

REVIEW OF THE B.S. IN INFORMATION SYSTEMS

Classification of Instruction Programs (CIP) Code: 11.0103
Data Processing and Data Processing Technology/Technician

OVERVIEW

The **B.S. in Information Systems** program at Illinois State University is housed in the School of Information Technology within the College of Applied Science and Technology. The School of Information Technology houses six degree programs: a B.S. in Computer Science, B.S. in Cybersecurity, a B.S. in Information Systems, a B.S. in Network and Telecommunications Management, an M.S. in Computer Sciences, and an M.S. in Information Systems. In addition, the school offers a minor in Information Systems and Graduate certificates in Data Science: Computer Science, Enterprise Computing Systems, Information Assurance and Security, Internet Application Development, Network and Telecommunications Management, and Systems Analyst. The last review of the B.S. in Information Technology program occurred in 2013-2014.

The B.S. in Information Systems program’s curriculum is designed for students to develop skills to analyze organizational challenges and identify appropriate computing solutions. The program focuses on using computer technology and information management methods to solve business problems. Students enrolling in the B.S. in Information Technology select from three sequences: Integration of Enterprise Systems sequence, Systems Development/Analyst sequence, or Web Application Development sequence.

Enrollment by Plan of Study, Fall Census Day, 2014-2021

B.S. in Information Systems, Illinois State University

First Majors Only

	2014	2015	2016	2017	2018	2019	2020	2021
Information Assurance and Security sequence	111	125	144	63	10	2	1	1
Integration of Enterprise Systems sequence	10	11	11	15	18	12	8	6
Systems Development/Analyst sequence	108	111	116	101	95	90	69	57
Web Application Development sequence	31	37	43	37	39	46	37	29
No subplan			1		1			
Total	260	284	315	216	163	150	115	93

Table notes: The Information Assurance and Security sequence was phased out starting in Fall 2017 and replaced with the B.S. in Cybersecurity degree program.

Degrees Conferred by Plan of Study, 2014-2021
B.S. in Information Systems, Illinois State University
 First Majors Only

	2014	2015	2016	2017	2018	2019	2020	2021
Information Assurance and Security sequence	25		32	37	24	14	1	
Integration of Enterprise Systems sequence	3			1	3	3	5	3
Systems Development/Analyst sequence	26		23	19	30	25	22	20
Web Application Development sequence	4		5	9	4	13	7	12
Total	65	65	60	66	61	55	35	35

Table notes: Graduating Fiscal Year consists of summer, fall, and spring terms, in that order. For example, Graduating Fiscal Year 2019 consists of the following terms: summer 2017, fall 2017, and spring 2018. The Information Assurance and Security sequence was phased out starting in Fall 2017 and replaced with the B.S. in Cybersecurity degree program.

EXECUTIVE SUMMARY
PROGRAM REVIEW SELF-STUDY REPORT

Program goals

The program educational objectives (PEO) of the information systems program are as follows:

- Be a successful practitioner in an Information Systems related field or accepted into a graduate program
- Engage in professional development through continuing education, certifications, professional organizations, or experience
- Live and work as contributing, well-rounded members of society

Student learning outcomes

At the time of graduation, a student in our information systems program must attain the following outcomes:

- Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.
- Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.
- Communicate effectively in a variety of professional contexts.
- Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.
- Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.
- Support the delivery, use, and management of information systems within an information systems environment.

Program curriculum (2021-2022)

Graduation requirements (Integration of Enterprise Systems sequence):

122 credit hours including 83 credit hours for the degree program and 39 credit hours for General Education. The 83 credit hours for the degree program include 51 credit hours of information technology courses and 32 credit hours of courses external to the School of Information Technology.

Graduation requirements (Systems Development/Analyst sequence):

Program review conducted 2021-2022. Report submitted to the Illinois Board of Higher Education, Fall 2022

123 credit hours including 84 credit hours for the degree program and 39 credit hours for General Education. The 84 credit hours for the degree program include 52 credit hours of business courses and 32 credit hours of courses external to the School of Information Technology.

