.

Informal class discussions do occur in some World History courses; however, students are not regularly expected to demonstrate oral communication or given assignments that ask them to use oral communication. Again, class size is cited as an obstacle to students and faculty engaging in frequent class discussions:

_**Interview (World History):**_ We don’t typically have discussions because with the large number of students you’re limited and you wouldn’t be able to cover enough material at that level. I do try to frequently ask students to just answer questions rhetorically and non-rhetorically. A question may be “What explains this?” Students sometimes try to come up with an idea or an explanation and you try to encourage them to think during the lecture. But it’s hard to do that kind of thing in a large section.
The ability to communicate both orally and in writing was perceived by all Technology and Civilization interviews as an important aspect of their courses. According to one faculty member, “Well, one thing we’ve stressed, especially since we’ve gone to the smaller section format is communication skills, writing skills and also oral communication skills.”

Demonstrating effective written communication is considered a central focus among both HIST 1210 and 1220 courses. Students are regularly asked to complete written assignments in the form of essay exams, summaries, papers and quizzes.

*Interview (Technology and Civilization):* Everybody has a writing component of one manner or another. Essay-type exams, and a lot of people have discussion sections in their courses. That’s great. So, those clearly match up with some of the broader goals of the university, or outcomes.

*Interview (Technology and Civilization):* Virtually every week they’re doing some writing for me. And then on the examinations they do even more writing, because they’ve got a major essay question to answer on the exam.

A sample essay question from HIST 1220 is provided below where students are expected to construct a clear and coherent written response:

<table>
<thead>
<tr>
<th>Sample Essay Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write an essay on the development of commercial aviation in the United States through the 1930s. What did the Wright brothers accomplish that had eluded other researchers in heavier-than-air flight? How did the airplane come to be regarded as commercially important? What was the role of the federal government in promoting this technology? What airplanes were most important in marking this development and why?</td>
</tr>
</tbody>
</table>

Oral communication is encouraged among students and is covered with a fair amount of depth in most Technology and Civilization courses. Students engage in discussions as a means of demonstrating analytical skills and critical thinking. As students progress in the courses, the level of oral communication increases. According to one interviewee, “I tend to have two sessions every week devoted to discussions, and I really do try to get everybody involved if possible. And I think they get better over time at engaging in discussion.”

*Interview (Technology and Civilization):* One of the benefits of the small sections is that students can’t be a passive member of your class and then after four weeks try and catch up right before an exam. They have to be there every day, participating in class. We all give quizzes over the reading or the lecture. So, you have a very active involvement every day of class. You can’t come in and not participate, you have to be there every day and that really helps us. I think students are evolving over time in their intellectual development. If you treat it as a class where you’re passive for three weeks, it doesn’t work. You have to attend and be with us every day of the week.

A faculty member added that, in addition to faculty encouragement, alumni speakers also encourage students to develop proficient oral and written communication skills:

*Interview (Technology and Civilization):* You know, Auburn alumni come back after they’ve spent five or ten years as scientists or engineers and they talk to students. And what they say over and over again is, “you don’t need more science or engineering, you

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need more communication. You need to be able to write, you need to be able to sit at a meeting and figure out logically what’s going on and what needs to be contributed.”

In its course outcomes, the Human Odyssey program identifies that it will support students in their development of communication skills: oral and written. Students are asked to write short answer essay responses and complete term projects involving submitting written reports.

Interview (Human Odyssey): They also have term projects, many of them wrote, but we gave them tremendous latitude. Some have short essays assignments; some have done assignments including creating music or plays incorporating the readings, book reports. No multiple choice, but a lot of writing.

As stated, students in Human Odyssey are expected to orally communicate during lab sessions. The labs provide students with opportunities to integrate content from the readings and responses to outside speakers. According to the program director:

Interview (Human Odyssey): Everybody, 125 students across these five sections, meet on Tuesdays for lab. The lab can be a film, it can be a speaker. All of the Littleton lectures that come are scheduled to come during our class period. Then on Wednesdays and Fridays the sections meet. Essentially, students are the discussion leaders with their questions. Drew Clark came in and talked about Virgil’s Aeneid and students really responded well to him. If you look at the syllabus, you can see there is a lab to accompany his lecture and there is a handout to accompany the lecture and a reading that complements what he talked about. We are talking about this whole idea of human motivation and war.

World History identifies Informed and Engaged Citizenship as a central focus of the sequence. The nature of content studied in HIST 1010 and 1020 asks students to demonstrate knowledge and understanding of the global development and expansion of social, political and cultural systems. Students are expected to recognize how these variables are integrated and, as a result, evoke social change. According to the program director, students occasionally compare historical events to contemporary issues, although this more difficult in HIST 1010 than in 1020.

Interview (World History): When you teach something like 1010 it’s difficult. I will try to offer some comparisons with the general patterns of political change. For example, under the Roman Republic, there were in two political factions, one was known as Populares and the other Optimates. The former claimed to represent the masses while the latter appeared to embody the interest of the elite. The division between the Populares and the Optimates does resemble, to some extent, the contemporary political division between the Democrat Party and the Republican Party; you know there’s some of that. For another example, when you talk about Greek history, you cannot afford not to discuss the issue of Democracy, and talk about the political structure, talk about assemblies, so on. And then of course you want to point out our democracy is ultimately attributable to Greek, especially Athenian democracy. And I always point out the existence of checks and balances under the Athenian political system. To some extent students get that. It’s just difficult when you talk about that early period to try to make direct connections.

From Objectives of the Human Odyssey Program. (fall, 2008). Department of History: Auburn University.
Informed and Engaged Citizenship is strongly emphasized in Technology and Civilization courses. This outcome is viewed as a key goal of the sequence, particularly students’ understanding of the social, political and cultural contribution of technology and science in the development of modern culture.

*Interview (Technology and Civilization)*: Informed and Engaged Citizenship, we don’t really think you can be an informed citizen if you don’t have some sense of the historical background of our civilization and of our institutions. So, I think our class helps contribute to that.

All interviewees cited readings, quizzes, exams and class discussions as assignments that contribute to students becoming informed and engaged citizens. One interviewee cited the importance and relevance of studying US history in achieving this goal:

*Interview (Technology and Civilization)*: You can’t understand the Civil War if you don’t understand what came before. The ideals of the founders, it’s clear when we’re talking about Democracy, even at Carthage, there’s really no area of history that we teach that you can’t find some sort of relationship to our history. And the notion of republicanism and representative government, students don’t know that we were a colony, they don’t understand the debate that went on, the Articles versus the Constitution, that that was another debate. And there are ways to inject that, hold them responsible for it so in the end they come out with all of this global history but they also know something from me about the US history and its formation, because they won’t get it otherwise. I do have the Constitution, the first ten amendments of the core Constitution as a link. I’ll refer to it and ask them to read it as an assignment. I think that’s our students should know our history.

Human Odyssey courses also emphasize Informed and Engaged Citizenship. Faculty dyads from diverse subjects develop unique approaches to discussing citizenship as it relates to philosophical issues of science. Discussion topics relevant to this outcome explored in the lectures and lab sections include cloning, nanotechnology, genomics, ecology and morality.

**Intercultural Knowledge and Diversity Awareness** is identified as a central focus of the World History sequence. Both courses examine the development of cultures within and outside the US and study the importance of diversity in a society’s evolution. Through lectures and assigned readings, students examine how racial differences impact global issues and situations. In some sections of World History, students are exposed to this outcome as early as the first day of class.

*Interview (World History)*: I talk about what we are trying to do here in this class in World History is to try and define ourselves through an explanation of World History. The reason for this emphasis on the present is that I tell them history is simply an extension and modification of the past. So then I talk about the objectives, I talk about what this course in intended to accomplish. Not just a narrative but explanation. And I talk about how different civilizations developed by the end of the eighteenth century and the different characteristics of these civilizations and I point out that those characteristics are qualitatively different. I then ask them the question, how does one explain the radically different outcomes in the evolution of these civilizations? And more importantly, are there common patterns in their evolution? Is it possible to develop a unifying framework that is capable of explaining the evolution of different civilizations? And then I get into a discussion of my conceptual framework. I talk about my theory, explaining key concepts such as primary tradition, secondary tradition,
Intercultural Knowledge and Diversity Awareness is a central focus of Technology and Civilization courses. Both courses expose students to unfamiliar cultures and discuss the impact of technology on a culture’s social evolution.

Interview (Technology and Civilization): It certainly contributes to Intercultural Knowledge and Diversity. Since we teach the class as a global course, we talk about all of the great traditions, the major traditions. So, we talk about Chinese history, Japanese history and Southeast Asia, North and South America, as well as talking about Europe, the Mediterranean, and Africa. We do our best to make it a global survey.

In Human Odyssey, students are regularly exposed to issues of diversity. Also identified as a course outcome, faculty members are expected to provide an environment that nurtures tolerance and respect for diversity39. Topics students examine include Greek and Roman cultures’ influence on modern mathematics and architecture and relationships between significant cultural events and diversity such as the French Revolution, the Tuskegee experiments and war.

