School of Information Sciences

2015 Learning Outcomes Assessment Report

July 24, 2015

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SIS Learning Outcomes Assessment, Executive Summary – 2015

Undergraduate Program (BSIS)

The School of Information Sciences (SIS) has one undergraduate program; it leads to the Bachelors of Science in Information Science (BSIS) degree.

Highlights of Assessment

The BSIS program continues to be attentive to the changing needs of industry for entry-level information professionals. In frequent consultation with employers and with members of our Industry Advisory Council, the faculty continues to reshape the curriculum to feature clearly articulated specializations and to expand opportunities for students to gain practical experience. Assessment processes over the past several years have increasingly driven the curriculum to include integrative, project-based work that requires a breadth of knowledge and skills. In addition, assessment has driven a clearer articulation of interdependencies within the curriculum, with the outcome that these interdependencies are being explicitly addressed.

There is general acknowledgment by faculty of the value of project-based work in improving learning outcomes. Over the last three years the BSIS program faculty has reviewed student class projects and considered their impact on student learning. Team-based project work is proving to be an effective means of introducing students to the industrial practice of software and systems design. As a result, this year we increased both the number of team-based and individual projects, notably building strategic partnerships with the School of Medicine, School of Pharmacy, and School of Dental Medicine on student projects.

Professor of Practice Dmitriy Babichenko continues to lead a series of independent studies framed as consulting projects with Magee Hospital and the Wiser Center, and in January 2015, our second professor of practice, Leona Mitchell, joined the faculty after retiring from her position as vice president of IBM. Leona is developing curricula in project management and leadership, focusing primarily on the undergraduate program.

Information Science students continue to compete in the annual Deloitte Case Competition, forming teams and solving a case-based problem. Their solutions are presented to faculty and senior Deloitte officials, and our students routinely demonstrate their competitiveness and ability to work effectively in multidisciplinary teams. The Deloitte competition provides opportunities for Information Science students to exercise their presentation skills, problem solving, and proactive initiative.

In each of these learning activities, employers, faculty, and student peers provided critical feedback, providing a rich assessment process that drew out both the strengths and weaknesses of our students. As a result, enhancements to the curriculum are steadily incorporated to increase the emphasis on communication and presentation skills, and to include more targeted exercises designed to enhance students' critical thinking and problem solving skills.

In addition to emphasizing project-oriented classroom experiences, more students are engaging in internships. At the end of the term, the employment supervisor and a faculty member review each student intern's performance, focusing on notable strengths and weaknesses.

The formal and informal feedback we have collected from multiple sources, including faculty, staff, employers and peers has provided a rich pool of data with which we are identifying areas of strength and triangulating areas needing improvement through course content and student advising. Student success in project-oriented learning is also influencing the marketing of the undergraduate program to potential candidates. Even though our students have been successful to date, the evidence continues to show a very competitive marketplace, and one in which students must demonstrate a broad range of capabilities, from the highly technical core components of our curriculum to critical thinking, problem solving, and effective communication.

Summary of strengths

The increased focus on defining specializations and the provision of expanded opportunities for gaining practical experience through capstone courses, independent studies, integration of real world consulting projects in the classroom, and internships are making BSIS students very competitive among employers. Student placement rate following graduation hovers right around 100% and entry-level salaries are second only to Pitt graduates from Engineering.

Summary of challenges

The expanding expectations of employers (coupled with their reductions in internally supported education) are placing demands on the School that continue to become more evident. The current curriculum, with a requirement for 30 credits in Information Science courses, is barely sufficient to develop the technological knowledge and skills required for entry-level employment, while employers clearly seek a range of capabilities beyond the purely technical. The undergraduate faculty is examining this issue with an expectation that the course requirement will need to be raised to 39 – 45 credit hours, placing it in the competitive range with other upper-division undergraduate programs at Pitt and with external competitors, such as Penn State.

Changes resulting from assessment

This year we welcomed our second Professor of Practice to the faculty. Leona Mitchell was hired in order to bring a working knowledge of corporate leadership and industry relations to the faculty. Working in collaboration with the program chair and regional industrial partners, Prof. Mitchell is developing a full course in project leadership and additional modules in leadership and entrepreneurship that can be incorporated into other courses.

Curricular compression issues consistently bound our creative responses to the assessments conducted. While much has been accomplished in terms of students focusing on specializations and gaining practical experience, the faculty is now examining the overall undergraduate IS experience through a

larger lens, considering the spectrum of technical, professional, and social skills increasingly expected of our graduates.

Global competence

Our operational definition and expected learning outcomes for undergraduate global competence are stated as follows:

"Students will possess an understanding of how information systems and data are used on a local, national and global basis and how they add value to an individual, organization or society. In particular, data and systems will be examined from a global perspective in order to appreciate the impact that they have economically, politically and socially."

In order to assess students' developing global awareness, a faculty committee interviews a sample of students following their internship experience, capstone course or independent study. All students are expected to be able to discuss their experience and explain the details of how their work affects individuals, groups and society (both within the US and internationally). Once again, course compression becomes a complicating factor, and many students struggle with this more expansive requirement. As a result, in the course of the broader examination and likely expansion of the required curriculum, the faculty will be considering ways to incorporate a global perspective more explicitly into the curriculum and capstone projects.

Overall, the process of continuing assessment has become a fundamental component of the undergraduate curriculum and, as a result, adjustments are routinely being made so that the student experience reflects both the rewards and challenges found in the workplace and in our academic discipline. We are currently engaged in discussions with Computer Science and other select units on campus to develop a proposal for a new academic and administrative unit that consolidates the curricular and research strengths of the university. The emerging proposal is already exhibiting facets informed by the findings of our student learning outcomes assessment experience over the past few years.

Graduate Programs (LIS, GIST, TeleNet)

The School of Information Sciences (SIS) has three graduate programs: Library & Information Science, Information Science & Technology, and Telecommunications & Networking.

Interest in gaining direct professional experience (e.g., through internships and field placements) is increasing across all of our programs, presenting the need and opportunity to consider approaches that are systemic to the School's programs. A proposal for a *professional immersion* specialization is being explored for each of our Master's programs to respond to this growing student interest. The idea behind such a specialization is that, in addition to the structured curricula the students will already be following, the experience-oriented learning outcomes will be introduced and tracked as milestones vetted by staff and faculty, with those students who successfully "pass" these milestones being awarded some form of professional immersion recognition.

Library & Information Science (LIS)

Highlights of assessment

Two years ago, the LIS program underwent its 7-year reaccreditation review by the American Library Association (ALA). Learning Outcomes Assessment (LOA) results were included in the self-study of the MLIS program in preparation for the review. Encouraged by feedback from the Committee on Accreditation's External Review Panel and the unconditional reaccreditation received in 2013, the faculty continues to experiment with new techniques to assess the extent to which students have met the program's goals. The LIS program currently identifies eight learning outcomes in the Assessment Matrix. The two assessed during the 2014-15 LOA process are:

Outcome 3. Advance the creative and ethical applications of information technologies.
Outcome 5. Promote intellectual freedom and equity of access to information.