Graduation requirements (Web Application Development sequence):

121 credit hours including 82 credit hours for the degree program and 39 credit hours for General Education. The 82 credit hours for the degree program include 50 credit hours of business courses and 32 credit hours of courses external to the School of Information Technology.

Program delivery

The program is offered on the Normal campus.

The program is delivered primarily through face-to-face or blended face-to-face/online instruction.

Department faculty (Fall 2021)

21 tenure track faculty members (8 Professors, 5 Associate Professors, and 8 Assistant Professors)

16 non-tenure track faculty members (3 full-time, 13 part-time, totaling 7.2 FTE)

Undergraduate student to faculty ratio: 30 to 1

Undergraduate student to tenure-line faculty ratio: 41 to 1

Specialized accreditation

The B.S. in Information Systems program is accredited by the Computing Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET) through September 2027. The program was reaccredited in 2021.

Changes in the academic discipline, field, societal need, and program demand

Likely the biggest change experience by the Information Systems program since our last review is the change in demand among prospective students. Although this statement is misleading. Our overall reduction in demand was simply a shift in student demand from Information Systems to Cybersecurity as it became a standalone major. To be clear, the enrollment in the B.S. Cybersecurity far exceeds the reduction in the Information Systems major. That major took some of our majors but also has attracted additional students to Illinois State. This change was the result of an internal factor. Externally, the demand for IS students remains strong. According to the Information Systems Job Index (last published in 2019), placement rates at graduation have remained steady (at 70 percent) and average starting salaries have risen to over \$65,000. In addition, ABET – our accrediting body added a requirement for security content. The program added IT 250 to our curriculum as a required course for all Information Systems majors. The last model Information Systems curriculum was dated 2010. While a model IS2020 has been proposed, it has not yet been adopted. The IS2020 model curriculum being circulated suggests a move to more competency-based curriculum. This may represent a shift in how students are assessed. The program will continue to monitor the progress of this recommendation in order to determine how to adapt it to our environment.

Responses to previous program review recommendations

1. *Continue multi-faceted efforts to recruit highly-qualified students, including, but not limited to, outreach to high school counselors and sponsorship of camps for middle and high school students, with an emphasis on improving gender diversity.* The School has engaged in a variety of outreach efforts including sending letters to high school seniors, follow-up with applicants, focus on recruitment scholarships, events for high school and community college counselors, summer camps and other events for high school students, and participation in community STEM events. The program found direct outreach to high school counselors to be ineffective and have discontinued that and the summer camps. Our efforts to grow the program need to be revisited (as the program is now able to take a measure of the number of students shifting from the B.S. Information Systems to the B.S. in Cybersecurity). The program has been somewhat successful in recruiting women into the program (the percentage of women has grown to nearly 15

percent, it is still below the national average of 37 percent). The recruitment and retention of women (as well as under-represented groups in general) will continue to be a focus of the program in coming years.

2. *Continue efforts to address gender diversity among faculty members as hiring opportunities arise.* The program has successfully hired two new female tenure-track IS faculty and 3 new female faculty in other disciplines within the School. While women are still in the minority, as expected in Information Technology, the program and the School now have a substantial percentage of women in tenure-track roles to serve as role models and mentors for our students.

3. *Design and implement a systematic program of regular communication with program alumni to collect and maintain data on alumni perceptions of the program and on alumni successes in employment and graduate studies.* The School of Information Technology instituted a program of collecting data from graduates at our commencement receptions, including a non-Illinois State email and information about employment. The program has also made some attempts to collect the same information from students who do not attend the receptions but have been less successful in getting data from those graduates. The program has also improved our communication outward to alumni and have increased opportunities for alumni to be engaged with current students. The program maintains multiple social media sites (Facebook, LinkedIn, Instagram) as well as sending a bi-annual newsletter (called IT matters). However, the program still needs to improve our data collection to include a larger percentage of our alumni and the program also needs to work on developing a more systematic program of data collection from those alumni.