Students are expected to discuss impacts of these events in cultural development. In addition to readings, students often watch films documenting cultural influence in civilizations. Such films include The Greeks: Crucible of Civilization and Power of the Past (PBS) and the James Burke documentaries Point of View and Infinitely Reasonable (BBC).

World History courses do not ask students to demonstrate scientific literacy in either course; topics of science and technology are not addressed.

Scientific Literacy is covered with a fair amount of depth in HIST 1210 and is a central focus of HIST 1220. In both courses, students are expected to carefully examine the philosophical and historical foundations of technology and its influence on the promotion of civilizations. Topics introduced in 1210 often include the role of technology and society in Asian civilizations such as China and India, European Imperialism, economic expansion in Europe and the Scientific Revolution.40

Interview (Technology and Civilization): We do a lot of history of science in the course, but not so much as to change the emphasis; the emphasis is really on technology. I think we are making a contribution to Scientific Literacy as it’s been defined here. A major contribution, because if people don’t really understand the history of these things, and they’re just given material from a

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very presentist point of view, they don’t understand the struggle it was originally to evolve the things that they’re learning about. So, they can never appreciate really how important what they’re learning is. But once you’ve shown them how civilizations have had to hammer these things out over time and how knowledge gets lost, and has to be rediscovered, and how it laboriously spreads from one area into another, I think it gives the scientist, the engineer a really good sense of what their career is all about. That they’re contributing to some long-standing human project. So, I would hope that they come out of it both feeling more committed to their profession but also with a sense of the larger context their profession exists in.

In HIST 1220, students are given a more focused examination of how scientific discoveries and advancements are all integrated and serve as a basis for modern technologies. Topics include, but are not limited to, technology and imperialism, development of machines, the role of technology in WWII and the space revolution, the digital age and nanotechnology.

Human Odyssey courses also ask students to demonstrate Scientific Literacy skills, as this outcome identified as a central focus. Students regularly discuss and debate ethical issues related to modern science through completing primary source readings. Topics include early issues of Greek science, relativity, particle physics and human development. Discussion of human evolution is followed by lab sessions where students examine different samples of human skulls and debate issues of chronology. According to the program director, this assignment often challenges students’ personal value systems:

*Interview (Human Odyssey):* Oh yeah, this is the first major challenge. And you know what, we’re going to keep talking about it, you’re going to keep talking about it, in the context of that we have a lot of skulls they all look at in this evolution section. As they look at them, they are asked to deal with what to do with these things that are or aren’t human. We pass them around and let them look at them and ask them to compare the sizes of their skulls. So, it’s really neat hand-on stuff you can do in a classroom.

Documentary films, in addition to primary source readings, are regularly shown as a means of presenting scientific literacy in a broader context of history.

*Interview (Human Odyssey):* Our history is not a history where they learn chronology, dates and whatnot. As an example, they watch a film on the French Revolution. I don’t care about the dates, but then the discussion is “What were the ideas these people were fighting about?” and “Why is that important?”, and “What’s the significance of that occurring well after the American Revolution and before the American Civil War?” So we’re trying to get them to think across that way about this whole business of people determining their destiny. We want them to talk more and discuss more the basic ideas.
Aesthetic Appreciation and Engagement is viewed as only covered marginally in World History courses. In the first Technology and Civilization course (HIST 1210), students are presented with various artifacts and must determine their historical value in the development of societies. In addition to having students create artifacts like quipu, students are also given visual representations of history. A unique aspect of the course in its creation during the 1970s was the integration of slides. Students are still shown slides representing visual elements of technology as a means of visually understanding the relationships between science, engineering and the humanities.

Interview (Technology and Civilization): We still use slides pretty extensively in the plenary lecture at the beginning of the week, so everyone in Tech and Civ gets a kind of visual education and a number of us use what you could call art history slides. We make points about technology and about different cultures by looking at their artistic works. So, there’s a kind of aesthetic education going on at the same time. It’s pretty steady; I mean they get this week after week after week, so I think gradually they become more tuned into the visual side of the course.

Arts and aesthetics are an important aspect of the Human Odyssey courses. Attending plays or lectures, in addition to completing primary source readings, are all considered means of aesthetically thinking about the world. Students are required to attend speakers and are often asked to attend cultural events in the surrounding community.

Interview (Human Odyssey): The theatre is going to be doing this Picasso at the Lapin Agile, this has been a play that has been produced on Broadway and we are doing it here. It’s about Picasso and Einstein meeting in a bar, it’s a science-artistic interaction written by Steve Martin. The two look at the commonalities of these creative minds, the scientist and the humanist.

Assessment

Aside from a written qualitative exit interview administered in some sections of World History, the sequence is not formally assessed. In general, faculty use exam grade distributions as a means of determining whether or not students are achieving course outcomes. According to the program director, “I have not asked people how they assess the outcomes of their teaching.”
Technology and Civilization courses are also not formally assessed, however, upper level courses in the Department of History are. One interviewee addressed this:

*Interview (Technology and Civilization):* We don’t, conceptually. We didn’t do it for the core; we did it for the graduate program and the major courses. We came up with various means of assessment to determine if we were meeting our goals and outcomes. We have not done it with Tech and Civ in the core here at all. And coming down the line obviously is that we are going to have to come up with a means of assessment for the core.

Informal means of assessment in the courses include weekly meetings where Technology and Civilization faculty members discuss pedagogical approaches to presenting information and provide feedback on teaching approaches. Also, faculty members meet at the end of each semester to review syllabi, exam scores and share student feedback. Possible means of assessment explored include administering a standardized test, possibly a pre and a post test. Student evaluations and chair evaluations are also used to help individual faculty members assess their courses and instructional approaches.

Human Odyssey courses are assessed informally among the program director and faculty through regular e-mail discussions of the course readings. The curriculum is also evaluated based on shared feedback from faculty. In the past, the program has administered pre-tests where students are given key words and concepts and asked to identify whether or not they recognize them.

*Interview (Human Odyssey):* Actually we did it [pre/post testing], and we found about what we thought we were going to find and we’re not sure that we can say anything more than what final exams would indicate. Let’s say you do two hours worth of written final exams where people have to respond to certain questions and incorporate their readings and do critical thinking, all that. And you evaluation that and do a comparative thing; you’ve got some internal standards where you put them each into three stacks: the very best, the very worst and the average.

A possible means of assessment discussed would be asking students to evaluate each of the primary source readings. According to the program director, an advantage to this approach might include greater understanding of the diversity in ideas. “They would be more accepting of the kinds of stuff they are reading.”

Suggestions

A suggestion given by the program director in World History includes providing leave time for faculty to develop new methods and approaches for teaching concepts to students.

*Interview (World History):* I have no problem with the existing structure. I believe that the key to strengthening the core curriculum is to offer teaching faculty leave time to develop fresh and innovative approaches to teaching. Because people simply don’t have the time, especially new faculty. What do they know about World History? They are trained as an Americanists, as Europeanists, they join the History faculty one day and the next day they are told to teach World History. They have no notes, no broad knowledge of world history, but they must begin teaching large World History sections right away. All they do, during their first semester of employment at Auburn anyway, is follow the structure of their chosen textbook and try to keep themselves afloat, never
having the time to develop an intellectual grasp of the material, unable to develop fresh perspectives or innovative approaches to teaching. What we do know is that the university can and should do, in my opinion, is offer the teaching faculty leave time to sit down, to critically examine their assumptions, to reflect on their existing conceptualizations, and to see if they can come up with novel and superior ways to conceptualize World History. I believe that all things considered, this is the key to improving the quality of the core curriculum.

One member of the Technology and Civilization faculty suggested students be exposed to all history offered in the core, as opposed to just one perspective or emphasis. Others suggested keeping a core curriculum and establishing a foreign language requirement for all students.

*Interview (Technology and Civilization)*: I think we need United States history as part of the core. Some years ago, someone came and lectured us about incorporating more civics in the courses. At every opportunity I inject the Constitution, [and] our colonial roots. I know that they’re never going to get it otherwise. I try to keep it somehow contextual. But for instance, you can’t understand the Civil War if you don’t understand what came before.

*Interview (Technology and Civilization)*: I would make a foreign language requirement in the university core. Many, many colleges and universities have a foreign language requirement in their core. It seems to me to be a reasonable thing to ask for.

*Interview (Technology and Civilization)*: My recommendation would be to resist, to the utmost of our abilities, any effort to do away with the core or erode key components of the core.

Comments from the program director in Human Odyssey cited the importance of the core curriculum to exposing students to new and diverse ideas.

*Interview (Human Odyssey)*: I think the core provides a very valuable function in the engineering of the university. I think that this kind of mandatory exposure to different ways of dealing with the world. Over time, the core exposes people to 13 different faculty with different opinions about the world and different ideas, plus they’re also starting in their majors. I think it’s really valuable. I’d probably like to see it expanded somewhat. I love the diversity of ideas in a core, I like the idea of a core. I don’t know that I’d change anything more, but I also think that this particular course in the core is a good idea, it exposes them in one semester to more things. I think it’s good to do that to 18 year old kids.
Table 7 History Core Courses and General Education Outcomes

Using the following scale, can you identify to what extent the following college-level General Education Outcomes apply to the courses you oversee?