For the assessment of outcome 3, the following measurable interpretation was used: "The student will be able to use various technologies as a medium to present information of various types."

Similarly, for the assessment of outcome 5, the following measurable interpretation was employed: "Students will be able to identify and explain the concepts of open access to information and be able to discuss socio-economic aspects."

In our 2013 report, we noted an unusually high proportion of students meeting or exceeding the stated learning objectives. Reflecting on this, the standards for critical analysis were raised in 2013-14 to make the assignments more challenging, with the result that the number of students meeting or exceeding expectations fell a bit short of the goal (80% for outcome 2 and 70% for outcome 7, where the goal for each was 85%). These results turned around again this year, with nearly all students' reviewed work meeting or exceeding expectations.

We interpret this evidence as demonstrating that the rate of student success as measured by the learning outcomes assessment processes aligns closely with admission standards and is well matched with curricular demands and expectations.

Summary of strengths

The LIS program and each of its specializations are consistently ranked among the top 10 programs nationally, and the Pitt Online MLIS was recently ranked 8th by [TheBestSchools.org](). The specializations in archives & information science, children & youth, health, and school library certification are particularly strong and recognized nationally. The children & youth specialization is a long-term, traditional strength of the school, going back to its founding in the early 20th century. Recent faculty hires have added intellectual depth in new and emerging areas that are strategically important to the profession of librarianship, including research data management and digital curation.

Summary of challenges

Notwithstanding the recognized strength of several specializations in the program, three of the specializations are largely dependent on individual faculty members whose retirement can be anticipated within the next five years. The School is addressing succession planning for these key faculty roles.

The extraordinarily rapid changes in information technology are transforming librarianship and the very practice of scholarly communication. The curriculum must continue to adapt in response to changing existing conditions and in anticipation of more to come, incorporating an ever-increasing emphasis on information technology. The next major wave of change is being driven by issues emerging from requirements for digital curation and research driven by "big data."

The unsettled economy since 2008 has dramatically impacted enrollment trends nationwide. Specializations such as the School Library Certification Program, which in 2008 was the largest of the LIS specializations, is now the smallest, due primarily to cutbacks in public funding to education. In contrast, Archives & Information Science, which was the smallest of the specializations in 2008, is now the largest.

Changes resulting from assessment

The Learning Outcomes Assessment program has fostered a number of changes in course content, sequencing, and standards, and has identified some opportunities (and needs) to increase depth and rigor. Course standards in courses such as LIS 2600 (Introduction to Information Technology) have been raised, for example, in response to the high success rate of students in earlier assessments. The LOA process has also been largely responsible for the continuation of an ongoing series of rigorous curriculum review meetings.

Global competence

Library & Information Science is, by its very nature, global in its treatment of information resources; and this attribute is inherent, if implicit throughout the curriculum. LIS graduates must routinely demonstrate their understanding of learning outcomes in a global context. Students' first exposure to this is in the introductory course LIS 2000, which also provides the basis for the assessment of this learning outcome. With the explicit university guidance to assess global competence, the instructions and the rubric for assessing relevant LIS 2000 essay assignments were revised last year to emphasize international perspectives.

For the purposes of LOA, the LIS program maps the University's global competency goal "Understand the international dimensions of the discipline" specifically into the course goal "Students will be able to explain the international aspects of scholarly communication." The goal is that 85% of students' sampled essays in LIS 2000 will demonstrate an understanding of the international aspects of scholarly communication. In 2010, 54% demonstrated this competency, and in 2012, 76% did. This learning outcome was not assessed this year.

Graduate Information Science & Technology (GIST)

Highlights of assessment

In the GIST program, faculty members have taken an interest in exploring how students' self-assessment of mastered learning outcomes correlates with faculty expectation of the students' mastery of learning outcomes. For the 2013 assessment, the GIST program implemented a Web-based infrastructure to collect students' self-assessment of mastered learning outcomes for all courses they have taken, providing a foundation for future comparison of students' assessments to those of the faculty. For the 2014 assessment this infrastructure was extended to collect mastery *prerequisites* – students perceptions of skills that are required to succeed in a course. Since these skills could be the outcome of lower-level courses, this information also helps establish course prerequisites. Faculty also used paper-based surveys at the end of the Spring 2014 term to assess student perception of mastered learning outcomes and prerequisites. The GIST program uses student self-assessment of learning outcomes as a component of the overall assessment.

GIST faculty have explored *peer-based evaluation* of learning outcomes by both student peers and other faculty not teaching the assessed course. Extending this practice, some faculty also experimented in 2014-15 with public poster-based presentations of final projects, which were intended to encapsulate all critical skills mastered in the course. A poster presentation format allows course outcomes to be made more visible and to engage a broader set of stakeholders in learning outcomes assessment.

Faculty and staff have also prepared a survey directed at alumni to self-assess their educational outcomes. An initial version of the survey is currently being reviewed in the Dean's office.

Summary of strengths

The GIST program has sustained its long-term reputation for a strong focus on systems-level issues (e.g., system architecture, performance, and usability) and for the rigor of the curriculum. It attracts a technically strong international student body, predominantly from Asia. In addition to the conventional curriculum offerings, the GIST program offers students a number of online facilities developed in the School to expand their horizons and to broaden their overall educational experience. These resources are, themselves, outcomes of research in which many of our students participate. *CourseAgent* supports faculty in student advising, enabling students to explore alternative career opportunities and to relate these to specific specializations and, ultimately, to course sequences. *CoMeT* (Collaborative Management of Talks) is a social network site for sharing information about scholarly talks and presentations in the region. *Eventur.us* provides a social networking venue to share information about cultural events, and *Conference Navigator* provides social networking services tailored to the needs of participants in professional conferences.

Summary of challenges

Information Science is one of the few active computing-related areas without national standards for learning outcomes. ACM covers related fields such as CS, ECS, MIS and Information Technology. Rather

than conforming to a set of accepted standards, therefore, our primary basis for external assessment consists of benchmarking against peer programs

Faculty consultation with industry partners has identified a set of learning outcomes that are considered critical for success in the profession, yet are not explicitly taught in any specific course within the program. The challenge is to ensure that students acquire the following skills through their cumulative experiences in the program and that these are measurable as student learning outcomes:

- o Group leadership and group work
- o Public technical presentations
- o Recognition and analysis of new IT trends and topics
- o Professional application of research results
- o Personal skill awareness and presentation

Because these outcomes transcend any one class, they are perhaps best measured and assessed outside of the classroom (in a manner similar to how progress is measured in the doctoral student's progress, for example).

Changes resulting from assessment

Following an analysis of student performance related to the program's prerequisite expectations, the admission letters for MS and PhD programs now stress prerequisite skills required of entering students. The annual PhD student evaluation process now requires students to complete a new form on the status of their prerequisites at the time of annual evaluation.

In response to the English language and technical writing difficulties exhibited by some of our international students, more guidance is being provided to students working on projects regarding the organization, structure, and content expected in a written report. In addition, two sections of a course prepared by ESL specifically for GIST students, first offered in 2014, will be continued in the fall 2015 semester, when we will welcome another large number of newly matriculated international students.