4. *Complete revisions to the student learning outcomes assessment plan to more closely align the plan with standards of the Accreditation Board for Engineering and Technology (ABET) and to further integrate program and learning assessment; implement the revised plan; utilize assessment results to make program improvements; and document how this has been addressed.* Revisions of the program assessment plan were completed following the last program review, and systematic data collection has been done. In addition to regular data collection and some curricular changes that were based on assessment data, the School of Information Technology has implemented a process in which the faculty for each program in the School meet each semester to discuss the assessment data that was collected in the previous semester. This process encourages the faculty to consider both curricular and pedagogical changes that would enhance student learning. Minutes are taken at each program faculty meeting regarding assessment data. The assessment committee then reviews the minutes from the program faculty meetings. The program faculty are pleased that our very recent program accreditation visit report noted no weaknesses or concerns in the area of assessment or continuous improvement.

5. *Regularly monitor and adjust the curriculum to ensure its currency and relevance in light of changes in information technology and student needs; curricular changes to consider include, but are not limited to, offering a transition course to help retain students who enter the program with minimal computing experience, incorporating global aspects of information technology into appropriate courses, removing content redundancies, and simplifying program requirements.* The program faculty has made curricular changes in light of changes in the field and accreditation standards. The program faculty have worked to help students transition into our introductory class (IT 168) through the offering of free tutoring and debugging as well as a new video library. Further, IT 164 was added to our curriculum for student who would like some foundational help before starting the program.

6. *Support ongoing efforts of the recruitment and retention committees in the school to sustain enrollment and graduation rate increases achieved during the prior program review cycle.* Faculty have worked to sustain enrollments through ongoing contact with admitted students. The program regularly send congratulatory letters and a small gift to admitted students. The program faculty also worked with University Recruiting to develop a more complete communication plan to span several months to keep students excited about Illinois State University. To address graduation rates, the program faculty worked to make sure all pre-requisite structures are needed. The program also pays careful attention to DFW rates. Our graduation rates were improving until COVID required a shift to online education. This resulted in more students sitting out semesters, withdrawing from classes, and to some extent higher fail rates.

Major findings

Overall, the program faculty believe that the Information Systems program is doing well, though there are opportunities for improvement. There are many aspects of the program that are working well.

- The program continues to be accredited by ABET.
- The curriculum is routinely updated.
- The assessment plan has also been updated, and faculty have become more involved in the assessment process and especially in the process of considering assessment results and looking at pedagogical and curricular adjustments that may be suggested by the assessment process.
- Over 70 percent of graduates have completed internships, and the evidence that the program has regarding employment suggests that most students find jobs in their field or being graduate school within 12 months, with a significant percentage having job offers in hand at graduation.
- The program's percentage of minority students generally mirrors or is slightly higher than the percentage in the university as a whole.
- The program has been successful in hiring multiple female faculty and has also seen slight growth in the percentage of female students.

The program does have a few areas that would benefit from improvement.

- Although the female student population has increased, the program is still below the national average. The program needs to work to find ways to recruit women into the program as well as continuing to focus on retaining the women the program has.
- The program needs to work on maintaining connections with our graduates. Since the last review, the program has started regular collection of data from graduating seniors but have obtained data from less than half of any graduating class. The program has also significantly increased our communication outward to alumni, but has been less effective at consistently getting feedback from our alumni.
- The program faculty needs to identify ways to grow the program.

