# BINGHAMTON
# U N I V E R S I T Y
### STATE UNIVERSITY OF NEW YORK

**Academic Business Plan for Master of Science in Information Systems Program**
**January 2020**

*Overview*

There is growing demand for Information Systems (IS) professionals, those with strong skills in configuring and integrating various IS components such as networking and software systems, databases, data analytics, web-based systems and software packages, as well as developing programming and scripting skills, including software testing skills, for larger applications. This skill set differs from that of the computer science program, which tends to emphasize theoretical foundations, design and formal analysis techniques that impart the skills for designing computer systems in hardware and/or software and the skills for assessing performance, cost and functional tradeoffs. To meet the demand for Information Systems professionals, **the Department of Computer Science proposes to start a new Master of Science in Information Systems (MSIS) program** to prepare students for employment in this field. The proposed program has incorporated recommendations from two external reviewers who visited Binghamton University in May 2019. It has been approved by the Department of Computer Science, the Graduate Committee of the Watson School of Engineering and Applied Science, and the Graduate Council. The program will be initially offered on campus, but with the expectation that it may scale to include on-line education at a later time.

The proposed program requires 30 credit hours (equivalence of 10 courses). Among them, 9 come from required courses, 18 from electives and 3 from a termination project. Students are expected to complete the degree requirements in 1.5 to 2 years. Two optional practicum courses will be offered to provide coverage of fundamental concepts in information systems to students with less background in computing; the home department will advise incoming students appropriately.

The proposed program includes multiple courses in different focus areas, allowing students to place an emphasis on material they find particularly relevant. **The initial design of the program includes tracks for cybersecurity, applied data science, and web-based information systems**. We anticipate that these tracks will evolve over time to match changes in student interest and changes in the needs of potential employers.

The curriculum includes bridge courses, designed to enable students from other disciplines to transition smoothly into the program. It also allows students who have the preparation and interest to optionally take existing CS courses as electives. The program proposes to use a combination of in-class lectures and remote delivery of program materials with live assistance for the students.

*Context*

The Computer Science Department currently offers three degree programs in computer science (Bachelor of Science, Master of Science, and PhD) and a double-diploma bachelor's program in information systems with Istanbul Technical University. The Department currently has over 1,050 students and among these students, over 600 are undergraduate students, over 360 are master's students and there are about 80 PhD students. The Department has the largest graduate enrollment among all departments on campus. The Department has 33 full time faculty, including 27 tenure-track faculty members and 6 lecturers. It is in the process of hiring 3 additional tenure-track faculty.

The Department is in a unique position to start the proposed MSIS program. First, its master's program in computer science (MSCS) is closely related to the MSIS program in terms of curriculum and faculty expertise. Many CS faculty are capable of teaching MSIS courses and many existing CS courses can be used as electives for the MSIS program. Second, the Department has rich experience in recruiting a large number of master's students and managing a large master degree program. Third, many applicants for the MSCS program are not admissible to the MSCS program but can be admitted to the MSIS program. These applicants could be persuaded to enroll into the MSIS program instead. By taking advantage of these resources and strengths, starting a new MSIS program in the Computer Science Department would be much more cost effective than starting it within another program on campus.

*Benefits*

Offering the MSIS Program will bring great benefits to both the university and the Computer Science Department as elaborated below.

- Enhance the "Premier Public" status of university by providing new educational opportunities in a rapidly growing area. Binghamton University's mission combines academic excellence and public service. This role is embodied in the university's Road Map to Premier strategic plan as the following statement: "Binghamton University is a premier public university dedicated to enriching the lives of people in the region, state, nation and world through discovery and education and to being enriched by partnerships with those communities." The proposed program will advance the university's mission in academic excellence and community partnership by training the next generation of information systems professionals. Information systems in general and cybersecurity, data science, and web-based services in particular, have become integral parts of almost every area of activity; from finance, to business systems, research, and healthcare. Professionals trained in those areas also gather, organize and process vast amounts of data to produce meaningful results.