The GIST program is engaged in a process of explicitly identifying learning outcomes for each course and aligning these with program-level learning outcomes. Fine-grained learning outcomes and prerequisites are being distilled for all courses. The results will be used to refine program-level learning outcomes, to improve the prerequisite structure, and to facilitate review of expected student competencies with industry.

Global competence

Addressing issues of global competence in Information Science includes several components:

- o Encouraging group diversity for course projects by forming teams of students from different countries
- o Adding materials on national standards and other international issues to several courses

- o Introducing more research seminars delivered by non-US faculty, and encourage graduate students to attend by adding seminar attendance requirements to several relevant courses
- o Targeting clusters of students from areas of the world not currently represented at our School for which their countries provide tuition support, such as Brazil (through Pitt's affiliation with the Brazilian Scientific Mobility Program).

The GIST operational definition and expected learning outcomes for global competence follow:

> The profession of Information Science is international by its nature. Most of the tools, approaches and techniques used are the same worldwide. Yet different countries have different policies, rules, and standards (i.e., telecommunication, privacy, document structure) and other national aspects that have to be taken into consideration when designing and assessing information products adapted for specific countries. To foster global expertise, the faculty resolves to integrate these aspects into several relevant courses (e.g., Security and Privacy, Interactive Systems Design, etc.). In addition, a part of global expertise is the ability to work in international project teams. The faculty resolves to encourage this practice in project-oriented courses.

Telecommunications & Networking

Highlights of assessment

In 2011-12, the Telecommunications & Networking program underwent a very substantial curriculum revision informed by LOA results, economic conditions, a reduced faculty size, and evolving needs of the international telecommunications and networking industry. The curriculum was trimmed and the design was streamlined, minimizing low-enrollment, non-essential courses. The reconceived Telecommunications & Networking curriculum was in effect for students entering the program in the fall 2012 term. It has doubled in size since the new curriculum was introduced, and is currently attracting a very high performing international caliber of student.

Summary of strengths

Among the iSchools (now numbering 65 globally), SIS's Telecommunications & Networking program continues to be the most technically rigorous. Graduates from the program excel professionally in academia, in industry, and in government. Based on surveys of graduates from the fall of 2013, 5 of 6 graduates were already employed or offered employment in the field. A survey of the 6 fall of 2014 graduates revealed the same outcome… 5 of them were employed, had accepted a job offer, or had been offered a job.

Results from the most recent LOA process, including an independent evaluation of eight student group projects from the fall 2014 Network Performance class, concluded that all projects met expectations. An independent review of sample student projects from the spring 2015 Computer Networks / Applications of Networks concluded that 2 students exceeded expectations and 4 met expectations. A review of

sample student quizzes and lab reports from the spring 2015 Computer Networking Laboratory concluded that all 5 students met expectations. A review of final exams and projects from the Cryptography course concluded that all 11 students met expectations. The program is relatively small in its overall enrollment and attracts highly capable international students. Its size enables greater personalized attention of faculty to student performance, hence the relatively high performance reported. This reinforces the program's reputation as one of the most technically rigorous and challenging telecommunications programs in schools to which we compare.

Summary of challenges

The Telecommunications & Networking program is relatively small by Pitt standards and attracts a largely international cohort of students; many of our current students are from India. Analysis of enrollment trends over an extended period suggests that international enrollment is largely composed of "waves" of students from developing countries that are investing substantially in their communications infrastructure (e.g., Iran, Saudi Arabia, Thailand, India, and China). These waves appear to run for 5 – 10 years, starting modestly, peaking, and then trailing off. Some of them have a relatively steady state component that persists after the wave. Having observed several of these waves, we continue to seek early indicators of their emergence, and, ideally, indicators that would enable a focused recruitment activity that has the potential for high yield.

Changes resulting from assessment

The curriculum was comprehensively restructured and streamlined in 2012 in light of a number of factors, including the results of LOA processes. A long-standing and signature feature of the program is its hands-on laboratory that supplements theory with very practical experience. The Computer Networking Laboratory course was among those revised in 2012 based on student performance and industry guidance.

Given three years of consistently high performance on assessments with the revised curriculum, the faculty is reviewing the standards of performance in several key courses with the objective of raising them further. While, perhaps, an obvious response to students' high achievement in the program, it is also the case that nearly all of the students are high performing, international students.

Global competence

The Telecommunications & Networking operational definition and expected learning outcomes for global competence follows:

> The profession of Telecommunications and Networking is fundamentally global. Most of the infrastructure, tools, and techniques used are common worldwide. Yet different countries have different policies, rules, and standards (e.g., tariff structures, spectrum management, privacy, security) and other national aspects that have to be taken into consideration when designing and assessing telecommunications and networking solutions adapted for specific countries. To foster global expertise, the faculty seeks to identify and integrate these aspects into several relevant

courses. In addition, a part of global expertise is the ability to work in international project teams. The faculty encourages this practice in project-oriented courses.

Whereas previous years assessments focused on international teams of students working on projects together, this year's focus was on individual students' ability to demonstrate their understanding of global telecommunications issues through their writing. An independent review of student papers concluded that all 15 students met expectations.

As indicated in last year's LOA report, focusing substantial attention on "global competence" in a small program that is composed almost entirely of international students from a variety of countries may not be the best investment of time and resources. Students' very presence in our program engages them in a diverse international community through the natural course of their studies.

Feedback to SIS Program Chairs in Response to the 2015 Learning Outcomes Assessment

Undergraduate Program (BSIS)

The undergraduate program continues to make excellent progress in aligning curriculum with its programmatic goals and in framing learning outcomes to assess students' progress. The articulation of specializations, the hiring of a second professor of practice, and the expansion of opportunities for students to gain professional experience through internships and related activities demonstrate the program's commitment to student success. Particularly noteworthy is the expanding attention to a project-oriented curriculum that introduces students to actual industrial practice in system design and implementation. The strong, project-oriented collaborations with the School of Medicine, the School of Pharmacy, and the School of Dental Medicine provide exceptional opportunities for students to gain practical experience. The growth in the number of internships provides worthy evidence of the value both students and regional industry place on this priority. I also note the rising standards in the core courses relating to critical thinking and communication skills.

Your assessment matrix this year reported on four of the program's six learning outcomes. While notable progress is clear in each of these areas, the measures tend towards qualitative judgments supported by anecdotal observation. The report makes reference to the use of rubrics without fully defining them. Future assessment reports would benefit from more explicit statement of rubrics used and quantitative analysis of student performance against those rubrics.

While developing global competence among BSIS students continues to present a challenge, I note the very positive progress made on international agreements with universities in Korea and China. Exchange programs emerging from these agreements have great potential to advance the global competence of students who take advantage of the opportunities presented. You might also find it helpful to seek ways to engage undergraduate students with graduate students in a range of venues, academic and social, using the third floor as a resource. Student Services staff are eager to facilitate such events. With the large number of international graduate students, this might help undergraduates become more adept in appreciating the international dimensions of their professional community, as well as help socialize the international graduate students beyond their group of close friends and acquaintances.