Initiatives and plans

Based on major findings of this program review self-study, the Information Systems faculty plan to do the following during the next program review cycle to improve the program:

1. Continue to improve our assessment plan and activities. Creating a consolidated schedule for all majors within the School of Information Technology will help streamline our processes which likely will both improve efficiency and effectiveness.
2. Continue to monitor changes in the field and accreditation and update curriculum as appropriate.
3. Implement our new strategic plan. The plan includes efforts to grow enrollment and increase diversity among our students. It also includes efforts to internationalize the student experience.
4. Develop accelerated master's degree opportunities for our students. A plan is almost complete for an accelerated opportunity between the Information Systems undergraduate and graduate programs. We will also expand our thinking to programs outside the SIT.
5. Identify and implement at least one new sequence. Our research into aspirational programs (as well as recent conversations with recruiters) suggests any new sequence should be data related.
6. Renew our focus on student recruiting.
7. Improve our data collection from and communication with program alumni.
8. Improve honors participation rates.
9. Carefully monitor time-to-degree (post pandemic) and take action if the most recent data is not an anomaly.
10. Improve outreach to alumni.

PROGRAM REVIEW OUTCOME AND RECOMMENDATIONS FROM THE ACADEMIC PLANNING COMMITTEE

Review Outcome: The Academic Planning Committee, as a result of this review process, finds the B.S. in Information Systems program in the School of Information Technology to be in Good Standing.

The Academic Planning Committee recognizes that many of the efforts and activities that led to the development of the self-report were accomplished during the time period coinciding with the COVID-19 pandemic. The committee thanks the program for a comprehensive and critical self-study report that included input from multiple stakeholders including from an advisory board.

The committee notes that the program's enrollment during the period covering the program review cycle has declined significantly over the period of review (from 260 in 2014 to 115 in 2020), largely due to the elevation of the Information Assurance and Security sequence to a standalone Cybersecurity program in 2017 (in which enrollments are exceeding expectations). The committee commends the faculty work to elevate that sequence and supports ongoing discussions to explore the development of a new sequence for the program. The program indicates that, with current resources, this enrollment level is below their ideal target of 150 to 200 students. The committee commends the School faculty for efforts to increase the gender and racial/ethnic diversity among its students. Similarly, the percentage of students identifying as female has increased from 8.5 percent in fall 2015 to 14.8 percent in fall 2020. The percentage of undergraduate students from groups traditionally underrepresented in the discipline has also increased (from 27.8 percent in fall 2015 to 40.0 percent in fall 2020), generally above the University average during the period of review. The committee commends the program for the use of three endowed scholarship funds for incoming FTIC and transfer students.

The committee commends the program faculty for their efforts to support the success of their students. We commend the program on its ability to continue to limit enrollments in many of its courses, which is in keeping with the University's commitment to fostering a small-college atmosphere with large-university opportunities. The committee commends the program for the creative and varied co-curricular options it provides its students to meet their education and career goals. These include three student organizations, a lifestyle floor in Manchester Hall, collaboration with State Farm on an annual mobile application development competition, and opportunities to participate in other competitions and hackathons. These opportunities help the School prepare students for employment and build a strong student community in the program. The School provides some opportunities for student participation in research opportunities, including the new Next STEM Scholars program (supported through an NSF grant). However, students participating in the honors program has decreased, from 3.2 percent to 1.7 percent between 2016 and 2020. The committee also notes that the School has excellent laboratory facilities and works to incorporate significant hands-on experiences into the curricula of the various programs. We support faculty work to develop new initiatives to support student success, while recognizing that the COVID-19 pandemic has delayed the start of some of these (the peer mentoring and bootcamps for incoming students). We hope that these initiatives can be implemented soon.

The committee commends the program for the creative and varied curricular options it provides students to meet their educational and career goals. The committee commends the faculty's work to revise the curriculum during the period of review based on feedback from multiple stakeholders. This included revisions information systems curricular requirements, providing more flexibility to students by reducing the overall required number of credit hours, the addition of a course that focuses on social, legal and ethical issues in the discipline (IT 214), and revision and expansion of elective options. We note that all undergraduate programs in the School include a professional practice requirement, usually in the form of a paid internship in the field. The committee also commends the program for their collaborations that support other programs and departments and provide opportunities for students who want to double major.

