

Program Outcomes and Assessment

Degree Program: Associate of Information Technology (AASIT)
Bachelor of Information Technology (BIT)

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Program Mission Statement: The IT Program (AASIT, BIT, BSIT, CSCI) is committed to positively impact society (locally, nationally, and internationally) through academic, applied, and educational research to build, expand, disseminate and teach the information technology body of knowledge.

AASIT/BIT Learning Outcomes

Outcome 1: Use and apply current IT discipline-related concepts and practices.

Outcome 2: Identify and analyze problems or opportunities in the IT realm and define requirements for addressing them when an IT solution is appropriate.

Outcome 3: Design and develop effective IT-based solutions and integrate them into the user environment.

Outcome 4: Create and implement effective project plans.

Outcome 5: Identify and investigate current and emerging technologies and assess their applicability to address individual and organizational needs.

Outcome 6: Analyze the impact of technology on individuals, organizations, and society.

Outcome 7: Collaborate in teams to accomplish common goals.

Outcome 8: Communicate effectively and efficiently.

Outcome 9: Recognize the qualities necessary to succeed in a professional environment.

Assessment Methods/Type of Evidence

The IT Department at Clayton State used Bloom's taxonomy of the cognitive domain (Bloom 1956) to develop a scheme for mapping program outcomes to courses. Three levels of mastery have been defined based on Bloom: developing level of mastery, mature level of mastery, and proficient level of mastery. Correspondingly, assessment rubrics for each assignment element rely on these three levels of mastery (Booth 2006). See Table 1.

Table 1. Levels of Mastery

Level	Definition
Developing	Demonstrates an emerging level of knowledge and skills; can perform beginning skills and shows potential to perform independently.
Mature	Demonstrates a refined level of comprehension; is able to apply appropriate skills and perform both independently and as a team member
Proficient	Demonstrates a superior level of knowledge and understanding; integrates and applies skills across multiple areas both independently and as a team member.

One or more of the program outcomes is mapped to each course. The mapping indicates whether the outcome will be assessed at the developing level, mature level, or proficient level (see AASIT/BIT Matrix). One or more individual course objectives are mapped to each program outcome. The mapping of course objectives to program outcomes is recorded in public syllabi for each course.

Beginning in 2004, a database was developed to collect selected graded assessments. WebSubmit (Preston and Wilson 2004) is still in use. Beginning in 2007, a plan was developed to expand the collection of data. A subset of all IT courses was chosen to implement data collection under this format in 2008. The goal for 2009 is to have data collected in all IT courses.

Instructors develop and administer assessments, collecting data for each course they teach. A given assessment may address many objectives and an objective may be addressed by many assessments. To effectively map this many-to-many relationship, assessments may be viewed as having one or more elements. Each element is designed to measure one or more course objectives. A given course objective might be assessed by more than one element. Course objectives support specific program outcomes and should be measured against a specific mastery level (Booth, et al. 2009).

Assessment data is collected for each program outcome in each course where that outcome is addressed (see AASIT/BIT Matrix). A variety of assessment tools are used: Quizzes, tests, assignments, presentations, projects, portfolios, and internships. Data is summarized for each course. Because each program outcome is addressed by many courses, data is summarized longitudinally for each program outcome across all relevant courses.

References

- Bloom, B. S. (1956). *Taxonomy of Educational Objectives Handbook 1: Cognitive domain*. New York: Longman, Green & Company.
- Booth, L. (2006). A database to promote continuous program improvement. *Proceedings of the 7th Conference on Information Technology Education SIGITE '06*. 83-88.
- Booth, L., Booth, V., Hartfield, F. (June, 2009). Continuous course improvement, enhancements and modifications: Control and tracking. *Online Journal Distance Learning Administration*.
- Preston, J., Wilson, D. (November, 2004) Achieving consistency and communication in online education via an online grading system. *Proceedings of Teaching Online in Higher Education (TOHE)*.