Graduate Programs

Library and Information Science (MLIS)

The unconditional reaccreditation of the MLIS program in 2013 speaks well for the overall intellectual strength of the program, particularly at a time when some very good programs are only receiving a provisional reaccreditation by the ALA. The program and its specializations have also consistently maintained strong national rankings. As was pointed out during the reaccreditation process and is clearly an ambition for the program, the linking of course outcomes to program outcomes is an important ongoing process.

As is the case with the GIST program, the active engagement of the students (particularly those in the Partners Program) in reflecting on their achievement of learning outcomes is valuable. The MLIS assessment uses as its point of reference an 8-point programmatic framework.

Given the precipitous and ongoing decrease in the size and composition of the LIS enrollment, partly due to cutbacks in public funding to education and partly due to shifting employment prospects, the exploration of emerging specializations in areas such as digital curation and research data management becomes an urgent necessity. Shifting enrollment is becoming an ongoing challenge requiring agile leadership and creative adaptation to employment needs and professional opportunities. Changes within the curriculum (e.g., dropping under-enrolled courses and specializations, introducing new specializations, and becoming very strategic with online offerings) will likely require equally strategic changes in student recruiting and admissions criteria in order to attract students to the program who are suited to these emerging professional opportunities. We will also need to consider succession plans for sustainable specializations in the program in the course of the coming year.

As reported in the 2013 LOA summary, an unusually high proportion of students met or exceeded expectations for learning outcomes, leading to faculty raising the performance standards. In 2014, the number of students meeting the raised standards fell below the goal, suggesting that the program is at a balance point in admissions criteria, curricular rigor, and expectations for student performance. This year, the number of students meeting or exceeding expectations (in the 3rd and 5th learning outcomes) was, again quite high.

Information Science and Technology (MSIS)

The GIST faculty, facilitated by a newly established dedicated Assessment committee, is making notable progress in exploring creative ways to assess learning outcomes, including:

- experimenting with faculty-based vs. peer-based (student) assessment, now supported by an online system,
- determining students' ability to self-assess their mastery of learning outcomes using a web-based infrastructure,
- preparing a survey for alumni to self-assess the impact of their education on their subsequent professional progress, and
- holding public presentations of final class projects (poster and oral presentation) with peer-based review and assessment.

Student assessment continues to identify the extent to which international students (particularly those from the PRC) lack sufficient mastery of the English language and of communication / presentation skills. In response, a special ESL course that is specifically designed for international IS students, first offered in the fall 2014, will be expanded to two sections in the fall 2015 term, and additional guidance will be provided to students unfamiliar with professional and scholarly writing styles.

The GIST program continues to be particularly effective in designing research projects around social media topics that are then offered as new services to enhance the student experience. Examples include

CourseAgent, CoMeT, Eventur.us, and Conference Navigator. It would be useful to consider quantitative measures that capture the impact of these innovations on student learning outcomes.

The GIST outcomes assessment also notes that a large number of students from the PRC come to SIS with solid preparation in the formal foundations of information science. This provides the opportunity to increase the rigor in critical courses, making the curriculum in areas such as big data, security, social media, and data mining more competitive against peer programs. Without specific national standards for learning outcomes (as are available in computer science, engineering, and related disciplines), benchmarking against peer programs becomes an increasingly important gauge. While the GIST faculty is clearly learning from benchmarking peer programs, the discussion of the outcomes of these initiatives remains largely qualitative (e.g., modifying existing courses in Data Mining and Information Visualization, and developing new ones in Software Testing and Cloud Computing). I encourage the faculty to set goals, develop rubrics, and establish quantitative metrics that facilitate measuring improvement in student performance over time.

In the discussion of global competence, the LOA submission reports that faculty plan to experiment more with international teams on class projects. This is a worthwhile experiment that was launched last year. Given the difficulty the Tele program had in prior years with this approach, it would be valuable to understand in greater detail the GIST experience. The addition of materials relating to national standards and international implications looks like a valuable addition to the program. Perhaps most noteworthy is the operational definition and expected learning outcomes for global competence developed by the faculty last year.

Overall, while the GIST faculty are clearly focusing on improving learning outcomes and are introducing substantial innovations into the curriculum, future reports need to include a stronger quantitative assessment using well-defined rubrics, against which goals can be asserted and progress assessed.

Telecommunications and Networking (MST)

The Telecommunications and Networking program attracts a high performing cohort of international students and prides itself in providing a substantial level of hands-on laboratory experiences and personal attention. Since restructuring the curriculum in 2011-12, enrollment has essentially doubled.

The program retains its reputation as the most rigorous telecommunications and networking program among the iSchools. The 2015 assessment conducted by Tele faculty is quite striking in the consistency of reported outcomes. In five out of six learning outcome categories (theory, theory & practice, practice, specialization, and global competence), **all** students are reported to have met or exceeded expectations, with the resulting action plan being "No changes are planned at this time." The program is clearly delivering a commendable education to its students, and employers (as reported in the long term success outcome category) confirm that students meet or exceed their expectations, as well. Last year's learning outcomes assessment reported similar high levels of student accomplishment, leading to a faculty decision to review "the standards of performance in several key courses with the objective of raising them further." This would seem to be a conclusion to be drawn from this year's assessment, as well.

The issue of global competence also takes on a rather unusual aspect, given that the student body is almost exclusively international. It does seem to be the case that the program, by its very nature and composition, addresses this objective inherently.

Concluding remarks

This year presents an extraordinary opportunity to reconceptualize all SIS programs in the context of a new academic unit on campus that consolidates computing and information disciplines into a single school. We are being offered the opportunity to explore curricular options that in most years would be unimaginable and, in so doing, we have a fresh opportunity to consider the student learning outcomes appropriate for such an organization. I look forward to working with you on this exciting and compelling venture.

I will also take this opportunity to mention that Ithaka S+R (a strategic consulting and research service) has published a case study of Pitt's assessment process. It is available here. The author, Martin Kurzweil, was particularly interested in Pitt's faculty commitment to the assessment of student learning.

 In addition, I remind you of the Assessment Community within the my.pitt.edu portal, which is open to all faculty and staff. The community is meant to supplement the Assessing Student Learning website and contains proceedings from the 2013 and 2014 conferences. A link to the keynote address by Dr. Marco Molinaro from UC Davis at the 2015 conference is also available there.

Program Assessment Report

ASSESSMENT MATRIX

PROGRAM OR SCHOOL			
Assessment Coordinator for Program or School	**Name:** Robert R. Perkoski	**Email:** perks@pitt.edu	**Phone: 624-9425**
Program or School Mission Statement		The Mission of the School of Information Sciences is to support and advance the broader education, research and service mission of the University by educating students, furthering knowledge and contributing our expertise to advance humankind's progress through information.	
Program or School Goals		To educate students about the role of people, information and technology in today's society. To educate students and give them the experiences necessary to compete in a global economy. To develop the leadership and communication abilities of students. To provide students with a competitive skill set to design, build, and implement today's information systems. To enhance students appreciation of how information systems can add value to the individual, organization and society.	