The committee commends the program faculty on the development, implementation, and revision of their plan for the assessment of student learning outcomes. During the current review cycle, faculty have used the evidence gathered through the student learning outcomes assessment plan to inform program changes, and this includes the incorporation of rubrics as tools for assessing student coursework regarding the program's learning outcomes. The committee acknowledges the use of such rubrics as one method to provide consistent reviews of student learning that can provide potential areas for improvement. The information gathered through these measures has been used to make program changes, and several examples of these changes were specified.

The committee commends the School faculty on their success at hiring and retaining a higher number of female faculty members. We recognize the faculty members of the program for their scholarly contributions to the B.S. in

Program review conducted 2021-2022. Report submitted to the Illinois Board of Higher Education, Fall 2022

Information Systems program. Faculty members are active researchers who publish peer-reviewed journals articles, and present at national and international professional conferences.

The committee appreciates the in-depth analysis of comparator and aspirational programs. As part of this analysis, the program faculty identified multiple institutions with similar programs that excel in ways that our program may aspire to. The committee also recognizes that faculty developed specific action plans to implement similar initiatives as those to improve the program at Illinois State University.

The committee commends the program faculty for being accredited by the Accreditation Board for Engineering and Technology (ABET) but also one of the first departments in the nation to have ABET accreditation for both a computer science program and an information systems program. Furthermore, Illinois State University continues to be the only university in Illinois to hold both accreditations.

Follow-up Report.

The self-study report identifies a number of potential initiatives related to the program curriculum, time-to-degree, and credit hours. The committee asks that the program faculty consider these as part of a comprehensive review and evaluation of the curricula across all sequences, and develop a plan for necessary revisions. This analysis should include examining the role of the articulation of transfer courses and how they impact time-to-degree, identify any courses that are potential bottlenecks due to high DFW rates (e.g., in the required mathematics courses and IT 168), the impact of limited offerings (e.g., required courses that are only offered every other year), and the availability and timing of the required internships. Additionally, the committee asks that the program faculty to use data about the flow of students out of the major to develop a better understanding of the underlying factors that are impacting enrollment trends (e.g., curriculum, faculty resources, student preferences). We ask that these discussions involve both internal and external stakeholders (e.g., alumni and the Advisory Board) as well as comparisons with the curricula of programs at comparator institutions. Accordingly, the committee asks the faculty to engage in discussions of this plan and to summarize the findings of those discussions in a report submitted to the Office of the Provost by May 15, 2023.

Recommendations.

The Academic Planning Committee thanks faculty and staff members of the School of Information Technology for the opportunity to provide input regarding the B.S. in Information Systems program at Illinois State University through consideration of the self-study report submitted by faculty. The following committee recommendations to be addressed within the next regularly scheduled review cycle are provided in a spirit of collaboration with School faculty members. In the next program review self-study report, tentatively due October 1, 2030, the committee asks the program to describe actions taken and results achieved for each recommendation.

Develop a plan for controlled enrollment growth. The committee notes that while the demand for the program has been strong, enrollments have trended downward, especially following the elevation of the Information Assurance and Security sequence to a standalone program. If it is determined that declines in enrollments resulted from students selecting the Cybersecurity program, then committee supports the discussions by the faculty to develop a new sequence that may fill that void that will attract new students to the program. We encourage the program to continue refining and implementing their plans for recruiting students from groups who are traditionally underrepresented in the program and discipline. We note that many of the recruitment strategies are described at the School level, and we recommend that the program faculty explore the use of program-specific recruitment strategies (e.g., program-specific scholarships), especially in light of the planning for a new sequence. The committee also recommends that the program faculty examine their existing pipeline programs for effectiveness and work with their advisory groups to identify and pursue additional new pipeline opportunities.