- Enhance the "University's economic, social and cultural impact through engagement from the local to the global level" by providing students with skills that are needed for the jobs in New York state and beyond. The US Dept. of Labor has recently (as of 9/4/2019) predicted growing demand for professionals in Information Systems. Positions in computer and information technology are projected to grow 12% from 2018 to 2028, much faster than the average for all occupations (the average is about 5.2%), with 2018 median salaries of $86,320. For positions in computer and information management, the growth rate is projected to be 1% from 2018 to 2028, with 2018 median salaries of $142,530. Positions in network and computer systems administration are projected to grow at 5% from 2018 to 2028, with 2018 median salaries of $82,050. As a graduate degree, the proposed program would prepare students for the higher growth rate managerial and

leadership positions. Within the Binghamton area, we would expect graduates of the program to be of interest to employers such as Lockheed-Martin and UHS. Within New York State, many financial services companies would likely have great interest.

- Provide a new employment pathway for more Binghamton University students. The proposed program is designed to accommodate undergraduates from liberal arts, science and engineering disciplines via a series of bridge courses or some of the undergraduate courses currently available to CS minors. We expect the master's program in Information Systems to be of value to BS and MS graduates from a variety of majors on Binghamton University campus, as it empowers them to pursue a wider job market.

- Help reach the graduate enrollment goals of the university. Growing graduate enrollment has been a strategic goal of Binghamton University since President Stenger became the president of the university in 2012. The Computer Science Department has been one of the driving forces behind the university's graduate enrollment growth during this time. Graduate enrollment of the Computer Science Department nearly doubled during this time – from 235 in 2012 to 445 in 2019. The proposed MSIS program has the potential to become another graduate enrollment growth engine for both the Department and the university. In five years, this program is expected to have 160 students.

- Help further the growth of the Computer Science Department. The Department's most recent strategic plan (2018-2023) calls for an aggressive growth in terms of new degree programs, faculty and staff, as well as students, especially graduate students. We believe that the planned growth can enhance the profile and reputation of the department nationally and internationally and it can also improve its ranking among its peers. Starting the proposed MSIS program is a significant part of this overall growth.

**Teaching**

By offering the MSIS program, students will have opportunities to receive high-quality instruction on the design, integration, and use of large information systems. The courses have been designed to provide practical, hands-on experiences, allowing students to be prepared for the work opportunities available now, while also being well equipped to adapt to the changes that will come. Students in the MSCS can also benefit from the option of taking some of the more practical MSIS courses as electives. Some of the courses of the MSIS program, especially electives, will be taught by existing faculty of the department while planned hires will include instructors with a primary focus on courses in information systems.

**Research**

The research conducted by the tenure-track faculty hired to teach courses in the MSIS Program will help expand the research areas of the Computer Science Department and help create new research synergies within the Department.

**Community Service**

Large information systems occur in many fields. We anticipate collaboration with local health care providers (e.g., United Health Services), as they expand their use of electronic record keeping. Several

Computer Science Department faculty members are engaged in projects with UHS staff, and we anticipate that these collaborations will expand with the addition of the MSIS program.

### *Cost and Financial Plan*

An initial cost of up to $140,000 is needed to prepare for the launch of the proposed MSIS program. Of the $140,000, $40,000 will be used to hire a senior lecturer as the Director of the program for the semester before the new program starts, up to $30,000 is for hiring an IT staff during the semester before the start of the program, $40,000 will be used for purchasing additional computer servers, $10,000 for software licensing fees, and $20,000 to cover advertisement fees for the new program on select websites and travel expenses of recruiting trips. **The Watson School will cover the entire initial cost**.

When the program is started and as the student enrollment grows, additional faculty and TAs will be added as needed (the details are provided below). **Starting from Year 1 of the program, the university will cover all the cost related to personnel and TAs while the Watson School will continue to cover the cost for equipment, supplies (software) and recruiting activities**.

- In Year 1, the program will hire (1) a tenure-track faculty ($100,000), (2) a second full-time lecturer ($68,000), (3) the senior lecturer becomes full-time ($80,000), (4) an IT staff (i.e., continue the IT staff, $60,000), (5) a graduate administrative assistant ($46,000) and three TAs ($83,500, for 2 PhD TAs at $30,250 each and 1 MS TA at $23,000 each); existing faculty/staff will receive a 2% raise. The recruiting cost will be at $15,000 and the software licensing fees at $10,000.

- In Year 2, the will hire a third full-time lecturer ($70,000) and three more TAs are requested (add $83,500 for 2 PhD TAs and 1 MS TA); existing faculty/staff will receive a 2% raise. The recruiting cost will be at $14,000 and the software licensing fees at $10,000.