Learning Outcomes *What will students know and be able to do when they graduate?*	Assessment Methods *How will the outcome be measured? Who will be assessed, when, and how often?*	Standards of Comparison *How well should students be able to do on the assessment?*	Interpretation of Results *What do the data show?*	Use of Results/Action Plan *Who reviewed the finding? What changes were made after reviewing the results?*
1. Students will possess an understanding of the core principles of programming, databases, computer operations, systems analysis, networking and human computer interaction.	1. A committee of three faculty members will review the exams and papers biannually of a sample of students from across the core courses. 2. *A second option of looking at a capstone course systems project or other major class projects which includes the skills taught in the core classes was added in 2008. (edited to include projects from other classes other than capstone , 2012)*	1. All students should be able to demonstrate proficiency of the major constructs in each of the core courses. 2. Students should be able to highlight selected constructs by demonstrating a working example of an assignment. (Ex. Interface, code project)	**Updated 2015**: The types of projects that students are working on have become more involved and complex. For example, projects now include joint work with the Medical School, Pharmacy School and Dental school. Again, Information Science students competed in the Deloitte Case competition.	**Updated 2015** A server has been created and is used to host many of the student projects. This has allowed a more efficient method to review projects in both classes such as INFSCI 1024 and in the independent study projects. Faculty can review the work of the class. In addition, rubrics were used when faculty members reviewed projects and this information was discussed and used as feedback to the faculty member who was the course creator.

Learning Outcomes *What will students know and be able to do when they graduate?*	Assessment Methods *How will the outcome be measured? Who will be assessed, when, and how often?*	Standards of Comparison *How well should students be able to do on the assessment?*	Interpretation of Results *What do the data show?*	Use of Results/Action Plan *Who reviewed the finding? What changes were made after reviewing the results?*
2. Students will possess an understanding of how information systems and data are used on a local, national and global basis and how they add value to an individual, organization or society. In particular, data and systems will be examined from a global perspective in order to appreciate the impact they have both economically, politically and socially.	1. Annually, a committee of three faculty members will select a sample of students from the internship experience, capstone course and independent study course for an interview.	1. All students should be able to give a presentation about their experience and explain the details of how their work affects individuals, groups and society. .	**Update 2012** Students gave presentations in their User Centered Design, Capstone, Design classes and spoke about the impact systems have both locally and globally. In most cases the global impact and discussions lacked depth	**Update: 2015:** Two agreements with international universities are nearly finished and will allow students to engage in 2+2 type programs. These schools are in Korea and China.
3. Students will demonstrate leadership and project management capabilities with large and small groups.	1. The percentage of students, who complete a capstone course, hold a campus leadership position, manage a class assigned project, or complete an internship, will be evaluated.	1. Students should be able to articulate their leadership styles and give examples of tools and techniques they have used along with examples of current leadership practices. 2) At least 25% of our students should meet this requirement.	Nearly 50% of our students completed a capstone class which was much higher than our 25% minimum. Student Services is in the process of developing a system to track the other criteria.	**Update 2015**. A new internship coordinator has been hired and our success record for internships remains high. Upon review of supervisor's evaluations of student internships, the case can be made that our students are doing very well in a myriad of environments ranging from healthcare to start-up firms.
4. Students will possess specialized knowledge in at least one area of offered concentrations making them competitive in the marketplace.	1. The percentage of students completing a concentration requirement will be tabulated.	1. 100% of the students should complete a concentration.	**Update 2013** In addition to the Data Analytics concentration discussion there is work being done on an Application Development concentration. With the addition of a Professor of Practice new courses in software engineering and team coding can be established.	**Updated 2014:** The addition of a professor of Practice has had a positive impact on course development in our Systems concentration. Feedback from previous course projects, faculty meetings and consultation with the Program Chair provided valuable assessment feedback that was used to rewrite two upper level Information Science courses: INFSCI 1025 and INFSCI 0017

Learning Outcomes *What will students know and be able to do when they graduate?*	Assessment Methods *How will the outcome be measured? Who will be assessed, when, and how often?*	Standards of Comparison *How well should students be able to do on the assessment?*	Interpretation of Results *What do the data show?*	Use of Results/Action Plan *Who reviewed the finding? What changes were made after reviewing the results?*
	2. Job placement rates, titles, and salaries of graduating students will be collected via surveys on a yearly basis. 3. Acceptance rates for students seeking admission to graduate and professional schools	2) Placement rates should be over 90% and over 30% of the placements should be with major, national corporations. 3. At least 80% of students seeking graduate admission will be successful	**Update 2015:** Again, we are showing a placement rate in the 90's with a salary in the low to mid-fifties. Our students are in demand in many fields and employers hold our students in high regard. A system is being developed in conjunction with the Director of Student Services to track the appropriate student data.	**Update 2015**: Our placement information is used in recruitment and shared with our students. Also, faculty members are informed of our track record with employers. This is a strong indication that our skills based curriculum is working well.
5. Students will demonstrate a basic appreciation for the relationship between culture and information systems design	1. During their final term, each student will incorporate into at least one project or paper an international perspective. A 2-member faculty team will randomly sample 10 projects or papers for evidence of global awareness.	1. Each student's work should offer evidence of an international perspective, e.g., a multilingual interface or incorporation of design features that reflect an understanding of cultural or policy differences from those of the US.	**Updated: 2013** Students presented projects in the user centered design class and discussed how colors, symbols, and words would be interpreted by different cultures. An example of their website was discussed in class by both the students and instructor.	**Updated 2013**. This exercise demonstrated student's knowledge of other customs and interpretations. This will become a standard part of the content of this course. Students will be required to visit websites and read materials that describe the various cultural perspectives. The depth and challenge of the project will be increased as students examine more closely cultural differences.
6. Students will be proficient in thinking critically and analytically.	The Collegiate Assessment of Academic Proficiency (CAAP) Critical Thinking Module will be administered biannually to a random sample of BSIS students.	75% of the students should perform above the national 50th percentile.	**Updated 2012:** The test was administered to 38 students in the spring term of 2012 to an introductory Information Science class. 95%% performed at or better than the national 50th percentile.	**Updated 2012**: The program chair reviewed the findings. See attached report: Assessment Summary Report for Information Science Undergraduate Program2012.docx

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ASSESSMENT

MATRIX

PROGRAM OR SCHOOL	Master of Library and Information Science		
Assessment Coordinator for Program or School	Name: Sheila Corrall	Email : scorrall@pitt.edu	Phone: 4-9317
Program or School Mission Statement	The mission of the School of Information Sciences is to support and advance the broader education, research and service mission of the University by educating students, furthering knowledge, and contributing our expertise to advance humankind's progress through information.		
Program or School Goals	The Library and Information Science Degree Program offers a professional degree at the master's level for students who have earned a baccalaureate-degree and who aspire to become information professionals in libraries, archives, corporations, and various other institutions. Upon completion of the degree, graduates will be able to: 1. Draw upon the ethics, values and history of library and information science and other related disciplines. 2. Apply the principles of information management. 3. Advance the creative and ethical applications of information technologies. 4. Apply the principles of management to various functions in information environments. 5. Plan, implement, evaluate and advocate for information services to meet the needs of diverse users. 6. Promote intellectual freedom and equity of access to information. 7. Understand and apply research in library and information science. 8. Demonstrate a commitment to the advancement of the information professions through advocacy, continuing education and lifelong learning. These eight outcomes for graduates last revised in April 2011.		
	All students in the 36-credit MLIS program are required to complete two core courses: LIS 2000 Understanding Information and LIS 2600 Introduction to Information Technologies. Depending on which of the nine specializations the student has selected, the student takes other required courses and a choice of electives. The faculty agreed to require that graduating students prepare a portfolio of their work demonstrating how they are meeting these eight outcomes. An electronic professional portfolio will be introduced in the Fall term 2015 as part of the introductory LIS 2000 course and continued throughout the academic year.		