AASIT and BIT Program Outcomes Inventory by Course									
<div>Developing Level of Mastery</div> <div>Demonstrates an emerging level of knowledge and skills, can perform beginning skills and shows potential to perform independently.</div> <div>Mature Level of Mastery</div> <div>Demonstrates a refined level of comprehension; is able to apply appropriate skills and perform both independently and as a team member.</div> <div>Proficient Level of Mastery</div> <div>Demonstrates a superior level of knowledge and understanding, integrates and applies skills across multiple areas both independently and as a team.</div>	1) Use and apply current IT discipline-related concepts and practices.	2) Identify and analyze problems or opportunities in the IT realm and define requirements for addressing them when an IT solution is appropriate.	3) Design and develop effective, IT-based solutions and integrate them into the user environment.	4) Create and implement effective project plans.	5) Identify and investigate current and emerging technologies and assess their applicability to address individual and organizational needs.	6) Analyze the impact of technology on individuals, organizations, and society.	7) Collaborate in teams to accomplish common goals.	8) Communicate effectively and efficiently.	9) Recognize the qualities necessary to succeed in a professional Environment.
1: Foundations									
ITFN 1101 Foundations of Information Systems					D	D		D	D
ITFN 2001 Professional Development Seminar						D		D	M
ITFN 2012 Lower Division Capstone in IT	M	D		D	D			M	M
ITFN 2123 Foundations of Project Management	M			M				M	
ITFN 3012 Information Technology Entrepreneur				M		M		M	M
ITFN 3112 Systems Analysis and Design	M	M	M	P				P	
ITFN 4003 Portfolio Development and Presentation	P					M		P	P
ITFN 4014 Internship Cooperative	P	P	M	P	P			P	P
2: Database									
ITFN 1201 Foundations of Database Design	D	D	D				D		
ITFN 2211 Intermediate Database Design		M	M				M		
ITDB 4201 Advanced Database Modeling	M	P					P	D	
ITDB 4202 Database Applications		P	P				P	P	
ITDB 4203 DB Administration and Architecture	P	P			P				
ITDB 4204 Special Topics in Database	P				P	P			
3: Programming									
ITFN 1301, 2, 3 Foundations of Programming	D		D		D				
ITFN 2311, 2, 3 Intermediate Programming	M		M		M				
ITFN 2314 Programming Language Concepts	M		M		M				
ITFN 3314 TQA in Software Development	M	M	M	M	M		M	M	D
ITSD 4301 Algorithms I	P		P					M	
ITSD 4303 Human-Computer Interaction	P		P		P	P	M	P	
ITSD 4304 Advnc'd Client-Server Software Dev.	P		P		P			M	
ITSD 4305 Special Topics in Software Dev.	P	P	P		P				
ITSD 4312 Algorithms II	P		P					M	
CSCI 1301 Computer Science I	D		D		D				
CSCI 1302 Computer Science II	M		M		D				
4: Web, Multimedia, E-Commerce									
ITFN 1401 Introduction to Webmaster	D		M	D					D
ITFN 2411 Intermediate Webmaster	M		P	M					M
ITFN 2422 Advanced Webmaster	P	M	P	M	P	M	P	P	P
ITMM 3413 Infrastructure for E-Commerce	P		P		M		M		
ITMM 3423 Security for E-Commerce									
ITMM 4404 Multimedia Production and Dev.	M	M	P					P	
ITMM 4405 Legal Implications of E-Commerce	P		M		P	P			P
5: Networking/Security									
ITFN 1501 Foundations of Networking and Security	D	D			D				
ITFN 2511 Intermediate Networking and Security	M				M		D		
ITFN 3134 Secure Systems Development	M	M	M						
ITNW 4501 Network Planning and Design	P		P	M	M		M	D	D
ITNW 4502 Secure Nets and Comm. Protocols	P				M				
ITNW 4511 BCP & Disaster Recovery	P	P	M			M	M	M	
ITNW 4512 IT Security Case Studies	P		P			M	P	M	
6: Operating Systems									
ITFN 1601 Introduction to UNIX	D		D					D	
ITFN 2611 Intermediate UNIX	M		M					M	
ITFN 3601 Operating Systems	P	M					P	P	
ITFN 2601 Operating Systems	M	M					M	M	
Applications/Service									
CPTG 1111 Introduction to Computing	M							M	
CPTG 2201 Advanced Computer Applications	D								D

Discussion of Results and Changes – AASIT and BIT

Assessment Plan

One or more of the program outcomes is mapped to each course. The mapping indicates whether the outcome will be assessed at a developing level, mature level, or proficient level (see AASIT/BIT Matrix). One or more individual course objectives are mapped to each program outcome. The mapping of course objectives to program outcomes is recorded in a public syllabus for each course. Instructors use the public syllabus to construct a section syllabus for each course they teach.