Continue to focus on equity, diversity, and inclusion. While the committee recognizes the efforts to increase the gender and ethnic diversity of faculty and students within the program, the committee encourages the program to continue to pursue its goals related to further developing an equitable, diverse, and inclusive environment that effectively supports students, faculty, and staff from diverse backgrounds. Furthermore, we encourage the program faculty to continue to examine ways to infuse diversity, equity, and inclusion into the curriculum.

Continue to focus on student success and retention. The committee recommends that the program faculty develop a plan for student success. The plan should be used to increase transparency and communication around “student success” by defining the program’s goals for, assessment of, and actions towards supporting students enrolled in the program. The plan may provide an overarching structure for other plans (e.g., retention, curriculum, alumni engagement). The committee recommends continued periodic review of the program structure and content to remain current with changes in the field and to maintain program retention and graduation rates (including the percentage of graduates completing the program within four years and trying to reduce the numbers of curricular exceptions needed). The committee recommends that the program continue monitoring student retention, particularly of students from traditionally underrepresented groups. The committee also suggests that the program systematically examine the pattern of internal transfers between programs and sequences and the impact of major changes on student success. The committee suggests that faculty members investigate student interest and participation in the Honors program to ensure that students desiring to complete the program with honors have sufficient opportunities to do so.

Continue to review and revise the curriculum. The committee recognizes substantial work by faculty members to review and update the program and its curriculum, especially with respect to responding to accreditation standards. The committee recommends continued periodic review of the program structure and content to remain current with changes in the field. As part of this review the committee recommends that the program faculty undertake a time-to-degree analysis. In particular, we suggest that the faculty examine ways to strengthen the articulation of transfer courses that may help reduce time-to-degree, especially for external transfer students, identify any courses that are potential bottlenecks due to high DFW rates (e.g., IT 168) or limited offerings (e.g., courses that are only offered every other year, like IT 326). Continue to develop and expand the internship program for majors, perhaps through input from the Advisory Board in creating additional opportunities for interaction among students, alumni, practitioners, and prospective employers. The committee encourages the program to clarify the research components in the curriculum (e.g., are there potential discrepancies between professional practice and independent study) and to continue developing opportunities for student research and creative activities, and participation in the Honors program. The committee recommends that the program faculty examine the pattern of internal transfers, not only in and out of the major, but also between sequences. Understanding the flow of students can inform future curricular revisions.

Continue implementing and refining the student learning outcomes assessment plan. The committee encourages faculty to continue its implementation of the student learning outcomes assessment plan for the program during the next program review cycle, to continue to utilize information gathered through plan implementation to make program revisions as necessary, and to document how that has been done. The committee encourages faculty to periodically evaluate the effectiveness of the plan in assessing student learning to identify any modifications to the plan faculty may deem necessary.

Continue the collaborative work with Milner Library. The committee recommends that the program work with the subject liaison librarian to examine and evaluate the library's journals and monograph collection related to information systems to aid in both the selection and deselection process of these sources. Given recent journal cancellations and expected increases in distance and hybrid courses, we encourage the School and the Library to further collaborate to increase awareness of alternative access to resources, such as Interlibrary Loan and I-Share lending, among faculty and students. We also recommend that the program work with the subject liaison librarian to develop a tiered approach for information fluency learning outcomes for the School, align those outcomes to the curricula, and integrate those outcomes into the student learning outcomes assessment plan for the program.

Continue to refine a plan for alumni tracking and engagement. While program faculty have been successful at increasing scholarships through donations from alumni, the committee encourages the program faculty to continue to refine their plan for tracking program alumni and use this system to enhance alumni networking and engagement. These activities may become even more important in the years ahead as the program’s alumni become more diverse. The program could benefit from increased involvement of its alumni, employers, and other external stakeholders in providing input regarding the program and in mentoring students and providing employment opportunities for program graduates.