- 1=is a central focus of the course
- 2=not central but covered with a fair amount of depth
- 3=covered marginally
- 4=not covered at all

<table>
<thead>
<tr>
<th>General Education Goals</th>
<th>General Education Outcomes: Students will...</th>
<th>HIST 1010</th>
<th>HIST 1020</th>
<th>HIST 1210*</th>
<th>HIST 1220*</th>
<th>UNIV 2710</th>
<th>UNIV 2720</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information Literacy</td>
<td>Demonstrate information literacy</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Analytical Skills and Critical Thinking</td>
<td>Read analytically and critically</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Critique an argument effectively</td>
<td>4</td>
<td>4</td>
<td>2.8</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Construct an effective argument</td>
<td>4</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Apply simple mathematical methods to the solution of real-world problems.</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Select and use techniques and methods to solve open-ended, ill-defined or multi-step problems</td>
<td>4</td>
<td>4</td>
<td>2.8</td>
<td>2.8</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Effective Communication</td>
<td>Write effectively</td>
<td>4</td>
<td>4</td>
<td>1.4</td>
<td>1.2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Demonstrate effective oral communication skills</td>
<td>4</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Informed and Engaged Citizenship</td>
<td>Be informed and engaged citizens of the United States and the world</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Intercultural Knowledge and Diversity Awareness</td>
<td>Understand and appreciate the diversity of and within societies of the United States and the world</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Scientific Literacy</td>
<td>Understand and appreciate methods and issues of science and technology</td>
<td>4</td>
<td>4</td>
<td>1.8</td>
<td>1.4</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Aesthetic Appreciation and Engagement</td>
<td>Understand and appreciate the arts and aesthetics as ways of knowing and engaging with the world</td>
<td>3</td>
<td>3</td>
<td>1.4</td>
<td>2.2</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

*Multiple faculty were interviewed for Technology and Civilization courses, mean scores of all respondents is presented.
Summary

Auburn University’s Core Curriculum Social Science requirements are satisfied by completing two courses from among two different groups of listed courses. Group I courses include Introduction to Anthropology, Global Geography, Introduction to Psychology and Sociology: Global Perspectives. Group II courses include Principles of Microeconomics, Political Economy and American Government in a Multicultural World. Based on 2007-2008 academic year data, Introduction to Psychology (PSYC 2010) is the most commonly taken of the Group I courses, with 2,608 student enrollments (22% of all enrollment across the seven standard courses and 43% of the Group I courses). Principles of Microeconomics (ECON 2020) is the most commonly taken of the Group II courses, with 3,544 student enrollment (30% of all enrollment across the seven standard courses and 63% of the Group II courses). Approximately half of the Social Science core sections (51%) and are taught by tenure/tenure-track faculty. The remaining sections are taught by Instructors (16%) and GTAs (33%). Depending on how the course is designed, the median class size varies from 29 to 89 students in Group I and from 27 to 75 students in Group II.

Information Literacy is strongly emphasized across all Social Science core courses. The Anthropology, Political Economy and American Government in a Multicultural World courses define Information Literacy as the ability to access and critically evaluate information contained within web sites. In the remaining Social Science courses, Information Literacy is perceived as asking students to complete readings of assigned texts.

Analytical Skills and Critical Thinking are viewed as a central focus in both groups of Social Science courses. Students learn how to read analytically and critically by completing assigned course readings. Many of the assigned readings enable students to effectively prepare for class discussions, quizzes and exams, while others help students develop individual arguments demonstrated in later assignments. Students learn to critique arguments presented by theorists and authors and examine discipline-specific concepts. Examples of these ideas and theories studied include Darwinism in Anthropology, immigration issues in Geography, personality disorders in Psychology, cultural rituals in Sociology, basic economic theory in Microeconomics and diverse political systems in Political Economy. Students are often asked to construct individual arguments through both written and oral responses to course readings. Students demonstrate multi-step or open-ended problem solving skills only in Anthropology, Psychology and Economics.

Effective Communication is not perceived as a central focus among any of the Social Science courses. While students are asked to complete short writing assignments, these assignments are not given with a grade penalty for proper or improper writing techniques. Similarly, students communicate orally through informal classroom discussions, but are not given formal oral communication assignments that are graded.

Both Informed and Engaged Citizenship and Intercultural Knowledge and Diversity Awareness are identified as essential to all Social Science courses. Several of the courses ask students to develop
interpersonal knowledge of these outcomes through completing short writing assignments, course readings, in-class discussions, homework assignments and lab sections.

Scientific Literacy is perceived to be a central focus in the Anthropology, Sociology, Psychology and Economics courses. In these courses, students are asked to apply scientific theories to solve social or theoretical problems presented. Aesthetic Appreciation and Engagement is not a central focus among any of the Social Science courses.

Grades are the primary means of assessing student performance the Social Science courses. Due to limitations of large class sizes, almost all of the courses are only able to assess student performance through exams and homework/lab assignments. Some of the respondents cited informal class discussions as means of assessing to what extent students comprehend course material. Many departments are working to establish more formal assessment plans.

Suggestions made regarding the Core Curriculum included creating an upper division core, requiring study abroad for all students, possibly adding a diversity requirement to the core and establishing a campus-wide resource for students to access help with individual writing skills.
Social Science Core Courses at Auburn University

Auburn University’s Social Science requirement is satisfied by completing six semester hours. Students must select one course from Group I and one from Group II:

**Group I**
- *Introduction to Anthropology: A 4-Field Approach* ............................................. ANTH 1000
- *Global Geography* ............................................................................................... GEOG 1010
- *Introduction to Psychology* ................................................................................ PSYC 2010
- *Sociology: Global Perspectives* ............................................................................. SOCY 1000

**Group II**
- *Principles of Microeconomics* ............................................................................. ECON 2020
- *Political Economy* ............................................................................................... POLI 1020
- *American Government in a Multicultural World* ............................................... POLI 1090

**Graph 1** Social Science Core Courses: Number of Students and Number of Sections (2007-2008 academic year)

**Graph 2** Instructors of Social Science Core Courses by Number of Students and Number of Sections (2007-2008 academic year, primary instructors of record for UNIV courses)
Using data from students who received baccalaureate degrees in summer 2006 through spring 2008, this report analyzes how Core Social Science courses figure in students’ course-taking patterns, how those patterns vary by college of enrollment, and how students perform in those courses. We included all AP, transfer credits as well as successful completions of Core Social Science courses at Auburn – where “successful” means that the student received a grade of “D” or higher. If a student took the same course several times, we selected a record with the highest grade earned. The following graphs are based on student-course records, so that students are counted once for each Core Social Science course they successfully took. Students take Core Social Science courses for a variety of reasons other than fulfilling the requirements of the Core Curriculum.

**Graph 3** Social Science Core: Section Sizes (2007-2008 academic year)

**Graph 8.4** Successful Completions of Social Science Core Courses by Recent Graduates
*Social Science courses were offered prior to Auburn conversion to semester system and included UNIV 0101 (Social Science: Society, Culture and Environment), UNIV 0102 (Social Science: Political Economy), and UNIV
0103 (Social Science: Individual and Society).

Observations:

- AP and transfer credits account for 26% of Core Social Science credits earned in courses from Group I (10% in Anthropology, 1% in Geography, 39% in Psychology, and 23% in Sociology) and 13% in courses from Group II (18% in Microeconomics and 0% in Political Economy and American Government).
- Successful completions of Core Social Science courses are not distributed evenly among the available options: in Group I Anthropology accounts for 8% of Core Social Science credits, Geography for 12%, Psychology for 43%, and Sociology for 37%; in Group II Economics accounts for 62%, Political Economy for 21%, and American Government for 16%.
- Overall, students complete Core Social Science courses early in their academic careers: 57% of successful Core Social Science Group I completions at Auburn were taken by students in their freshman year and 24% in their sophomore year, 11% in their junior year, and 8% in their senior year. About 38% of successful Core Social Science Group II completions at Auburn were taken by students in their freshman year, 38% in their sophomore year, 15% in their junior year, and 9% in their senior year.
- Based on the following charts, the distribution of Core course completions among the eligible Group I Social Sciences does not vary markedly by students’ college of graduation. The distribution of Core course completions among the eligible Group II Social Sciences varies by college of graduation. For example, the vast majority (94%) of graduates of College of Agriculture took Principles of Microeconomics. Only about 39% of graduates of College of Liberal Arts took Principles of Microeconomics.

**Graph 8.5.1** Distribution of Core course completions for the **Core Social Science Group I** by College of graduation
The image shows a bar graph titled "Distribution of Core course completions among the Core Social Science Group II by college of graduation." The graph includes data for various colleges such as College of Arch Design and Const, College of Sciences & Mathematics, College of Agriculture, College of Business, College of Education, College of Engineering, College of Human Sciences, College of Liberal Arts, School of Forestry & Wildlife Sci, and School of Nursing. Each college's bar graph is color-coded to represent different categories: ECON, POL.EC., and AMER.GOV.

Overview of Courses

Courses offered in Group I of the Social Sciences introduce students to basic methods of study and content within social sciences. Specifically, the courses enable students to examine human behavior and how it is influenced by factors such as culture, gender, geographic location, historical foundations, etc. All of the courses in Group I place a strong emphasis on enhancing students’ understanding and appreciation of diversity as well as on analytical skills and critical thinking.