Every time a course is taught, data will be collected. Assessment data is collected for each program outcome in each course where that outcome is addressed. A variety of assessment tools are used: Quizzes, tests, assignments, presentations, projects, portfolios, and internships. Data is summarized for each course. Because each program outcome is addressed by many courses, data is summarized longitudinally for each program outcome across all relevant courses.

Responsibility

To implement continuous program improvement, analysis of data must lead to planned curriculum revision. CIMS has developed clearly defined levels of responsibility for change management.

Work at the College Level:

- Develop college outcomes in line with university outcomes.

- Establish goals, objectives and guidelines – an overall plan for achieving college outcomes.

- Develop a feedback loop that takes into account departmental performance, faculty feedback, and departmental evaluation of program effectiveness. Revise college outcomes, goals, objectives, and guidelines as necessary. Document changes so that the college can verify continuous improvement.

Work at the Program Level:

- Develop program outcomes in line with college outcomes.

Map program outcomes to courses. Establish acceptable performance criteria.

For each course, develop core course objectives that support each program outcome mapped to the course. This is a departmental level, top down design, exercise because courses and their prerequisites flow together to create the curriculum as a whole. Courses do not exist in isolation.

Develop a feedback loop that takes into account course performance data, student feedback, and faculty evaluations of courses. Revise program outcomes, course outcomes, and acceptable performance criteria as necessary. Document changes so that the program can verify continuous improvement.

Work at the Faculty Level:

Develop additional course objectives. This secondary set of course objectives encourages bottom-up evolution of the curriculum. For both core course objectives and secondary course objectives, develop instructional components designed to teach course objectives.

Develop assessments and corresponding rubrics for each course objective.

Create a spreadsheet for recording student scores based on assessments and rubrics. Note: be as discrete as possible. For example, if a test covers two or more objectives, the spreadsheet elements for recording the test should have a column for each objective.

A separate page of the grading spreadsheet should contain 'roll-up' formulas that summarize overall student performance that can be compared to established performance criteria. While each faculty member may have individual and creative instructional components, assessments, and rubrics, the 'roll-up' should be standardized so that program level summaries of course objectives and program outcomes are easy to achieve.

Develop a feedback loop that takes into account student performance, student feedback, and peer evaluations of teaching effectiveness. Revise instructional components, assessments, and rubrics as necessary. Changes should be documented so that faculty can verify continuous course improvement. Proposed changes to program outcomes and/or core course objectives should be submitted to the program curriculum committee for consideration by the faculty as a whole.

Chronology of Results and Changes

2005-2007

In 2004, the IT Department eliminated the Certificate Degree in Information Technology. With maturation of the IT field, the certificate became less useful as a credential within the industry. At that time, some changes were made in the Associates degree in IT. In 2005, the IT Department began a major curriculum revision project. Evolving standards in the industry and within academia necessitated further revisions to the Associates degree. These revisions are fairly extensive and had an impact on upper division IT courses as well. The project concluded in 2007.

The Special Interest Group for Information Technology Education (SIGITE), a subgroup of the Association for Computing Machinery (ACM) developed accreditation standards for IT. These accreditation standards influenced some of the changes proposed by the IT department. Since the IT department will seek accreditation in the near future, it was prudent to adjust the curriculum at this point in time.

In 2005 with approval of CAPC, the IT Department began offering a totally online degree, the WebBSIT. The WebBSIT is a collaborative effort between 5 universities in the USG. Curriculum development of the WebBSIT also influenced the proposed changes.

Finally, some changes were proposed to bring IT course offerings into better alignment with other IT programs within the USG. This eased some transferability issues. The changes are detailed below.

- Remove Math 1101 as a pre/co requisite from ITFN 1101. Math 1101 content is not necessary for successful completion of ITFN 1101 and removal of the pre/co requisite will allow more students to take the course. Math 1101 would remain a prerequisite for the rest of the lower division IT courses, helping to meet the University's critical thinking requirement and reinforce Program Outcome 1.
- Remove COMM 1001 and COMM 1002 as required courses. Replace Comm1001, COMM 1002 with COMM 1110. Speech is a critical skill for IT graduates. This change will also improve scheduling of classes and streamline IT course offerings. This change improves our ability to meet Program Outcome 8.