Learning Outcomes	Assessment Methods	Standards of Comparison	Interpretation of Results	Use of Results/Action Plan
What will students know and be able to do when they graduate?	*How will the outcome be measured? Who will be assessed, when, and how often?*	*How well should students be able to do on the assessment?*	*What do the data show?*	*Who reviewed the finding? What changes were made after reviewing the results?*
First Student Learning Outcome Based on Goals for Graduates of the MLIS program # 7: Understand and apply research in library and information science. A student learning outcome in core course LIS 2000 Understanding Information maps to MLIS Student Goal # 7: Students will be able to write a comparative analysis of a publication from the professional or research literature on information and assess the author's findings by using supporting examples from the text.	**This assessment is conducted biennially. The last assessment was in Spring 2014 based on LIS 2000 from Fall 2013. The next assessment will be in Spring 2016 based on LIS 2000 in the Fall 2015.**	**This assessment is conducted biennially. The last assessment was in Spring 2014 based on LIS 2000 from Fall 2013. The next assessment will be in Spring 2016 based on LIS 2000 in the Fall 2015.**	**This assessment is conducted biennially. The last assessment was in Spring 2014 based on LIS 2000 from Fall 2013. The next assessment will be in Spring 2016 based on LIS 2000 in the Fall 2015.**	**This assessment is conducted biennially. The last assessment was in Spring 2014 based on LIS 2000 from Fall 2013. The next assessment will be in Spring 2016 based on LIS 2000 in the Fall 2015.**

Learning Outcomes *What will students know and be able to do when they graduate?*	Assessment Methods *How will the outcome be measured? Who will be assessed, when, and how often?*	Standards of Comparison *How well should students be able to do on the assessment?*	Interpretation of Results *What do the data show?*	Use of Results/Action Plan *Who reviewed the finding? What changes were made after reviewing the results?*
Second Student Learning Outcome Based on Goals for Graduates of the MLIS program # 2: Apply the principles of information management A student outcome in core course LIS 2600 Introduction to Information Technology maps to MLIS Student Goal 2: The student will be able to use research, collaborative and social networking tools to generate and to share content electronically through his or her blogs.	This assessment is conducted biennially. The last assessment was in Spring 2014 based on LIS 2000 from Fall 2013. The next assessment will be in Spring 2016 based on LIS 2000 in the Fall 2015.	This assessment is conducted biennially. The last assessment was in Spring 2014 based on LIS 2000 from Fall 2013. The next assessment will be in Spring 2016 based on LIS 2000 in the Fall 2015.	This assessment is conducted biennially. The last assessment was in Spring 2014 based on LIS 2000 from Fall 2013. The next assessment will be in Spring 2016 based on LIS 2000 in the Fall 2015.	This assessment is conducted biennially. The last assessment was in Spring 2014 based on LIS 2000 from Fall 2013. The next assessment will be in Spring 2016 based on LIS 2000 in the Fall 2015.

Learning Outcomes *What will students know and be able to do when they graduate?*	Assessment Methods *How will the outcome be measured? Who will be assessed, when, and how often?*	Standards of Comparison *How well should students be able to do on the assessment?*	Interpretation of Results *What do the data show?*	Use of Results/Action Plan *Who reviewed the finding? What changes were made after reviewing the results?*
Third Student Learning Outcome Based on Goals for Graduates of the MLIS program # 3: Advance the creative and ethical applications of information technologies. A student outcome in core course LIS 2600 Introduction to Information Technology maps to MLIS Student Goal 3: The student will be able to use various technologies as a medium to present information of various types	A representative sample of assignments from students enrolled in LIS 2600 Introduction to Information Technologies is examined **ASSIGNMENT: Students are to produce a portfolio in two formats, HTML and EPUB** Rubric used by assessors: Exceeds expectations as set forth in the instructor rubric Rubric = 3 Meets expectations as set forth in the instructor rubric Rubric = 2 Does not meet expectations as set forth in the instructor rubric Rubric = 1	85% of the sampled assignments by students in LIS 2600 will meet or exceed expectations to demonstrate the ability to creatively use different technologies as a medium for the effective presentation of information of various types	Assessment is made by two LIS faculty members who did not teach this course. These faculty members assessed assignments by 13 students selected in a representative sample from among the 60 students who registered for and completed the course LIS 2600 in Fall Term 2014 (22%). Of these 13 assignments assessed, the two faculty found that: 3 exceeded expectations (23%) 10 met expectations (77%) 0 did not meet expectations (0%) 100% of the demonstrations assessed met or exceeded the expectations, thus exceeding the standard of comparison set by the LIS faculty of 85%.	A suggestion was made by the reviewing faculty to require students to create a web site that is WCAG-compliant. This recommendation will be submitted to the full faculty in the Fall term 2015 and appropriate adjustments to assignments will be determined.

<table>
<tr><td rowspan="6">ASSESSMENT

MATRIX</td><td>PROGRAM OR SCHOOL</td><td colspan="3">M.S. Telecommunications</td></tr>
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	PROGRAM OR SCHOOL	M.S. Telecommunications		
ASSESSMENT **MATRIX**	**Assessment Coordinator for Program or School**	**Name:** David Tipper	**Email:** tipper@tele.pitt.edu	**Phone:** 624-9421
	Program or School Mission Statement	To educate people for professional positions in the global Telecommunications industry, to provide curricular leadership for the evolving Telecommunications discipline, to provide useful research for the Telecommunications field, and to serve the Telecommunications profession.		
	Program or School Goals	• **Proficiency in theory and application**: A broad understanding of telecommunications and networking including knowledge of theoretical foundations, protocols, design, policy, and regulatory issues • **Specialized professional knowledge**: Develop professional knowledge specialized for sub areas of telecommunications such as for managing networks, assuring network security, or in wireless communications		