- **Introduction to Anthropology: A 4-Field Approach (ANTH 1000)** introduces students to the study of human evolution, early civilizations and globalization, linguistic and cultural problems using the four sub-fields of anthropology: biological/physical anthropology, archaeology, cultural anthropology and linguistics.
- **Global Geography (GEOG 1010)** examines spatial and locational context for analyzing change in the contemporary world, including elements of both physical and cultural environments.
- **Introduction to Psychology (PSYC 2010)** introduces students to the various subfields of psychology.
- **Sociology: Global Perspectives (SOCI 1000)** provides an introduction to the study of social and cultural patterns of society.

Courses offered in Group II of the Social Sciences emphasize social science theories from economic and political perspectives. Specifically, the courses introduce students to concepts of different forms of government as well as to international, economic, and political issues and how issues affect the greater global community.

- **Principles of Microeconomics (ECON 2020)** introduces students to Economic principles emphasizing scarcity/choice, consumer behavior, supply/demand, markets, production/cost, globalization of markets, role of government, market/government failure.
• **Political Economy (POLI 1020)** examines the two-way interaction between politics and the economy with special attention to contemporary issues of public policy.

• **American Government in a Multicultural World (POLI 1090)** introduces students to American political institutions, processes and behavior in comparative context, with special attention to the ways in which cultural and social diversity in the US has impacted its politics.

Social Science Courses and General Education Outcomes

Outcomes for the Group I Core Courses, as identified by the Program Directors and Instructors, include an emphasis on exposing students to historical foundations, basic concepts, theoretical perspectives and research approaches unique to each discipline. Group I Program Directors and Instructors stated the major goals for their courses as follows:

• **Introduction to Anthropology:** We want them to know all of the basic concepts and some of the general approaches or theories for the sub-disciplines and we want them to have basic knowledge of the methods within the field. And that goes from archaeological methods to methods in physical anthropology that deal with analysis of the body and things you might even think of that would go into forensics. And then methods in language study and how to do interviews, how to gain rapport with people and how to collect data on any social problem.

• **Global Geography:** Most students walking in there haven’t had any geography since 7th grade. And it was half a semester up to a semester at most. The general thing that happened for most of us, no matter where you went to school, is that we memorized capitals, continents and countries. For us, ours is also pulling out what geography encompasses. We said that’s the 4th grade part of it, but the higher level is that it’s about spatial relationships, so we focus on case studies and how geographers look at the world.

• **Introduction to Psychology:** The overarching goal for this course is primarily to give students an accurate and truthful sense of what psychology is, what its values are, and, most importantly, how it can be applied to everyday life and to everyday problem solving. It really is, more than anything else, a course on appreciating psychology as a practical and applied discipline. Most of the students who take this course will never ever take another PSYCH class, so it’s important that they understand psychology as both a basic science and an applied discipline—psychological science provides people with myriad ways of improving their life by helping us understanding the variables of which our thinking and behaving are a function and using that knowledge for self-improvement.

• **Introduction to Sociology:** [Students] leave the course with an understanding of society and inequality and one’s social location and how that impacts your life chances and opportunities. Being able to apply that to your own life is an important component. Conveying an understanding of how sociology contributes to our understanding of history and the contemporary world. And, again, being able to apply it to real-world situations. And having a healthy skepticism of over-simplified explanations of human behavior.
Outcomes for the Group II Core Courses, as identified by the Program Directors and Instructors, emphasize fundamental perspectives and how cultural variables impact social and global operations. Group II Program Directors and Instructors stated the major goals for their courses as follows:

- **Principles of Economics**: The first course is an overview of how our free enterprise system works. [Some] chapters deal more with the consumer side, and [some] deal with the business side, including a little accounting and structure, and then individual chapters deal with competitive markets, monopolies, labor markets, and principles of international trade.
- **Political Economy**: To introduce students to basic theories and ideas of political economies, such as international relations or American government and understanding economic issues.
- **American Government in a Multicultural World**: To expose students to various topics of American government, including elections, presidency and judiciary. Exploring economic issues that become political issues and how the two systems interact to produce policy.

Group I Core Curriculum courses that place strong emphasis on **Information Literacy** include Introduction to Anthropology, Introduction to Psychology, and Introduction to Sociology. Within the Anthropology course, Information Literacy involves asking students to complete lab assignments where they visit, read and evaluate a web site created by the Program Director. The web site identifies environmental issues faced by citizens of India. Students are asked to visit the site, read, and answer questions related to the site. According to the Program Director:

**Interview (Anthropology)**: Some [labs] towards the end ask students to surf the web a little bit and get some information. One of the assignments is an online resource assignment and that's a web page I made. They have to go in and read all of that stuff and answer questions.

Examples of lab assignment and questions include:

Click on “Introduction to the Envirolitigators” and then on “Introduction” in the top row. First read the introduction page and answer the following:

1. What is the focus of this web site?
2. What environmental problem is at issue here?
3. What cultural issues come into play when talking about law, rivers, and water?
4. What is public interest litigation?

In Introduction to Psychology, students demonstrate Information Literacy through completing assigned readings of small units of information:

**Interview (Psychology)**: Students do a lot of reading and every week they either take short chapter quizzes or complete examinations over two chapters. We also hold

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41 [http://www.auburn.edu/~alleykd/envirolitigators](http://www.auburn.edu/~alleykd/envirolitigators).

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Office of Institutional Research and Assessment (OIRA)
periodic cumulative exams during the semester to give students a chance to remediate or relearn information. I’ve discovered that this approach to testing results in deeper and more long-term learning than that produced by other testing methods. Similarly, the Sociology Instructor interviewed also defined Information Literacy as mastery of course content. When identifying this outcome, the instructor indicated, “Students will be information literate through lectures and readings. That will be assessed through the exams, and students’ ability to use sociological concepts, and terms.”

Group II courses that place a strong emphasis on Information Literacy include Political Economy and American Government in a Multicultural World. The Program Director for these courses indicated that students are often asked to visit web sites from a list provided and respond to questions about what they’ve learned from the sites:

Interview (Political Science): One assignment I’ll have is web sites from about a dozen interest groups and send them [the students] there. You know, in some respects the Internet can do more for you faster than you could do yourself. If used appropriately, it’s really an extraordinary [channel]. They can get all of this information so much faster than I could give it to them. And on top of that, you can take a class of 300 students, give them a dozen or so websites and there’s something in there for everybody. There’s one for the NRA, the ACLU—well some kids, they’re going to want to find out about that, others are going to want to blow it up.

All Group I courses focus on Analytical Skills and Critical Thinking, especially on the outcome students will read analytically and critically. Each of the Program Directors and Instructors perceived this outcome to be demonstrated by reading assigned course texts and supplemental materials. In the Introduction to Anthropology course, students are assigned readings they must complete in order to prepare for class lecture, exams and lab assignments. According to the course lab manual, topics students read about include basic concepts of evolution and anthropological approaches to studying archaeology.

In Geography, students must read analytically and critically in order to prepare for exams and response quizzes given during class. Readings cover topics such as globalization, human geography, political geography in Africa, the Middle East, social welfare in Russia, the Cold War and the historical and cultural geography of South Asia. Similarly, Psychology assigns students readings involving such topics as historical foundations of psychology, the human nervous system, human evolution, human brain development, psychopathology and social psychology. The Program Director indicated students are expected to read in order to prepare for exams, quizzes and lab/lecture session discussions:

Interview (Psychology): The purpose of our near-weekly quizzes is to get students into the reading before they take exams. We also hold students responsible for learning vocabulary words—in order to understand any discipline, students must first understand its language.

The text commonly used in Introduction to Psychology assists students’ critical thinking and analytical skills by providing students with critical thinking questions throughout the chapters.
In Sociology, students are assigned readings from an introductory text that illustrates diversity among human cultures. According to the Instructor, “We also read a classic anthropological reading, which is Horace Miner’s *Body Ritual among the Nacirema*, it’s read in many introductory social science courses. Then, students must write a short essay that demonstrates their ability to apply the concepts in the reading.”

All Group II courses identify reading critically and analytically as a central focus. According to the Program Director in Economics, students are expected to complete assigned readings and corresponding homework questions. In selected classes, the required texts are packaged with software that quizzes the students on their reading assignments. These quizzes contain questions that require students to apply critical thinking skills. If a question is answered incorrectly, the student is redirected to the appropriate section of the text for re-reading, with their final score reflecting their performance and instances of required re-readings:

*Interview (Economics):* This is an instructional program that a Stanford economist developed and is now being used in other disciplines (accounting and finance). It assigns the students homework, they submit all of the answers over the Internet, it grades it and the grades are given back to the course instructor.

A sample Economics homework question is provided below:

1. **Indicate how each of the following changes would influence the incentive of a decision maker to undertake the action described.**

   a. A reduction in the temperature from 80° to 50° on one’s decision to go swimming.
   b. A change in the meeting time of the introductory economics course from 11:00 A.M. to 7:30 A.M. on one’s decision to attend the lectures.
   c. A reduction in the number of exam questions that relate directly to the text on the student’s decision to read the text.
   d. An increase in the price of beef on one’s decision to buy steak.
   e. An increase in the rental rates of apartments on one’s decision to build additional rental housing units.