- Remove CPTG 1010 Computing with Spreadsheets. Remove ITSK 1701 Database Applications. These two one-hour courses will be replaced by CPTG 2201 which covers spreadsheet and database topics. CPTG 2201 was developed to serve business students. It makes sense to take advantage of the course for IT students as well. CPTG 2201 will reinforce coverage of Program Outcomes 1 and 9.
- Move ITFN 1112 Foundations of Systems Analysis to the upper division. Renumber/rename it ITFN 3112 Systems Analysis and Design. Revising the course and moving it to the upper division will allow greater depth of coverage; Program Outcomes 1, 2, 3 and 7 are now expected to be mastered at the mature level of mastery, Program Outcomes 4 and 8 at the proficient level. It will allow easier transferability of this course since most IT schools offer systems analysis at the upper division.
- Add an introduction to systems analysis as a unit to ITFN 2123 Project Management. With the Systems Analysis course now moved to the upper division, the lower division project management course needs to have a systems analysis perspective added. ITFN 2123 will address Program Outcomes 1, 4, 7 and 8 at the mature level of mastery.
- Rename ITFN 3134 Advanced Systems, Security, and Process Development to ITFN 3134 Secure Systems Development. This change reflects the addition of an upper division systems course (ITFN 3112) and recognizes the increasing role of security issues in systems development. The prerequisite to 3134 will be 3112. While the content of this course will shift to security issues, coverage of Program Outcomes 1, 2, and 3 at a mature level of mastery will continue.
- Move Foundations of Operating Systems to the upper division, renumber/rename it ITFN 3601 Operating Systems. Revising the course and moving it to the upper division will allow greater depth of coverage; Program Outcome 2, will now be expected to be mastered at the mature level of mastery, Program Outcomes 1, 7, and 8 at the proficient level. It will allow easier transferability of this course since most IT schools offer operating systems at the upper division.
- Require students to take a math elective (Math 1231, or 2020, or 2502) at the associate level and remove Math 3902 as a requirement. With the proposed computer science degree, this change will make it easier for the math department to serve the needs of both IT and Computer Science. It should help ensure enrollments for Math 1231, 2020, and 2502. Finally, removing Math 3902 makes room at the upper division for operating systems. The new curriculum guidelines proposed by SIGITE and reflected by other IT programs within the USG show Math at the lower division. The University's critical thinking requirement and the IT Department's Program Outcome 1 can be achieved with this change.

- Require all IT students to take ITFN 1303 and ITSK 2313. Requiring a pair of courses in programming brings us in line with the new Area F for IT. Even though the BIT was approved with a non-standard Area F, we have always made sure that we offer a package of courses that are equivalent to an Area F. Renumber ITSK 2313 to ITFN 2313 to reflect its foundational nature. After completing the programming pair, Program Outcomes 1, 3, and 5 will be expected to be mastered at the mature level of mastery.
- Require all IT students to take the webmaster courses at the lower division. Web skills are increasingly important to the practice of information technology and should be included in the foundational preparation of each IT student regardless of eventual major concentration. Currently, these courses are numbered ITSK 1401 and ITSK 2411. Renumber them to ITFN 1401 and ITFN 2411 to reflect their foundational nature. Change the name of ITFN 1401 to Foundations of Webmaster. After completing the webmaster pair, Program Outcomes 1, 4, and 9 will be expected to be mastered at the mature level of mastery, Program Outcome 3 at the proficient level.
- The UNIX series (ITSK 1601 and ITSK 2611) will remain as electives at the lower division. Renumber them to ITFN 1601 and ITFN 2611 to reflect their foundational nature.
- Require students to choose one of the following two courses at the lower division. Students who wish to focus on database should choose ITSK 2211 Intermediate Database Design. Those with a focus in networking should choose ITSK 2511 Intermediate Networking and Security. Other focus areas may choose either. To reflect the foundational nature of these two courses, renumber them to ITFN 2211 and ITFN 2511.
- To add more flexibility for students taking ITFN 2012 Internship in Information Technology, revise this class to allow a special project to meet the capstone requirement. Rename the class ITFN 2012 Lower Division Capstone in Information Technology. Students may satisfy the capstone requirements by completing an internship, or may choose to work on a special project. In either case, students must have their internship or project pre-approved. ITFN 2012 will be required for the AASIT. However, students who wish only the BIT and choose not to earn the AASIT may elect to take ITFN 1601, 2211, or 2511. Students who choose to take ITFN 1601, 2211, or 2511 in place of ITFN 2012 will earn one excess credit at the lower division.

