

# A Senior Level AIS Course Based On The AICPA's Top-Ten Technology Issues

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## INTRODUCTION

In response to requests from accounting firms and companies that hire graduates of the Culverhouse School of Accountancy (CSA) at the University of Alabama (UA), the CSA was awarded a permanent increase in funding to enhance its Accounting Information Systems (AIS) course offerings. As a result of this, two new faculty were hired to teach AIS courses and a Collaborative Learning Lab (CLL) was constructed in the College of Commerce and Business Administration (CBA) computer center. Prior to this change, the AIS curriculum consisted of one undergraduate course and one graduate course in AIS. Two new courses were added to the curriculum, one each at the graduate and undergraduate levels. This past year I was responsible for the senior level AIS course, Accounting 489 (AC 489). Since there was no pre-specified list of topics to be covered in this course, I decided to use the American Institute of Certified Public Accountants' (AICPA) top-ten technology issues list as a basis for the content of the course. This paper briefly describes the AIS curriculum at UA and then discusses challenges faced when defining AC 489, the structure of AC 489, and an evaluation of the course based on my experiences this past year.

## THE AIS CURRICULUM

The AIS curriculum at the UA consists of four courses, two courses at the undergraduate level and two courses at the graduate level. The first AIS course students take is AC 389. AC 389 provides an introduction to computer technology including hardware, software, database management systems, and networks. AC 389 covers introductory Internet topics including the use of the Internet for e-commerce and the development of web sites. AC 389 provides an overview of the systems development lifecycle. Finally, AC 389 introduces control concepts and information system controls. Students generally take AC 389 during the spring semester of their junior year.

The second course, AC 489, extends the coverage of databases and database management systems by presenting Structured Query Language (SQL) and covers issues that arise when using multi-user and distributed databases. AC 489 continues the discussion of the use of the Internet for e-commerce and e-business by introducing the technologies required for a database-driven web site, control and security issues that must be considered when using the Internet for business, and new assurance services related to the Internet. AC 489 extends the discussion of computer crime by examining the major threats to an organization's computing resources and the security systems and technologies used to address these threats. AC 489 introduces the Extensible Markup Language (XML) and Extensible Business Reporting Language (XBRL). Finally, AC 489 covers the business and technology issues related to the selection and implementation of accounting systems. Students generally take AC 489

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*Readers with comments or questions are encouraged to contact the author via email.*

during the spring semester of their senior year. Also, students returning from internships take AC 489 during the last six weeks of the spring semester.

Students who pursue a Master of Accountancy degree take two additional AIS course. Management Information System (MIS) 510 is housed in the MIS department but taught by accounting faculty. MIS 510 provides an in-depth look at the systems development lifecycle. Students work with a local company or not-for-profit organization to develop a basic information system; the systems are often implemented on the Internet. AC 533 focuses on information systems (IS) controls and IS auditing. AC 533 is taught using a combination of lectures, hands-on activities, and cases.

All AIS courses meet in the CLL in the CBA computer center. The CLL includes 20 student computers running Windows NT 4.0. Each student's computer includes Microsoft Office, Microsoft Visual Studio, browsers, e-mail clients, and various other applications. The student computers are connected to a local area network as well as the CBA network and the Internet. An instructor's podium consists of a computer, VCR, and a control system for the projector installed in the room. Additionally, the instructor's computer can be used to take control of any student computer in the room. Two accounting servers are also housed in the CLL. Both servers run Windows NT 4.0 Server. The first server (GrapeApe) is configured as a web server running Microsoft's Internet Information Server (IIS) 4.0, SQL Server 7, and other server-based applications. Each AIS student has a user id and personal space on this server. The second server (EggPlant) is configured with the same applications as the first server; however, it is a backup server and is also used as a test platform for students taking AC 533.

