



FITC Institute Final Report

Appendix I

Curriculum Analysis Report:

Florida A&M University Information Systems Program

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1. Introduction

This curriculum analysis of the information systems (IS) program at Florida A&M University (FAMU) is one of the tasks required of the Florida IT Career Alliance (FITC) Assessment project. The analysis employs syllabus assessment to examine alignments between learning outcomes specified in the program syllabi and selected IS curriculum frameworks—the Association for Computing Machinery (ACM) and the Association for Information Systems (AIS) 2010 IS curriculum guidelines (hereafter ACM/AIS).

1.1 Research Question

RQ1: To what extent are the learning outcomes specified in the FAMU IS program syllabi similar to the ACM/AIS IS curriculum standards?

1.2 Literature Review

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Curriculum Analysis Report: FAMU IS Program

The IS discipline is unique from other programs within the scope of the FITC assessment. Unlike other programs such as computer science (CS) or computer engineering (CE), IS programs exist at the intersection of business and technology, and graduates are expected to navigate between the two fields (Henson & Kamal, 2010; Plice & Reinig, 2007). Often, hiring departments cannot distinguish between IS graduates and graduates from other computing disciplines such as CS or information technology (IT), believing that a graduate of a program like CS is capable of performing the same function as an IS graduate. However IS programs deliver unique business-oriented competencies that other programs may not provide (Rosenthal, 2010).

IS graduates can expect to work in a broad array of fields such as government, business, and healthcare (Topi et al., 2010). Because careers in IS fields require that employees interact with customers who may lack technical knowledge but meet their needs using technical solutions, much emphasis in an IS curriculum is placed on non-technical skills such as business and communication skills and technical skills (Alshare, Lane, & Miller, 2011). Business skills may include competencies such as knowledge of marketing or finance and management skills (Martz & Cata, 2008) and technical skills may include competencies such as developing a foundational knowledge of IT systems (Alshare, Lane, & Miller, 2011).

Although communication and interpersonal skills are more emphasized in the IS curriculum than in curricula for other computing disciplines, IS graduates and employees are still expected to maintain technical knowledge. Instead of focusing on a specific area of technical expertise such as databases as one may do in another technical program, IS professionals should have a foundational understanding of how IT functions as a system and also be able to demonstrate a holistic range of technical competencies (Sauls & Gudigantala, 2013). IS professionals are required to exhibit a diverse skill set (Henson & Kamal, 2010) even for entry-level positions. According to Plice & Reinig (2007), IS is characterized as “technology-enabled business development” (p. 24). Therefore, highly sought-after expertise includes technology skills, communication and interpersonal skills, the ability to think analytically and critically, and fundamental business competencies.

These unique program features are reflected in the ACM/AIS 2010 IS curriculum guidelines. Since the 1970s, the ACM/AIS have developed curriculum guidelines for IS programs since the 1970s that seek to reflect the evolutions in technology and industry needs (Topi et al., 2010). The ACM/AIS guidelines specify that IS professionals must work closely with IT professionals and must demonstrate “sound technical knowledge of computers, communications, and software” as well as a knowledge of organizational functions and other business skills (Topi et al., 2010, p. 12). Furthermore, the ACM/AIS 2010 curriculum guidelines specify several “high-level IS capabilities” that students may be exposed to in an IS program. These include: “improving organizational processes, exploiting opportunities created by technology innovations, understanding and addressing information requirements, designing and managing enterprise architecture, identifying and evaluating solution and sourcing alternatives, securing data and infrastructure, and understanding, managing and controlling IT risks” (Topi et al., 2010, pp. 16-18).

Curriculum Analysis Report: FAMU IS Program

Although the nature of the IS discipline is different from that of other computer-related disciplines, research related to IS programs is similar to the research conducted to study other computing disciplines such as IT or CS. Previous researchers like Mills, Velasquez, Fadel, and Bell (2012) have examined IS program content by comparing existing IS curricula to the ACM/AIS curriculum guidelines. Previous research has relied on employer input through surveys or interviews to determine skill requirements for graduates seeking employment in the field, (Plice & Reinig, 2007).