Learning Outcomes *What will students know and be able to do when they graduate?*	**Assessment Methods** *How will the outcome be measured? Who will be assessed, when, and how often?*	**Standards of Comparison** *How well should students be able to do on the assessment?*	**Interpretation of Results** *What do the data show?*	**Use of Results/Action Plan** *Who reviewed the finding? What changes were made after reviewing the results?*
1) Theory: Students will apply theoretical principles of performance analysis demonstrating their ability to design or evaluate a network for its ability to support an application or solving a telecommunications networking problem	One faculty member will examine a representative sample of final student projects or papers from the required "Network Performance" course annually using a faculty-developed rubric: 1. Exceeds expectations 2. Meets expectations 3. Does not meet expectations	80% of the sampled projects or papers will meet or exceed expectations in demonstrating a working knowledge of network architectures, protocols, and basic processes of performance analysis of networks.	Based on evaluation of all eight student group projects collected from the Fall 2014 Network Performance class projects all meet expectations.	The data was reviewed by telecom faculty (P. Krishnamurthy) and the program chair and will be shared with the faculty. No changes are planned at this time.
2) Theory and Practice: Students will apply their knowledge of computer networks to analyze network traffic and develop applications making use of sockets and network	One faculty member will examine a representative sample of student projects or papers from the required "Computer Networks" or equivalent course annually using a faculty-developed	80% of the sampled projects or papers will meet or exceed expectations in demonstrating a working knowledge of network traffic analysis and client-server programming.	Based on individual student projects from the Spring 2015 Computer Networks/Applications of Networks class two students exceeded expectations, and four meet expectations.	The program chair and the faculty reviewed the data. No changes are planned at this time.

Learning Outcomes *What will students know and be able to do when they graduate?*	Assessment Methods *How will the outcome be measured? Who will be assessed, when, and how often?*	Standards of Comparison *How well should students be able to do on the assessment?*	Interpretation of Results *What do the data show?*	Use of Results/Action Plan *Who reviewed the finding? What changes were made after reviewing the results?*
programming	rubric: 1. Exceeds expectations 2. Meets expectations 3. Does not meet expectations			
3) Practice: Students will demonstrate ability to identify and work with telecommunications equipment and software	One faculty member will examine a representative sample of student quizzes and lab reports from the required "Computer Networking Laboratory" course annually using a faculty-developed rubric: 1. Exceeds expectations 2. Meets expectations 3. Does not meet expectations	80% of the sampled quizzes and/or laboratory reports will meet or exceed expectations in appropriately configuring and using telecommunications equipment and software tools.	Based on a sample of five individual student lab reports and exams drawn from the three sections of the Spring 2015 Computer Networking Laboratory course, all students met expectations	The program chair reviewed the data and it will be shared with the faculty.
4) Specialization: Students will demonstrate proficiency in an elective telecommunications specialization: • Explain and critique specific emerging issues in wireless networking protocols, architectures and/or devices, or • Explain specific network security risks, implement or evaluate performance of cryptographic algorithms, or demonstrate understanding of network security protocols and	One faculty member will examine a representative sample of MST student projects or final exams from a subset of the elective courses – TELCOM 2700/2720, TELCOM 2820/2821 using a faculty-developed rubric: 1. Exceeds expectations 2. Meets expectations 3. Does not meet expectations	80% of the sampled projects or final exams will meet or exceed expectations in demonstrating proficiency in areas of wireless communications or network security.	Based on final exams and individual student projects collected from the Spring 2015 TELCOM 2820 course all 11 students met expectations.	The data was reviewed by the program chair and will be shared with the faculty at upcoming meetings. No changes are planned at this time.

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Learning Outcomes *What will students know and be able to do when they graduate?*	Assessment Methods *How will the outcome be measured? Who will be assessed, when, and how often?*	Standards of Comparison *How well should students be able to do on the assessment?*	Interpretation of Results *What do the data show?*	Use of Results/Action Plan *Who reviewed the finding? What changes were made after reviewing the results?*
architectures				
5) Long Term Success: MST alumni will be employed and successful in their first and subsequent professional positions following graduation.	1. Graduates will be polled in exit interviews.	1. 80% of surveyed MST graduates will be professionally employed within one year of graduation.	Based on the survey of Fall 2014 graduates, five of six graduating students were employed, accepted a job offer or had been offered a job. A survey of the 21 Spring 2015 students is on-going. Feedback from the employers of the 12 students completing practicum/internships over the Fall 14/Spring 15 semesters indicated that all 12 met or exceed employer expectations.	The data will be reviewed by the program chair and will be shared with the faculty and Dean, student recruitment services and school internship coordinator at upcoming meetings.
6) Global Competence: MST students will demonstrate the ability to identify the international dimensions and adapt the practice of telecommunications to different cultures. This is a developing learning outcome and a pilot attempt at assessment was conducted.	One faculty member will examine a representative sample of student papers from the required "Telecommunications Seminar" course annually starting using a faculty-developed rubric: 1. Exceeds expectations 2. Meets expectations 3. Does not met expectations	75% of the sampled papers will meet or exceed expectations in demonstrating proficiency in areas of global competency.	Based on assignments from the Spring 2015 Telecommunications Seminar course all 15 students met expectations.	The data will be reviewed by the program chair and will be shared with the faculty at upcoming meetings.

ASSESSMENT MATRIX	PROGRAM OR SCHOOL	M.S. in Information Science		
	Assessment Coordinator for Program or School	**Name:** Peter Brusilovsky	**Email:** peterb@pitt.edu	**Phone:** 624-9404
	Program or School Mission Statement	The Mission of the School of Information Sciences is to support and advance the broader education, research and service mission of the University by educating students, furthering knowledge and contributing our expertise to advance progress within an organization or across society in general through information.		
	Program or School Goals	• **Theoretical Understanding**: Understand and appreciate the respective roles of people, information and technology in the development of information systems. • **Proficiency in Information-related skills**: Acquire proficiency in skills that span a broad range with a significant level of depth and understanding. Ideally the graduate's skill set should include the ability to analyze information system structure and performance, to design databases, and to manage software projects. • **Ability to apply theory and skills**: Experience project work both as individuals and in teams that demonstrates the ability to apply classroom knowledge in novel ways in real-world settings • **Graduate-level professional skills and competencies:** Acquire experience and proficiency in several general skills expected from an information technology professional such as working in diverse groups, presenting results on professional work, analyzing new trends, and appreciating and using state-of-the-art research to assess, emphasize, and improve personal skills. • **Form the basis of global competency:** Acquire experiences supporting collaboration in international teams, develop an appreciation for local and national issues in global information technology areas such as national standards, cultures, and work organizations		

Learning Outcomes *What will students know and be able to do when they graduate?*	Assessment Methods *How will the outcome be measured? Who will be assessed, when, and how often?*	Standards of Comparison *How well should students be able to do on the assessment?*	Interpretation of Results *What do the data show?*	Use of Results/Action Plan *Who reviewed the finding? What changes were made after reviewing the results?*
1) Theory: Students will demonstrate fundamental knowledge of the abstract, theoretical principles of information science. These include, but are not limited to information theory, graph theory,	Courses in this area will test the competency of students to perform specific calculations, to be determined by the faculty, for each of the content areas (e.g., entropy, matrix inversion, disjunctive normal form). Courses in this area will incorporate items into exams	80% of the sampled question answers are expected to meet or exceed expectations in demonstrating a working knowledge of the formal constructs underlying information science. 27	Only 5% of sampled students were below the expectations. 73% of students met the expectations and 22% exceeded them. This demonstrates an increase of foundational knowledge of our graduate class. We believe that	Faculty examined the curriculum and the outcomes further to determine contributing factors and plan actions. Comparing the set of learning outcomes covered by GIST courses with the courses offered by peer schools, we modified several courses and developed new ones. In