Similarly, both Political Science courses ask students to complete assigned readings to prepare for exams and class discussions.

Group I Program Directors and Instructors from Anthropology, Psychology and Sociology focus on teaching students how to **critique an argument effectively**. Respondents identified this outcome as essential for both basic social science reasoning and preparing for class discussions.

In Anthropology, multiple readings expose students to contrasting theories and arguments. Topics students are exposed to include: arguments over basic forensic reasoning, over factors contributing to the rise of civilization, over positive and negative effects of civilization on forest ecosystems, and over effects of trade on indigenous populations. According to the Program Director:

*Interview (Anthropology):* In terms of the arguments, we have them read introductory texts. They have to know there are different perspectives in science and that arguments change over time, but we don’t get too far into that issue…an argument based approach like you would do in communication or something.

An example of one fundamental argument students discuss in Anthropology is Francis Galton’s theory of the predominance of Nature over Nurture.

**NATURE VERSUS NURTURE?**

For over a century a significant debate has raged about the nature of what creates an individual. This debate has often been called the **Nature versus Nurture controversy**, and was originally based on the ideas of Francis Galton. In this controversy very basic questions are asked about which is the strongest influence in the development of the individual human, your genetic constitution or the environment. The idea of one or the other has had strong appeal to many behavioral scientists. Some of the debate over nature versus nurture is not often logical, and most serious scientists would now suggest a distinctive interplay between both your genes and your environment for the development of the human individual.

In Psychology, students are asked to critique arguments involving topics such as evolution, genetics and addictive behaviors. Much like students in Anthropology, Psychology students also assess arguments.

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surrounding the importance and legitimacy of studying psychological human behavior. The Program Director indicated students’ ability to critique arguments also builds on their Information Literacy skills:

*Interview (Psychology)*: Ability to critique an argument effectively -- yes in a sense that they are able to understand what an argument is in looking at reasons for human behavior. It’s not like Philosophy, like a Logic course. But it is taking psychological information and trying to determine whether it came from a credible source, what alternative arguments might be, are there data available that support any of those points and how should I make a decision.

<table>
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<tr>
<th>The Mind Is Adaptive</th>
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<tr>
<td>The third theme of psychological science is that the mind has been shaped by evolution. Humans are products of both biological and cultural evolution, each of which exerts an influence over how people think and behave. From an evolutionary theory perspective, the brain is an organ that has evolved over millions of years to solve problems related to survival and reproduction. During the course of human evolution, those ancestors who were able to solve survival problems and adapt to their environments were most likely to reproduce and pass along their genes. That is, those who inherited characteristics that helped them survive in their particular environments had a selective advantage over those who did not. Random gene mutations endowed some of our ancestors with physical characteristics, skills, and abilities, known as adaptations, that increased their chances of survival and reproduction, which means that their genes were passed along to future generations. Of course, if the environment changes, what once was adaptive might become maladaptive. The ability to store fat in the body may have been adaptive when the food supply was scarce, but it might be maladaptive when food is abundant. Further complexities in the process of natural selection are discussed in Chapter 3.</td>
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In Sociology, students read and apply basic sociological theory. Once students fully understand the two primary macro schools of thought (Structural Functionalist and Social Conflict Perspectives), the issues and behaviors explored in the remainder of the course are all discussed and critiqued using these theoretical tools. Examples include: applying functionalism and conflict analyses to such varied topics as sports, the educational system and the domestic division of labor.

Students who take Economics for their Group II requirement learn in some depth how to critique an argument. In addition to completing course readings, the Program Director indicated, students in his classes watch examples from contemporary films and television to gain a basis for arguing a particular economic theory or idea:

*Interview (Economics)*: What I have been doing ever since I've been teaching auditorium classes is giving some teaching aids that involve me showing a two minute clip of a movie. There is a fairly well-know economist who has developed this approach, sort of “economics at the movies.” So, for instance, yesterday we saw a two minute clip of Bill Murray’s Groundhog Day which illustrates the concept of learning by doing. We saw about a two minute clip of Pretty Woman. He was trying to hire her for a week of her accompaniment; there was a barter back and forth. Coyote Ugly contained a bar room scene where these ladies were bidding on an evening with a college kid, illustrating an auction. So, then I show some clips narrated by John Stossell, things like rent control, agricultural subsidies, problems with international trade, etc.
Political Science courses also ask students to critique arguments through completing assigned course readings in order to participate in class discussions.

In all Group I Social Science courses, students are commonly asked to **construct an argument effectively**. Assignments vary from informal class discussions to formal research papers. However, students are regularly asked to structure individual arguments using reasonable assumptions and to provide supporting evidence.

In Anthropology, students argue basic anthropological evidence and forensic reasoning during structured lab sessions. For example, when studying the Anthropology of Art, students identify elements of American culture and argue their value and meaning as art and then apply their argument to masks in the New Guinea culture.45

### THE ANTHROPOLOGY OF ART

1. Provide an example of status elements in body decoration in American culture.
2. How does this function to achieve meaning?
3. What are some of the functions religious art serve?
4. Would it be correct to call the art of the central highlands of New Guinea as “primitive”? Why?
5. The use of masks may vary slightly from culture to culture. In some, the masks may be used once and then discarded while in other cultures the item may take on very important significance. What are some of the reasons for this?

Geography asks students to construct effective arguments through responding to questions asked during class quizzes. According to the Program Director:

*Interview (Geography):* I do response quizzes along the way which ask students to be prepared to come in and write on this, and that way I can do little bits, but it also lets me get an insight into ‘did they get this?’

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Sample Geography quiz questions might include:

1. Can you explain the greater economic growth in Poland, the Czech Republic, Hungary, and Slovenia in the 1990s compared to that in the other East Central Europe countries?
2. What are the causes of, and possible cures for, the strife in Bosnia and Kosovo?
3. What happened to urban landscapes in Communist Europe in the decades after World War II?

In Psychology, students complete short answer reading quizzes and construct an argument in their response.

Students in Sociology are asked to construct arguments through several short writing assignments. For example, students must complete an assignment involving a song analysis. The Instructor provides a brief discussion of this, followed by the actual assignment given to students:

*Interview (Sociology):* They also do in my class a song analysis where they pick any popular song from any musical genre or era and give a sociological analysis of the importance of the song’s message and its impact on social change. So, typically they pick something having to do with some sort of social injustice or social movement, e.g., war, poverty or environment. They can pick any song, even if I’ve never heard of it. So from, for example, the 60s you get a lot of Bob Dylan and John Lennon, but also a lot of hip-hop, some country. I don’t require them to submit the actual song, but they do have to provide the lyrics.

Parameters for the song analysis assignment are provided:

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<th>Parameters for the song analysis assignment are provided:</th>
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<td><strong>The purpose of this project is for you to apply your understanding of popular music and how certain songs impact social change. You will choose a song that represents a call for change in some area of society/social life/behavior. You will write a two-page paper on social relevance of the song and its message.</strong></td>
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<tr>
<td><strong>Song Choice</strong></td>
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<tr>
<td>- Your song choice must reflect a call for change. Any topic or issue is fine, but the artist must be protesting something and emphasizing the need for change.</td>
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<tr>
<td>- Any popular music genre is acceptable (e.g., Rock, Hip Hop, Country), but please choose only songs with English lyrics, and avoid folk songs, church hymns, and patriotic songs such as the national anthem.</td>
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<tr>
<td>- You may choose a song from any era, but you must discuss the historic and social relevance of the era in relation to the song, no matter which era your song is from.</td>
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<tr>
<td><strong>Elements to Cover in the Paper</strong></td>
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<td>- Brief introduction to the problem/issue, its history, and its sociological relevance.</td>
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<td>- Description of how the song is related to the particular issue and the song’s message about the issue.</td>
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<td>- Include background information on the artist/band as well as social factors that may have contributed to when and why the song was written.</td>
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<tr>
<td>- Cite specific lyrics that are especially useful in understanding the song’s importance in relation to the issue. (Such citations should be very focused and limited because the song’s complete lyrics will...</td>
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46 Bradshaw et al., (p.124).
47 Ware, A. (fall, 2008). *Song analysis paper.* Department of Sociology, Anthropology and Social Work: Auburn University.
be provided on a separate page – see below.)
- Discuss how non-lyrical elements (e.g., beat; tempo; melody; vocals; etc.) contribute to the mood/message of the song.
- Briefly discuss the significance of the song in relation to social change.

**Interview (Sociology):** A second assignment involves writing a self-assessment at the end of the semester that demonstrates the students’ ability to critically evaluate their own social locations in various social hierarchies (e.g., race, class, gender) and argue how these social forces have impacted – positively or negatively – their personal beliefs, behaviors and life course.

Students in Economics are asked to construct arguments in answer to open-ended questions following the assigned readings. A sample question is provided:

> “The government should provide such goods as health care, education, and highways because it can provide them for free.” Is this statement true or false? Explain your answer.