2. Method

2.1 Data Collection

The unit of analysis for this portion of the FITC Assessment Project was an individual course syllabus. The course numbers and names of the syllabi analyzed include:

1. CIS 1920 Professional Development I
2. CIS 3040 Information Systems in Organizations
3. CIS 4250 Computer Ethics and Professional Responsibility
4. CIS 4301 Systems Analysis and Design
5. CNT 4504 Data Communication and Organizational Network
6. COP 3014C Fundamentals of Programming
7. COP 3060 Concepts in Advanced Application Development
8. COP 3330 Introduction to Object Oriented Programming
9. COP 3530 Program Data and File Structures
10. COP 3710 Database Management Systems
11. COT 2104 Mathematics for Computing
12. ACG 2071 Managerial Accounting
13. MAN 3025 Principles of Management
14. MAR 3023 Principles of Marketing

The most recent course syllabus from each course was collected, resulting in a total of 14 (N=14) syllabi suitable for analysis.

2.2 Data Analysis

Python was employed as a way to automatically extract relevant portions of information from the syllabi and analyze the text. Because the syllabi followed no standardized format, course learning outcomes were extracted from relevant sections including the course description, course schedule, and course outcomes. Once the course learning outcomes were extracted, they were automatically compared to the ACM/AIS suggested seven core courses to determine the extent to which the syllabus learning outcomes are similar to the learning outcomes in the seven core courses.

The ACM/AIS curriculum guidelines follow a specific structure. The two groups jointly determine what should comprise the *Body of Knowledge* for each computing discipline—that is, what each program might include to prepare graduates to work in the industry. The ACM/AIS IS

Curriculum Analysis Report: FAMU IS Program

2010 curriculum guidelines provided a general architecture for the courses that focus on the development of information systems specific skills and knowledge. The high-level course description included seven core courses that specify the required knowledge units and topics that may be covered in an information systems program. Every instance of a course is not always technically a separate course in the schedule; it is possible that an implemented curriculum may, for example, combine two instances of a course into one (Topi et al., 2010).

The model curriculum also includes examples of elective courses, which either expand on the coverage provided by the core course within a specific knowledge area or introduce new knowledge areas to the curriculum. However, in order to remain consistent with the other curricula analyses in the FITC Assessment project, only core courses in the FAMU undergraduate IS program were analyzed.

The suggested seven core courses are:

- Foundations of Information Systems;
- Data and Information Management;
- Enterprise Architecture;
- IS Project Management;
- IT Infrastructure;
- Systems Analysis and Design; and
- IS Strategy, Management and Acquisition.

The course descriptions include a catalog description, learning outcomes, and topics for each of the courses. The course learning outcomes extracted from the 14 (N=14) FAMU IS course syllabi were compared to the learning outcomes and topics in the ACM/AIS suggested seven core courses. The percentage of learning outcomes coverage for each core course was then determined once the topics or learning outcomes from the syllabi were compared to the learning outcomes specified by the core courses.

3. Findings

The syllabus analysis found a great deal of similarity between the FAMU IS course learning outcomes and the core courses in the ACM/AIS curriculum guidelines. It was determined that 5 out of 7 (71.4%) suggested core courses demonstrated more than 60% learning outcome coverage in FAMU IS syllabi (N=14), meaning that more than 60% of the suggested learning outcomes in the ACM/AIS curriculum guidelines were included in the course syllabi analyzed. There were no instances of a core course whose learning outcomes were not at least partially covered in the syllabi analyzed.

Figure 1 illustrates the percent coverage of learning outcomes in each core course demonstrated by the FAMU IS course syllabi. Overall, 90% of the learning outcomes in IS Strategy, Management and Acquisition course were covered in FAMU IS syllabi. This includes 85.71% of the learning outcomes in Foundations of Information Systems, 76.92% of the learning outcomes in Systems Analysis and Design, 75.00% of the learning outcomes in IS Project Management, 68.00% of the learning outcomes in IT Infrastructure, 57.14% of the learning

Curriculum Analysis Report: FAMU IS Program

outcomes in Data and Information Management, and 45.45% of the learning outcomes in Enterprise Architecture courses.