Learning Outcomes *What will students know and be able to do when they graduate?*	Assessment Methods *How will the outcome be measured? Who will be assessed, when, and how often?*	Standards of Comparison *How well should students be able to do on the assessment?*	Interpretation of Results *What do the data show?*	Use of Results/Action Plan *Who reviewed the finding? What changes were made after reviewing the results?*
statistical and/or probabilistic methods	to be used as indicators for these specific competencies.		it is related to gradually increased fraction of graduate students from PRC. Unlike average US, Indian, and other foreign students; PRC students have good formal skills.	particular, our Data Mining course has been strengthened to reflect the current set of expected outcomes in a comparable course. Information Visualization course has been also updated following the field expectations. We also added some new courses such as Software Testing and Cloud Computing that address the skill gaps between the market needs and preparation of our students.
2) Analysis: Students will evaluate the structure and analyze the performance of an existing information system with respect to technical capabilities and organizational requirements.	Two faculty members will examine a representative sample of student projects or case studies from the "Systems and Technology Area – General Systems and Technology" (e.g., INFSCI 2510 Information Systems Analysis) biannually using a faculty-developed rubric: I. Exceeds expectations I. Meets expectations I. Does not meet expectations	80% of the sampled projects or case studies are expected to meet or exceed expectations in applying best practices in eliciting and interpreting system requirements and constructing UML-compliant models (class, state, and activity diagrams).	The data show that 14% of analysis-oriented projects don't meet expectations while 86% meet or exceed expectations.	

3) Design: Students will design information systems supporting functional and performance requirements that reflect an understanding of the cognitive information processing capabilities of humans.	I. The evaluation will be focused on a sample of student projects from the "Cognitive Area – Cognitive Science and Systems" (e.g., INFSCI 2470 Interactive System Design, INFSCI 2430 Social Computing, INFSCI 2480 Adaptive Information Systems)
	I. Two kinds of assessment, expert-based and peer-based will be performed in parallel. For peer-based assessment, all project teams in the same class will be involved in assessing project results. For expert assessment, two faculty members will examine biannually a representative sample of student projects using a faculty-developed rubric:
	  1. Exceeds expectations
	  2. Meets expectations
	3. Does not meet expectations
		80% of the sampled projects will employ best contemporary practices in interactive programming and usability engineering and demonstrate the understanding of human factors	The expert evaluations data show that 11% of design-oriented projects don't meet expectations while 87% meet or exceed expectations. According to peer evaluation, however, 100% of the projects meet or exceed expectations. Although peer evaluation did demonstrate students' ability to differentiate good from bad projects, their absolute values or ratings are considerably higher than those of experts. This suggests that a more reliable peer evaluation process might emphasize relative over absolute assessment data.	Major change for 2014-2015 AY is the establishment of a dedicated Assessment committee that is now working on expanding the scope of learning outcome assessment and plans the process for the year. The committee has met several times during the academic year and discussed several new ideas for performing the assessment. In particular, we were working on preparing the survey for alumni that we consider as an important component of the process.
				
				GIST faculty continued exploring how students' self-assessment of mastered learning outcomes correlates with faculty expectation of the students' mastery of learning outcomes. Now we have an online system in place that allows collecting student perception of mastered learning outcomes and prerequisites. To expand the coverage, we are now more extensively using paper-based surveys at the end of the class. Several classes ran this survey at the end of Spring 2015 semester.
				
				The faculty also expanded the practice of peer evaluation of learning outcomes by both students and faculty. Several classes now have public presentation of final projects in poster or oral presentation form where other

Learning Outcomes *What will students know and be able to do when they graduate?*	Assessment Methods *How will the outcome be measured? Who will be assessed, when, and how often?*	Standards of Comparison *How well should students be able to do on the assessment?*	Interpretation of Results *What do the data show?*	Use of Results/Action Plan *Who reviewed the finding? What changes were made after reviewing the results?*
				we have several faculty attending and filing assessment forms. This practice extends our older practice of peer evaluation of written final project reports.
4) Professional: Students will demonstrate the ability to work in diverse groups, clearly present results of their work, and appreciate and understand IT research	I. Two faculty members will examine biannually a representative sample of student project reports in project-oriented courses to assess student ability to clearly present the results of their work using a faculty-developed rubric: 1. Exceeds expectations 2. Meets expectations 3. Does not meet expectations II. Two or more faculty members will analyze biannually summaries of research talks prepared by students in advanced courses. A faculty-developed rubric will be used for assessment: 1. Exceeds expectations 2. Meets expectations 3. Does not meet expectations	80% of the sampled projects will demonstrate expected level of skills to present results of their work, and to appreciate and understand IT research 80% of the sampled summaries will demonstrate their abilities to appreciate and understand IT research, to distill research issues, and to summarize the essence of presented research projects	While 43% of the sampled students exceed expectations to comprehend and summarize professional information, 36% demonstrated a lack of sufficient presentation skills, primarily related to their insufficient mastery of written English. Given that the majority of the sampled classes were formed by students from PRC, this data indicates that a large fraction of these student don't have adequate presentation skills	The profession of Information Science is international by its nature. Most of the tools approaches and techniques used are the same worldwide. Yet different countries have different policies, rules, and standards (i.e., telecommunication, privacy, document structure) and other national aspects that have to be taken into consideration when designing and assessing information products adapted for specific countries. To foster global expertise, the faculty resolved to integrate these aspects into several relevant courses (e.g., Security and Privacy, Interactive Systems Design, etc.). In addition, a part of global expertise is the ability to work in international project teams. The faculty resolved to encourage this practice in project-oriented courses.

5) Employment: Students will be employed and successful in their first professional positions.	1. Graduates will be surveyed for employment status one year following graduation. 2. Members of the Industrial Advisory Committee (IAC) will report on the progress of SIS graduates at their organizations 3-5 years after being hired.	1. 95% of MSIS graduates seeking employment will be professionally employed within one year of graduation. 2. 90% of MSIS graduates employed by IAC member organizations will meet or exceed employer expectations.	The employment data is currently insufficient for statistical analysis. The only reports available have come from a voluntary questionnaire with a low response rate. While the data do show that some graduates have landed desirable positions, the information is only anecdotal at this point.	The program has sustained its long-term reputation for a strong focus on systems-level issues (e.g., architecture, performance, and usability) and for the rigor of the curriculum. It attracts a technically strong international student body, predominantly from Asia. In our internal peer evaluations our students demonstrate strong technical skills. In particular, this year we found that 100% of evaluated projects met or exceeded expectations on mastery of outcomes (the target was 80%). Another good evidence of their strong professional preparation of our MS student is a very high rate of success of our students in securing internships or jobs after graduation. Our PhD students are also very successful in their job search. This year our PhD graduate obtained tenure track positions at several good research universities such as SUNY or ASU as well as companies like IBM or Facebook.