- Make ITFN 4003 Portfolio Development and Presentation a 2 credit hour course. Include an ethics unit. This will allow Program Outcome 6 to be specifically addressed in a single course. We will continue to cover Program Outcome 6 in courses such as ITFN 1101, ITFN 2001, ITFN 4003, and others.
- Evolving standards in the IT industry and within academia prompted a review of lecture vs. lab hours in several upper division courses. The following courses will be revised from a lecture-lab-credit distribution of (2-2-3) to (3-0-3): ITDB 4201, ITDB 4202, ITDB 4203, ITDB 4204, ITSK 3413, ITSK 3423, ITSD 4301, ITSD 4312, ITSD 4303, ITNW 4502, and ITNW 4512.
- To reduce the total number of upper division courses offered, this proposal reduces the pool of available courses from 17 to 11. The courses for each emphasis area will be changed from 4 required IT courses + 1 IT elective to 3 required IT courses + 2 IT electives. IT electives are to be chosen from the pool of 11 remaining emphasis courses. Coverage of Program Outcomes will not be impacted since adequate coverage will remain in the pool of 11 courses.
- Prerequisites of lower division and upper division courses will be modified to reflect the changes outlined.

2008

Changes for 2008 were corrections to prerequisites necessitated because one of the programming course options was inadvertently left out of previous revisions. Making this change also required changing footnotes in the catalog.

EXISTING

ITFN 3314 - Testing and Quality Assurance in Software Development (3-0-3)

A high-level class in testing and quality assurance emphasizing the planned development of software and the nature of test development and implementation. Topics include test strategies, test planning, functionality testing, stability testing and debugging techniques. Lab fee required.

Prerequisite(s): [CSCI 1302 (C), or WBIT 2311 (C), or ITFN 2313 (C)] and ITFN 3112 (C).

CHANGE

Change Prerequisites to: [CSCI 1302 (C), or WBIT 2311 (C), or ITFN 2313 (C), or ITFN 2314(C)]

Reason for change: ITFN 3112 was removed as a prerequisite by CAPC action last year but catalog was not corrected. It is the IT Department's intent to allow ITFN 2314 to substitute for ITFN 2313 but that was not captured completely in previous changes to prerequisites for ITFN 3314.

EXISTING

ITFN 3601 - Operating Systems (3-0-3)

A conceptual and hands-on study of operating systems. Major areas discussed include operating system design and theory, applications and management issues, microcomputer and multi-user systems, including networks and mini/mainframe systems. Also covered are files, I/O, memory and process/processor management, networking, evaluation, tuning and application execution. Elements of operating system resource security including process, memory, file systems, and device peripherals, will be studied.

Prerequisite(s): [CSCI 1302 (C), or WBIT 2311 (C), or ITFN 2313 (C)] and [MATH 1231 (C), or MATH 2020 (C), or MATH 2502 (C), or WBIT 2300 (C)].

CHANGE

Change Prerequisites to: [CSCI 1302 (C), or WBIT 2311 (C), or ITFN 2313 (C), or ITFN 2314(C)] and [MATH 1231 (C), or MATH 2020 (C), or MATH 2502 (C), or WBIT 2300 (C)].

Reason for change: It is the IT Department's intent to allow ITFN 2314 to substitute for ITFN 2313 but that was not captured completely in previous changes to prerequisites for ITFN 3601.

EXISTING

Footnote ** on page 180 of the catalog and footnote *** on page 181 of the catalog currently read:

May choose CSCI 1301, 1302 in place of ITFN 1303, 2313

CHANGE

Footnote ** on page 180 and footnote *** on page 181 of the catalog should be changed to:

Programming options are: ITFN 1303/ITFN 2313 or CSCI 1301/CSCI 1302 or WBIT 1310/WBIT 2311. ITFN 2314 may be taken in place of ITFN 2313 or CSCI 1302 or WBIT 2311.