#### **CHALLENGES WHEN DEVELOPING AC 489**

While developing the approach and content for AC 489, I had several challenges to overcome. First, the desired content was not well defined. AC 389 has been offered at UA for a number of years and the majority of the content is predefined based on the needs of the accounting courses that follow AC 389. Last year I taught AC 389; as a result, I had a good grasp of the content covered and the skills possessed by the students. AC 489 is a relatively new course that has been taught by several different faculty and graduate students over the last few years. Each person teaching the course had done so based on his or her strengths. When I was assigned to teach AC 489 last year, I decided to base the course content on the AICPA's top-ten technology issues. I believe this is an appropriate way to define the course content since this list provides students with an introduction to contemporary AIS issues that they will face early in their careers, while at the same time providing an opportunity to discuss the importance of critically evaluating technologies. Since the top-ten technology issues list is updated annually, AC 489's content will change on a regular basis; however, there is a fair amount of consistency from year to year since technology issues generally do not change dramatically over the short term. As a result, I do not anticipate that the change in content will be excessive from one year to the next.

Second, a problem I often hear AIS faculty mention is that students do not believe AIS is an "accounting" topic. I have seen this in the classroom; students complain about having to learn computer-related topics since these topics do not fit closely with what they are covering in their financial, managerial, and auditing courses. Students also tend to devalue AIS since they think it is limited to spreadsheets and word processors, or at least their use of computers will be. At the same time, students who are currently working or have worked in professional positions generally understand the importance of understanding AIS. By basing the course content on the top-ten technology issues list, this helps to guide the students in seeing that technology issues are important to accountants. Additionally, many of the articles that the students read come directly from accounting publications targeted at practicing accountants.

Third, AIS tends to deal with unstructured, changing problems and issues. Technology changes over time; as a result, business application of the technology must change. Because of this constant change, there is a great deal of ambiguity regarding how to evaluate, implement, use, maintain, secure, and control information systems and technology. Fortunately, recent technology, system, and e-commerce failures provide a good opportunity to illustrate the importance of evaluating new technologies using established methods. By relating the current technology issues to business decisions that accountants are already familiar with, this tends to reduce the uncertainty about how to address AIS problems.

Finally, students returning from internships take AC 489 during the last six weeks of the spring semester on a five-day-a-week schedule. Because of this compressed schedule, students do not have much time between classes to read material and complete assignments. Students also do not have much time to reflect on and assimilate the material discussed. Additionally, I knew I would not have a lot of time between assignments and tests to grade materials. Because of this, the course needed to be structured so that there would be sufficient time for students to complete readings and other assignments. As a result, I developed a number of hands-on exercises that complemented the readings and other assignments. This provided students with an opportunity to complete readings and other assignments, and to work with the various technologies discussed in the readings.

### **THE AC 489 APPROACH**

AC 489 consists of five major components: readings based on the top-ten technology issues, in-class discussion of the readings, a database-driven web sites tutorial, in-class exercises, and tests. The first four components are described here. If you would like additional information about any of the components, access to the current course web site and archived sites is available via <http://www.is-education.org>.

As mentioned earlier, the approach I selected was to define the content of the course based on the AICPA's top-ten technology issues list. This list is updated annually and provides a statement of the technology issues that accountants believe will have a significant impact on the profession as well as the day-to-day activities of accountants. Since the list is updated on an annual basis, this has the potential to necessitate significant revision to the course each year. However, a look at the issues identified in the last few years shows that this list does not change dramatically from one year to the next (see the appendix for a list of the top-ten technology issues for the past six years). In general I anticipate that over time the course content will focus on a subset of the technology issues from both the current year and prior years. In some cases an issue identified quickly becomes less important as companies realize that the technologies required have not matured to the point where they are viable on a wide scale. In other cases an issue identified in a prior year remains critical and/or not well understood by accountants even though the issue does not make the new top-ten cut. Regardless, by using articles related to each of the issues, the course coverage can be quickly updated to respond to changes in the business world. Table 1 summarizes the topics covered in AC 489 during the spring 2001 semester. Since a single course topic might address several different top-ten technology issues and a top-ten technology issue might be addressed as part of several different course topics, there is not a direct mapping between the two. However, based on the topics covered in the various articles many of the top-ten technology issues for the last two years were addressed in AC 489.