Of the Group I Social Science courses, only Anthropology and Geography ask students to **apply simple mathematical methods to the solution of real-world problems.** In Anthropology, students complete a genetics exercise. According to the Program Director, “We don’t do mathematical models except for a genetic exercise where they do have to do some simple math to talk about transmission of traits.” Students are asked to use simple mathematical methods to determine the age of skull specimens using cranial capacity and a Morphology chart. Students are also asked to use mathematical formulas to determine body stature estimates, as illustrated below.

One of the standard formulas is as follows:

\[
2.32 \times \text{femur length in centimeters} \pm 66.53 + 3.94
\]

An example of this formula where the femur length is 46 centimeters would be:

\[
2.32 \times 46 = 106.72 + 66.53 = 173.25 \pm 3.94
\]

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48 Gwartney et al. (p.19).
In Geography, students are asked to complete online exercises involving atlases. As stated by the Program Director, “I have some online exercises where, using Blackboard, they work with an atlas. And those work in conjunction with the topics so they answer questions based on their atlas.”

Asking students to **select and use techniques and methods to solve open-ended, ill-defined or multi-step problems** is only referred to as covered with a fair amount of depth or marginally by Program Directors in Anthropology and Psychology.

In Anthropology, students must complete genetics exercises where they determine genetic probability of traits and use various forms of statistics to solve problems. An example of this type of assignment is provided below. In this question, students use methods such as the Punnett Square to determine genetic probability.  

**PUNNETT SQUARE**

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**Problem.** Why would all of the sons of a mating between a red green color blind male and a female who is homozygous dominant for this trait be normal in terms of blindness?

In Psychology, students learn about basic approaches and methodologies, such as scientific inquiry and non-experimental methods, in psychological research. According to the Program Director, “Students get repetitive exposure with applications of research methods, so they learn the basic fundamentals of how a scientific study is conducted, including the importance of random assignment, the use of experimental and control groups, basic data analysis, and how to draw conclusions from empirical evidence.”

Economics asks students to use required software in order to apply simple mathematical methods to the solution of real-world problems. This is perceived by the Program Director as an advantage to students, who thus gain experience with practical applications:

**Interview (Economics):** Well, the way this software has been structured, it might involve something like answering a multiple choice question; it may involve something like taking some data given in a chart and graphing it. Using a cursor, they can load the data onto a graph; they can make a supply/demand diagram. You’ve got to know how to adjust the supply curve; it’s just a neat program to demonstrate basic concepts.

Students are asked to use methods such as regular and equilibrium calculators to determine price. Students must then use the answer in a corresponding graph question. An example is provided below.

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51 Gwartney et. al. (p.19).

Core Curriculum Oversight Committee
Office of Institutional Research and Assessment (OIRA)
None of the Social Science courses place an emphasis on asking students to write effectively, if that term means demonstrating effective rhetorical strategies, creating multiple drafts for revising and editing, and demonstrating knowledge of genre conversions, including conventions related to content, format, structure, paragraphing, tone, style, and documentation, as defined by the General Education Outcomes. Aside from short writing assignments, many of which are informal, students are not asked to demonstrate written communication skills. Reasons identified by several respondents include class size and increased emphasis on content over style. According to the Sociology Instructor:

*Interview (Sociology):* We also, to my disappointment, can't help students with writing effectively. But, even in the papers, I sought out resources for students on campus. I take off for grammar and punctuation in my assignments, but it's more about them getting the content. I don't teach them to write effectively. I do correct it, but then I give it to them.

**Oral communication skills** are not cited as a central focus among any of the Social Science courses. Aside from informal class discussions, students are not asked to complete assignments where oral communication skills are evaluated. A sample of responses to questions about this outcome included:

*Interview (Sociology):* I would say some [oral communication], certainly not all students, but some because of the nature of the classroom discussion. I would say for that we have demonstration of effective communication skills for some students, not all.

*Interview (Political Science):* There are no presentations to speak of in this class, so they are not getting a lot of oral communication unless they participate in class.

*Interview (Geography):* I can't say we have formal discussion groups. One of the things that sounds really silly is that, for example, there's restrictions on what you can do in a classroom based on organization, there's a big difference. One of the rooms I traditionally teach the core in is HC 2182, and it's predominately controlled by our department. When they redesigned it, they redesigned its sideways, so it's 80 students arched around on tiers. I think there are only 5 rows. So now in there I can actually have a much more involved discussion and more students can get involved. This semester I have 100 students in a room with 200 seats straight back. For the most part, the only people who participate in those discussions are the ones in the first 5-10 rows. So, it's difficult to have that kind of interaction.

All of the Group I Program Directors and Instructors cited the outcome **students will be informed and engaged citizens of the United States and the World** as either a central focus or covered with a fair amount of depth within their courses.

In Anthropology, the Program Director identifies this outcome as the foundation for the course. “Students to be Informed and Engaged Citizens, yes. I mean, that’s one of our key goals.” Lab assignments that ask students to demonstrate this outcome include examining archaeological evidence and discussing its impact on Alabama heritage. Using common lithic artifacts indigenous to this population, students learn how the culture was organized during A.D. 600-800, determine morphology
and identify where and how this location relates to Auburn University. A similar lab assignment asks students to read and discuss how the Hickory Creek settlements affected Indian towns during the 18th Century, and how modern economic development possibly threatens any archeological evidence.

By completing assigned readings and response quizzes, students taking Geography can come to understand the relationship between citizenship and spatial location. According to the Program Director, exposing students to issues involving global citizenship involves exposing them to social, political, economic and cultural systems:

*Interview (Geography):* One of the things if we talk about geography being about spatial relationships including the ability to move across space, you can say things like, under apartheid black South Africans couldn’t be in a white area for more than 24 hours without a white person’s permission. In Russia, even their own citizens couldn’t move about without permission. In China, you can’t just move wherever you want even today. So I use that as a way to link in and say this isn’t without precedents and try and understand the ability to move across space and go where you want to go is very powerful. And, understanding [governmental need to] control where your people are is a big factor. One of the things we talked about today regarding Germany is even though it’s very diverse, you also have a lot of nationalism. A lot of the European governments have these nationalistic governments forming. It’s that constant struggle of how do you keep that country together? I mean, democracy is a great thing, but it’s never easy.

Regarding citizenship, the Program Director for Psychology indicated, “Our book that has a lot of cross-cultural information in it, considering how different behaviors are developed, modified and used in different cultures.” Students discuss cross-cultural behaviors through informal class and lab discussions.

In Sociology, students are asked to complete short writing assignments where they examine a current event or issue such as global inequality. “Another one is a current events short paper where they just find a newspaper article, (this is done about ¾ of the way through the semester), and then relate it to anything we’ve talked about using sociological concepts or theories.” Through this assignment, students can practice using sociological concepts to analyze contemporary issues either within their own or other cultures.

Group II Program Directors also perceive Informed and Engaged Citizenship as a central focus of their courses. In Economics, the Program Director indicated students are asked to complete assigned readings focusing on topics such as entrepreneurship and labor markets:

*Interview (Economics):* We focus on consumers, individual businesses, decisions you might make if you are looking to hire, you know, looking at it from kind of the ground up, not necessarily the great big picture. But yet, we always touch on what’s happening in the rest of the world does have an impact on us, as we are seeing right now. And then, when I teach it, there are always two or three chapters that talk about labor

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markets, so I can talk about pay differences between men and women, I can talk about
difference in earnings by race.

All Political Science students are encouraged to read daily newspapers to prepare for class discussions.
The Political Science Department web site provides a list of links for students to visit54.

Intercultural knowledge and diversity awareness is cited by all Group I Program Directors and
Instructors as a central focus of all the courses. Specifically, these courses emphasize the value of
cultural diversity and expose students to global issues impacting societies.

Students in Anthropology discuss cultural issues such as public interest litigation and how it impacts
global environmental issues. According to the Program Director, this outcome is viewed as a central
focus for the course and is found in almost all of the assignments students must complete:

Interview (Anthropology): Well, first of all, it’s all global content so they are learning
about different people and different systems, so it’s all about economies, political
systems and religions. It’s a really good introduction to any kind of global subject.
Regarding engagement, there’s one lab assignment that corresponds to the web page I
made that discusses environmental justice in India. It highlights citizens who have
looked at environmental problems and brought their cases to the courts. Intercultural
Knowledge and Diversity and Awareness, yeah, it’s all about that….that’s our major
outcome.

54 [http://media.cla.auburn.edu/polisci/ug/ps/links.cfm](http://media.cla.auburn.edu/polisci/ug/ps/links.cfm)
An example of the public litigation lab assignment can be found under the Information Literacy outcome. Additional lab topics that emphasize diversity include cultural factors that may have influenced evolution or environmental effects of pollution on indigenous cultures.