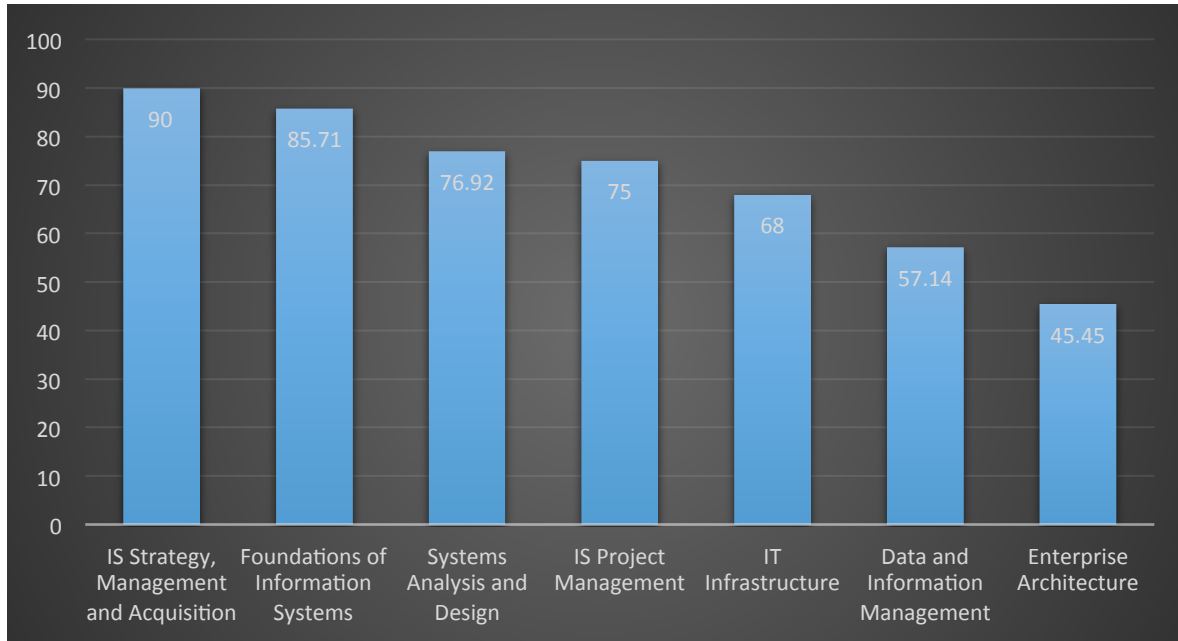


Figure 1: Percentage of ACM/AIS core courses covered in FAMU IS Syllabi

4. Discussion

4.1 Findings Discussion

The FITC Assessment Project has been tasked with analyzing several computing programs' course syllabi. This portion of the analysis answered one research question: To what extent are the learning outcomes in the FAMU IS program's courses similar to the learning outcomes in the Association for Computing Machinery (ACM) and the Institute of Electrical and Electronics Engineers (IEEE) Computer Society IS curriculum guidelines?

Based on the analysis of 14 core courses' syllabi in the FAMU IS program, it was determined that many of the core courses specified by the ACM/AIS curriculum guidelines are well represented in the FAMU courses and that there is much similarity between the curriculum guidelines developed by the ACM/AIS and the learning outcomes listed in the FAMU IS course syllabi. Only two suggested core courses, *Data and Information Management* and *Enterprise Architecture* had a percentage of learning outcomes coverage below 60%.

4.2 Limitations

For the purposes of this analysis, only core courses in the FAMU undergraduate IS program were considered. As the 14 core courses do not comprise a complete curriculum, it is

Curriculum Analysis Report: FAMU IS Program

likely that additional learning outcomes are covered in elective courses. Similarly, only syllabi were analyzed and certain learning outcomes and topic areas may be covered in other aspects of the courses, such as lectures and assignments.

5. Conclusion

Although syllabus analysis is an important aspect of curriculum examination, it is a small portion of a much larger picture. A program's curriculum cannot be understood based only on a syllabus analysis. Future research may focus on other aspects of student learning such as course instruction, student internship experience, textbooks, or assignments. Additionally, while curriculum guidelines such as the ones developed by the ACM/AIS are helpful in designing a comprehensive curriculum, a college program must also respond to other factors such as faculty expertise, community needs, and the needs of the local industry. These factors should be taken into account when examining a curriculum.

Curriculum Analysis Report: FAMU IS Program

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