Once the desired topics were identified, I reviewed a large number of articles appearing in practitioner-oriented publications and on the web to develop a set of readings. This task was particularly challenging since the topics to be covered tended to involve technologies that only recently had become

**Table 1: Topics Covered Spring 2001**

Topic	Summary
Accounting Software	Selection of accounting information systems.
Multi-user Databases	Implementing, operating, and maintaining a database in a multi-user/multi-system environment.
Assurance Services	New assurance services offered by CPAs – includes WebTrust and SysTrust.
E-Commerce Technologies	Technologies used to conduct e-commerce and e-business.
E-Commerce Accounting Issues	Evaluation, management, and control of e-commerce and e-business opportunities as well as the risks associated with e-commerce and e-business.
Electronic Transactions	Technologies required to use Electronic Data Interchange (EDI) and Electronic Funds Transfer (EFT), as well as control issues related to both.
XML, XFRML, and XBRL	Extensible Markup Language (XML) and Extensible Business Reporting Language (XBRL).
Computer Crime	Threats inherent in the use of computer systems and data communications systems.
Computer Security	Technologies used to secure computer systems and data communications systems.

popular in business. As a result, it was often difficult to find articles that dealt with the intended topic at the level of discussion appropriate for this course. After identifying the set of articles to be used in class, I developed a list of discussion questions for each article. Some discussion questions dealt with definitions while other discussion questions addressed the application of new technologies. Additionally, some discussion questions did not come directly from the articles assigned; in this case I provided additional elaboration during class. During in-class discussions, based on the students' ability to discuss the articles I was often able to identify articles that were either too technical or not clearly enough written to enhance the students' understanding of the issue. After the fall semester, I refined the list of articles by adding several new articles and removing several articles that did not accomplish the goals I had for the course. For the fall 2001 semester, I plan to modify the topics slightly by adding a new topic, Encryption Technologies, and moving some of the articles from the Electronic Transactions and Computer Security topics to this new topic. This new topic will cover encryption, public-key infrastructure, digital signatures and certificates, secure socket layer (SSL), and secure electronic transactions (SET).

In addition to reading and discussing articles, students also complete the Morrison and Morrison (2000) database-driven web sites (DDWS) tutorial outside of class. This tutorial provides a Microsoft Access refresher to re-acquaint the students with the graphical interface to Microsoft Access. The tutorial introduces the use of data manipulation (DML) and data query (DQL) commands using Structured Query Language (SQL). The tutorial introduces the hypertext markup language (HTML). Finally, the tutorial walks the students through the creation of a simple e-commerce application using Visual Basic Script (vbscript), Active Server Pages (ASP), and SQL. At various points throughout the semester we discuss the review questions included in the tutorial and issues related to the material covered in the tutorial.

On class days when we do not discuss articles, the students complete in-class exercises. These exercises draw on or extend topics covered in the articles and DDWS tutorial. The first exercise re-acquaints the students with various programs they will use throughout the semester including Windows NotePad, Internet Explorer, and file transfer protocol (FTP) using WS-FTP. After this, the students complete a Microsoft Access refresher exercise that covers basic data modeling, creation of tables, and

data entry using the graphical interface to Microsoft Access. Next, the students complete an SQL exercise that requires them to create queries to maintain data in the database (using DML commands) and retrieve information from the database (using DQL commands). The students complete a basic web page exercise where they create two web pages using HTML and load the web pages to the CSA's web server using FTP. Next the students complete an XML exercise where they create an XML document, document type definition (DTD), a couple Extensible Stylesheet Language (XSL) stylesheets, and web pages to merge the XML document and the XSL stylesheets. Finally, the students complete an ASP exercise that implements a vendor information extranet web site (VIEWS). VIEWS provides rudimentary security to control access to vendor information, a summary of the vendor's account, and can generate detailed information about vendor invoices and payments. This enables the students to see the implementation of a simple database-driven web site and identify issues involved with e-commerce and e-business. Exercises are linked to either the articles being discussed and/or chapters in the tutorial.

### **EVALUATION OF THE COURSE**

Overall I feel that this approach to the senior-level AIS course is sound and provides the students with critical skills necessary for success in graduate school and their careers. This approach requires students to read articles published in periodicals targeted at business people and to carefully evaluate the information provided. This approach requires students to assimilate information from a variety of sources to form a more well-rounded view of the issues being discussed. It also provides students with an opportunity to see that there are multiple viewpoints for most issues. Even with these advantages, students did encounter some problems adapting to this approach.