Students in Geography gain greater awareness of cultures both within the US and the world through assigned course readings and preparation for response quizzes and exams. As stated by the Program Director, teaching students about diverse cultures themselves enables students to learn geographic relevance. A sample reading on Scandinavian culture is provided below:

### Culture

Culturally, the Scandinavians (Swedes, Danes, Norwegians) are Germanic peoples, specifically the northern branch, and descendants of Vikings. Their languages are closely related, and so are their histories (see Figure 3.4a). The inhabitants of the Faeroe Islands, Iceland, and Greenland are descendants of early Scandinavian settlers and likewise have similar cultures, though Greenland also is inhabited by Inuits. In contrast, the Finns and Sami (more commonly but derogatorily called Lapps) are Finno-Ugric peoples whose languages, related to Hungarian, are not Indo-European like most of the other languages of Europe and bear no resemblance to the Germanic languages of the Scandinavians. The Sami practice a traditional nomadic lifestyle of herding reindeer. They are found in the far northern reaches of Norway, Sweden, Finland, and adjacent areas of Russia. Evangelical Lutheran Christianity is the major religion for Northern Europeans (see Figure 3.4b). Officially, 90 percent or more of the population are Lutherans in the four major countries and in Iceland.

Psychology students demonstrate intercultural knowledge through course readings and class discussions. According to the Program Director, exposure to diverse research theories and their origins enables students to better understand the global community of Psychology.

In Sociology, students are asked to demonstrate knowledge and understanding of diversity issues through a short writing assignment where they identify significant aspects of their own culture.

According to the Instructor, this assignment enables students to understand the sociological perspective by comparing their own behaviors to behaviors commonly found in other cultures:

**Interview (Sociology):** One assignment that we do is an ethnocentric description of some common behavior/practice in our own society. So students are asked to write a paragraph or two where they pick any normal, common, everyday behavior in our society and write a description of that behavior or practice as if they were an “outsider.” Students describe the practice in terms of being very strange or odd or ritualistic. So, that’s one assignment that gives them the tools of seeing how some of our own behaviors could be seen or described as weird or strange (or even voodoo) from the perspective of outsiders who do not understand our cultural norms and values. Thus, we spend a lot of time identifying ways that we can recognize our own ethnocentric attitudes and discontinue some of them.

The Instructor also described a similar writing assignment involving analyzing television ads. Specifically, students must watch two consecutive hours of television and pay close attention to the commercials:

**Interview (Sociology):** Depending of course, on what time of day, which channel you choose, all of those things, who the target audience is, they have to recognize that a lot

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55 Bradshaw et al. (p.106).

Core Curriculum Oversight Committee
Office of Institutional Research and Assessment (OIRA)
of marketing also involves racial and gender decisions, as far as representation of who’s selling what. So the product is important, who is selling it, who is portrayed in a domestic environment as opposed to a professional environment and start noticing and seeing that we have these reproductions of “difference” in everyday life that we don’t even notice.

For this research project, you will watch two hours of television for the commercials. You will investigate and provide a written analysis of race and/or gender images in television advertisements. The purpose is to identify patterns of race/gender images in tv ads then provide a meaningful analysis of what you found. You will need some type of recording device/system (VCR or Tivo) in order to view the commercials multiple times and pause while viewing.

General patterns to look for:
- Differences in race or gender roles/images (family; occupation; financial)
- Character dialogue (victim; expert; voice-over; etc.)
- Types of products sold by whom (race/gender), for what audience (race/gender)

Specific ideas:
- What percentage of women (or men) in TV ads are shown: ... with children under age five? ... preparing food or cleaning? ... in a financial exchange or discussion? ... in sexual roles or performing provocative or suggestive gestures/dialogue? ... on cable channels from midnight to 2:00 am?
- What is the difference in the level of representation of racial minority groups in TV ads: when comparing network channels to "minority-owned/friendly" channels? .... when comparing daytime and nighttime airings on the same channel? .... when comparing the types of roles individuals of color are shown in (e.g., family/parent roles, expert/professional roles, victim roles)?
- In TV ads that target young children, what is the level of gender and/or racial diversity shown in two hours of viewing on Nickelodeon or the Cartoon Network? What products are portrayed as "gendered"? What percentage of ads show people/children of different races interacting?

Ultimately, the paper should describe: 1) the patterns observed (reported in numbers/percentages), 2) the images and messages conveyed, and 3) the impact of those images/messages on certain groups and society as a whole.

In addition to completing assignments asking them to argue issues of diversity, students in Sociology closely study issues of gender and society. According to the Instructor:

Interview (Sociology): We discuss Naomi Wolf’s The Beauty Myth (1991) in which Wolf asserts that there is a strong relationship between female liberation and beauty. That is, throughout history, the more legal/material hindrances women have broken through, the more strictly, heavily, and cruelly images of female beauty have come to weigh on us. We discuss cited examples such as the 1980s, when women breached the power structure in the workplace, eating disorders rose exponentially and cosmetic surgery became the fastest-growing industry; also, in the early 1990s, 33,000 women told researchers they would rather lose 10-15 pounds than any other goal; in one study, 80% of fourth-grade girls reported to be on a diet. After talking about these examples, students are asked to discuss their thoughts on this quotation by Wolf:
“With more money, power, and legal recognition than women have ever had before, in terms of how we feel about ourselves physically, women today are worse off than our unliberated grandmothers.”

Also, Students are asked to discuss their thoughts on these questions: a) In the US, is sexism as serious as racism? b) Are gender differences in income as problematic as racial differences in income? c) Why or why not?

All Group II courses ask students to demonstrate **Intercultural Knowledge and Diversity Awareness**. In Economics, students demonstrate this outcome through completing assigned readings, homework questions and informal class discussions.

According to the Program Director, Political Science courses ask students to demonstrate an appreciation of diversity within the United States and the world through participating in class discussions about contrasting political systems and processes:

**Interview (Political Science):** When you’re talking about the constitution, you’re talking about how they dealt with this notion of multiple groups in society and how you manage conflict in a very diverse society and how you promote diversity to ensure that the rights of minorities who might be unpopular might still be guaranteed. I constantly highlight the differences between how parliamentary democracies work and how our democracy works. So I do it systematically, but I don’t do it topically. Other people might do it differently.

**Students will understand and appreciate methods and issues of science and technology** is viewed as a central focus of Anthropology, Psychology and Sociology courses. In Anthropology, lab assignments require students to use common archaeological methods to identify fossils and determine morphology. An example of this assignment is below:

1. Cranial capacity. Examine the Morphology data folder for each specimen in Mystery Fossil. Record the value (or the range) of the cranial capacity in cc in the pertinent column in Table 1.
2. Covert the age of each specimen, as given in the setting data folder, to my BP and record that in the pertinent column in Table 1.

Psychology students demonstrate appreciation for scientific methods through completing course readings, participating in course discussion and preparing for quizzes and exams. According to the Program Director, “Scientific Literacy is important from the outset of the course—in fact, it is one of the primary learning objectives for the course.“

Students in Economics are asked to complete homework assignments similar to the example provided for selecting and using techniques and methods to solve open-ended, ill-defined or multi-step problems.

In Sociology, students learn to apply scientific methods by completing aforementioned short writing assignments, specifically the ethnocentric description of society and the social location of self. The
relevance of this outcome was stated by the Instructor, “Science and technology...They read an ethnography, even more so we talk about all of the methods: surveys, questionnaires, observation, content analysis, all of those things. And they also do a couple themselves.”

Lastly, students will understand and appreciate the arts and aesthetics as ways of knowing and engaging with the world is identified as merely covered marginally, or not at all in the Group I courses.

In Anthropology, students examine body decorations in different cultures and religions and discuss whether or not they are considered art from an anthropological perspective. Looking at anthropological interpretations, students must complete a lab assignment where they observe examples of Mayan art to determine meaning.

Assessment

Current assessment practices among the Social Science courses vary. Writing assignments and exams provide the most accessible examples of student work associated with the Information Literacy, Analytical Skills and Critical Thinking, Effective Communication, Informed and Engaged Citizenship and Diversity outcomes.

Artifacts

Many of the assignments associated with Anthropology, Psychology, Sociology and Economics result in artifacts that may be utilized for assessment in student learning for Information Literacy, Analytical Skills and Critical Thinking, Informed and Engaged Citizenship and Intercultural Knowledge and Diversity Awareness outcomes.

A way in which Anthropology assess student work to determine whether or not students are attaining the outcomes for the course involves examining lab assignments when revising the course lab manual each year. According to the Program Director:

Interview (Anthropology): I think it becomes an informal process where the professors and instructors teaching the class will compare notes on what works and what doesn’t, what students got into, what they seem to respond to, and they modify their syllabi that way. But the overall outcomes, you know our outcomes have relatively stayed the same; you know they’re so general you know that you can meet some part of that general outcome by what you’re doing most of the time. But then the specifics of course are like, are they getting all of the material? Do they understand how to do the techniques...but that takes place later, the intro course is really just to get them thinking in a certain way.

A method cited by the Program Director in Psychology involves administering a pre and post test exams to determine to what extent students have learned key concepts, theories, and terms:

Interview (Psychology): In some semesters, but not all semesters, I give students a snippet of the final exam. I do not tell students the test was coming. Most students score in the 30s. So, I compare that value with the final exam scores and almost always the scores from the final are in the high 70s/low 80s range.
In Economics, homework assignments are used to determine to what extent students understand the materials assigned. With the software, students are given several chances to submit the correct answer, with all of the results sent to the course Instructor:

*Interview (Economics):* Now, this program I’m referring to just changed one of its forms. Up until this fall, they would always have a set of assignments they would call ‘practice.’ There would be a graded homework with 20-30 problems where they have to draw graphs or answer analytical type questions. And you have to do that by a particular due date that I can set that pertains to what we are talking about this week.