One concern I had going into the class was that the students were used to listening to lectures, and I was used to giving lectures. As a result, this approach would be a significant departure from what both the students and I were experienced doing. This approach requires students to speak in class, often about topics that they are not completely familiar with, and many students are hesitant to do this. I found that some students carried the class in that they participated on a regular basis; these students tended to be older and have had professional work experience in companies or accounting firms. Fortunately because of the topics discussed, I was often able to relate the topic to the students' experiences using the Internet; this helped to provide the students with a familiar frame of reference to discuss issues. In a few cases when participation tended to be declining across several class sessions, I gave unannounced quizzes to ensure that the students were preparing for class; this appeared to be effective since participation did rebound.

Most of the students taking AC 489 were not accustomed to reading articles published in professional or technical periodicals and discussing the articles in class; as a result, they had to develop the skills to extract useful information from the articles. The students initially tended to read the articles like they would articles intended for entertainment; they did not question or critically evaluate the content of the articles. I noticed a significant improvement in their interaction and level of discussion as the semester progressed. This indicated that they were developing the skills necessary to read and understand information presented in professional and technical periodicals. Additionally, students tended to discount articles that were more than a couple years old as being outdated and no longer relevant. I addressed this by providing information about the history of various technologies so that the students would understand that technologies now becoming common are the product of years or decades of work.

Articles published in professional or technical periodicals generally are not as refined as chapters in textbooks; as a result, I provided additional information to try to direct students to the more important issues. Articles are less structured, sometimes unclear, and in many cases not as focused as students are accustomed to. Because of this, students had a hard time piecing together the information to form a clear

mental model of the issues. To compensate, I provided discussion questions to direct the students to the more important issues contained in each article. I wrote my own papers when I could not find a suitable published article. Like textbooks, articles sometimes contain information that is incorrect and authors sometimes state opinions as if they are facts. In this case, I pointed out errors or opinions. I also attempted to explain why the author might have been mistaken; often the errors were a result of the author being overly optimistic about the rate of change or the historical impact of the technologies being discussed.

**CONCLUSION**

Overall, my experiences teaching the senior-level AIS course using articles tied to the AICPA’s top-ten technology issues list have been positive. With this approach I do not spend a lot of time lecturing and students are able to participate in class. I find it easier to update the course content over time since I can quickly update the reading list between semesters. I have also seen an improvement in the ability of students to retrieve relevant, factual information from articles published in a variety of periodicals. As discussed above, there are some difficulties associated with this approach to teaching; however, these challenges can generally be overcome. 📖

**AICPA Top-Ten Technology Issues for 1997 Through 2001**

#	1997 Top Ten Technology Issues*
1	Security of Transactions on the Internet
2	Image Processing
3	Communications Technologies
4	On-line Services
5	Training and Technology Competency
6	The "Year 2000" Problem
7	Electronic Commerce
8	Workflow Technology
9	Private Networks
10	Electronic Data Interchange (EDI)

\*Demery, 1997

#	1998 Top Ten Technology Issues*
1	Internet, Intranets, Private Networks and Extranets
2	Year 2000 Issues
3	Security and Controls
4	Training & Technology Competency
5	Electronic Commerce
6	Communications Technologies
7	Telecommuting/Virtual Office
8	Mail Technology
9	Portable Technology
10	Remote Connectivity

\*Anonymous, 1998

<b>1999 Top Ten Technology Issues*</b>	
1	Year 2000
2	Internet
3	Information Security and Controls.
4	Training and Technology Competency
5	Technology Management and Budgeting
6	Disaster Recovery
7	The Virtual Office
8	Privacy
9	Electronic Money
10	Electronic Evidence.

\*Matherne, 1999

#	<b>2000 Top Ten Technology Issues*</b>
1	e-business
2	Information Security and Controls
3	Training and Technology Competency
4	Disaster Recovery
5	High Availability and Resiliency of Systems
6	Technology Management and Budgeting
7	Electronically Based Financial Reporting
8	Net Issues
9	The Virtual Office
10	Privacy

\*Zollars, 2000

#	<b>2001 Top Ten Technology Issues*</b>
1	Information Security and Controls
2	e-Business
3	Electronically-based Business and Financial Reporting
4	Privacy
5	Training and Technology Competence
6	Disaster Recovery
7	Qualified Information Technology Personnel
8	Quality of Service
9	Electronic Audit Trail
10	Application Service Provider (ASP)

\*Anonymous, 2001

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**Notes**