*Tests*

All of the Social Science courses utilize exam scores as a means of assessment. In courses where the enrollment is high, Program Directors cited exams as the only practical means of assessing whether or not students are achieving the outcomes.

In Anthropology, students are assessed based on three exams and the graded lab assignments.

In Geography and Psychology, students are assessed based on three exams.

In Psychology, students are assessed based on four to six exams and graded lab assignments.

In Sociology, students are assessed based on three exams and graded written assignments.

In Economics, students in certain classes are assessed on three exams and graded homework assignments.

In Political Science, students are assessed based on exams.

*Suggestions*

Creating an upper-division core was suggested by the Program Director in Geography. Citing another institution that utilizes a similar structure, he suggested that this could be a way to help better prepare students for upper-division courses:

*Interview (Geography):* One of the things I did like at K-State was that they did have upper division core. So, they were taking something at the lower level and then were expected to make that transition to a higher level class. That was one thing. So many times, students feel that they’ve got to hit the tick marks and it doesn’t give them the opportunity to do something else. That was something that would be beneficial to see how these things operate at a higher level.

A suggestion was made by the Program Director in Psychology to require all students to complete a semester abroad to enhance intercultural knowledge and diversity awareness.

*Interview (Psychology):* I would insist that every student, as part of their core curriculum travel abroad. I think study abroad should be a core requirement. Studying abroad is likely to be an effective method of producing profound “world view” changes in how students see themselves relative to people in other cultures. It will, I think, help students develop a deeper appreciation
for the way diverse peoples live their lives. Study abroad should not be something open to just the privileged, because if you are privileged to begin with and travel in a privileged way, you are never going to make contact with all elements of a culture--you will never learn how to appreciate that diversity. I think a major problem we have in the United States is that only a few people truly understand what life is like for those of them who live less fortunate lives.

A similar suggestion was made by Program Director in Political Science to add a diversity course requirement to the existing core curriculum.

*Interview (Political Science):* I think that there should be some kind of global course in the Core Curriculum. I don’t know what the shape of that would be off-hand. Or, I think you could go about it in a number of ways, you could add options into the social science reqs.

The Core Curriculum Oversight Committee was complimented for establishing outcomes related to diversity and citizenship. According to the Program Director for Anthropology, “I’m glad now we have the Citizenship and the Diversity and the Global goals and they’re out there, and now we have a President who will support that. We’ve been a little behind in the global stuff there.”

Lastly, providing students with a university-wide resource for writing was suggested by the Instructor in Sociology as a means of enhancing students’ written communication skills.

*Interview (Sociology):* My only feedback would be that I wish there were some university-wide resource that would help students with their writing skills. I know how it is when you get into upper-level courses, but right now, they’re freshmen. But when it gets to five, six, eight page papers as a junior, it’s just not going to be acceptable. It’s a shame; I wish Auburn would give them some sort of resource.
<table>
<thead>
<tr>
<th>General Education Goals</th>
<th>General Education Outcomes: Students will...</th>
<th>ANTH 1000</th>
<th>GEOG 1010</th>
<th>PSYC 2010</th>
<th>SOCY 1000</th>
<th>ECON 2020</th>
<th>POLI 1020</th>
<th>POLI 1090</th>
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<tr>
<td>Information Literacy</td>
<td>Demonstrate information literacy</td>
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<td>Analytical Skills and Critical Thinking</td>
<td>Read analytically and critically</td>
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<td>Critique an argument effectively</td>
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<td>Construct an effective argument</td>
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<td>Apply simple mathematical methods to the solution of real-world problems.</td>
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<td>Select and use techniques and methods to solve open-ended, ill-defined or multi-step problems</td>
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<td>Effective Communication</td>
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<td>Informed and Engaged Citizenship</td>
<td>Be informed and engaged citizens of the United States and the world</td>
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<td>Intercultural Knowledge and Diversity Awareness</td>
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<td>Scientific Literacy</td>
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<td>Aesthetic Appreciation and Engagement</td>
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APPENDIX A
AUBURN UNIVERSITY PROGRAM DIRECTOR INTERVIEW

Interview Guide

Interview #: _______
Interview Date: _______

Introduction: The Core Curriculum Oversight Committee (CCOC) is conducting a study to assess the extent to which Core Curriculum courses are structured so that students learn, develop and demonstrate competency in the areas covered by the Auburn University General Education Outcomes. We need your input as Program Director for [list of courses]. During the interview we will focus on goals for student learning in the courses you oversee and their relationship to the University’s general education outcomes.

I would like to record your responses so that I can refer to this interview later. No quotation from this interview will be used in the report without your prior consent. You might also want to withdraw a quote from the report later. If you would like me to send you a draft of those parts of the report that refer to this interview prior to its dissemination, please let me know.

[Signing the consent form…]
1. I am very interested in your opinion on the general goals for student learning in the courses that you oversee. (What do you intend that students learn in these courses?)

Course 1:

Course 2:

2. Could you identify some more specific outcomes associated with these goals?

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<th>Course</th>
<th>Goal</th>
<th>Outcome</th>
<th>Assignment/Class Activity</th>
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3. What kinds of things do you ask students to do (what types of assignments are students asked to complete) in order to achieve these outcomes? (e.g., problem solving, presentation, attending events outside of class, class discussions, group work, etc.)

Course 1:

Course 2:

4. In your opinion, if students are doing well in these assignments (solving these specific problems, writing these specific papers, making these specific presentations, etc.), does this serve as a sufficient evidence that they have achieved the courses’ general learning goals (thinking logically, writing effectively, etc.)?

a. Do you carry out learning outcomes assessment in these courses? In other words, do you have methods that allow you to identify students' patterns of strength and weakness in meeting course goals and steps that might be taken to get better results next time? What are the methods you are using? (Would it be possible for me to see the results of these assessments?)

b. Would you recommend any additional ways to assess the extent to which students are achieving the broader educational goals of your courses?
5. [A few days ago] we sent you the list of Auburn University General Education outcomes. These outcomes can be achieved in many ways. (The Core Curriculum is not the only way possible.) At the same time, we think that courses in Core Curriculum probably address these outcomes. Could you please indicate which of these outcomes would apply to courses that you oversee?

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6. Using the following scale, can you identify to what extent the following college-level General Education Outcomes apply to the courses you oversee?

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<th>General Education Goals</th>
<th>General Education Outcomes: Students will...</th>
<th>COURSE 1</th>
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<th>Assignment / Class activity</th>
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<td>Scientific Literacy</td>
<td>Understand and appreciate methods and issues</td>
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<td>of science and technology</td>
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<td>Aesthetic Appreciation and Engagement</td>
<td>Understand and appreciate the arts and aesthetics</td>
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<td>as ways of knowing and engaging with the world</td>
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7. If you were to make changes in Auburn University’s Core Curriculum, which courses would you add/subtract? Why?

8. Do you have additional comments/suggestions related to Auburn University’s Core Curriculum? (General Education Outcomes)?

Thank you for participation!
APPENDIX B

CONSENT TO PARTICIPATE IN PROGRAM DIRECTOR INTERVIEW

As a Program Director for [names of the courses], you are invited to participate in an interview being carried out by the Core Curriculum Oversight Committee (CCOC) with the assistance of the Office of Institutional Research and Assessment at Auburn University.

While being voluntary, your participation is very important for the success of this evaluation. We need the information on all courses included in Core Curriculum at Auburn University. However, if you decide not to participate or withdraw from this study, your decision will not have any personal consequences. You may refuse to answer any questions or withdraw from the study at any time.

The information below provides more detail on this evaluation.

• PURPOSE OF EVALUATION

The primary purpose of this study is to assess the extent to which students are asked to demonstrate the Auburn University General Education Outcomes within core curriculum courses.

• PROCEDURES

If you agree to participate in this evaluation, we will ask you to answer 8 questions from the interview guide. Each interview will take about 45 to 90 minutes and will occur at a time and place that is convenient for you at a facility owned by and operated by Auburn University. Each interview will be audiotaped for future reference.

• CONFIDENTIALITY

Any information that is obtained in connection with this study and can be identified with you will be disclosed only with your permission. This consent form provides two ways of disclosing the information obtained during the interview. The first option allows investigators to use quotes from this interview without having you check the context and/or parts of a report that refer to this interview. The second option allows you to get parts of the report referring to this interview prior to report dissemination.

Only investigators will have access to the audiotapes and photographs collected during the study.

☐ I would like to have parts of the report referring to the interview with me prior to report dissemination.

☐ I would not need to have parts of the report referring to the interview with me prior to report dissemination.

I understand the procedures described above. My questions have been answered to my satisfaction, and I agree to participate in this evaluation. I have been given a copy of this form.

________________________________________
Printed Name of Participant

________________________________________
Signature of Participant

__________________________
Date

Office of Institutional Research and Assessment (OIRA)
Core Curriculum Oversight Committee