- In Year 3, a second tenure-track faculty will be added to this program ($100,000) and existing faculty/staff will receive a 2% raise. Two more TAs are added (add $60,500 for 2 PhD TAs). The recruiting cost will be at $12,000 and the software licensing fees at $15,000.

- In Year 4, a fourth full-time lecturer will be hired ($70,000), and existing faculty/staff will receive a 2% raise. Two more TAs are added (add $53,250 for 1 PhD TA and 1 MS TA). The recruiting cost will be at $13,000 and the software licensing fees at $15,000.

- In Year 5, a third tenure-track faculty will be added to this program ($100,000) and existing faculty/staff will receive a 2% raise. Two more TAs are added (add $53,250 for 1 PhD TA and 1 MS TA). The recruiting cost will be at $14,000 and the software licensing fees at $20,000.

**The overall cost is summarized in the table below:**

| Program Expenses Categories | Before Start | Academic Year 1 | Academic Year 2 | Academic Year 3 | Academic Year 4 | Academic Year 5 |
|---|---|---|---|---|---|---|
| (a) Personnel (including faculty, staff and TAs): fringes not included. | $70,000 | $438,900 | $599,508 | $768,658 | $902,731 | $1,068,421 |
| (b) Library | | | | | | |
| (c) Equipment (servers/storage) | $40,000 | | | | | |
| (d) Laboratories | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| (e) Supplies (software) | $10,000 | $10,000 | $10,000 | $15,000 | $15,000 | $20,000 |
| (f) Capital Expenses | | | | | | |
| (g) Other (Specify): Recruiting Expenses (ads and recruiting trips) | $20,000 | $15,000 | $14,000 | $12,000 | $13,000 | $14,000 |
| **(h) Sum of Rows Above** | **$140,000** | **$463,900** | **$623,508** | **$795,658** | **$930,731** | **$1,102,421** |

**Enrollment Schedule**

The following table summarizes our planned enrollment schedule over the first five years of the proposed MSIS program.

| Year | Anticipated Headcount Enrollment | | |
|---|---|---|---|
| | **Full-time** | **Part-time** | **Total** |
| **1** | 40 | 2 | 42 |
| **2** | 90 (50 new) | 5 | 95 |
| **3** | 110 (60 new) | 7 | 117 |
| **4** | 130 (70 new) | 9 | 139 |
| **5** | 150 (80 new) | 10 | 160 |

We plan to start the program with 42 students (40 full-time and 2 part-time) and increase the enrollment by about 11 (10 full-time and 1 part-time) in each subsequent year (total for the second year will be 42+42+11=95). By Year 5, the enrollment is expected to reach 160. With students typically spending two years in the program, there would be approximately 75 students continuing, with 85 new admits, in the fifth year. The number of students enrolled when the program reaches "steady state" could be close to 200 students – as the program progresses, we expect to continually balance the number of admitted students against overall demand and available resources.

**Financial Plan**

If we can hit our enrollment target, then based on reasonable assumptions (e.g., 75% of the students are out of state (OOS), including international, and 25% are in-state (NYS), which is similar to the breakdown of OOS/NYS students of our MSCS program), the revenue that can be generated from student tuition will be significantly higher than the cost of the program starting from Year 1 (by $367,600). As the enrollment grows in subsequent years, the difference (i.e., the net gain) will increase quickly (over $1M by Year 2). The table below has the details of the calculations.

| | Academic Year 1 | Academic Year 2 | Academic Year 3 | Academic Year 4 | Academic Year 5 |
|---|---|---|---|---|---|
| TOTAL FT ENROLLMENT | 40 | 90 | 110 | 130 | 150 |
| OOS Enrollment (75%) | 30 | 67.5 | 82.5 | 97.5 | 112.5 |
| NYS Enrollment (25%) | 10 | 22.5 | 27.5 | 32.5 | 37.5 |
| | | | | | |
| OOS FT (>= 12 | 30 | 37.5 | 45 | 52.5 | 60 |

| | | | | | |
|---|---|---|---|---|---|
| credits) | | | | | |
| OOS <12 credits | | 30 | 37.5 | 45 | 52.5 |
| OOS FT TUITION | $23,100 | $23,100 | $23,100 | $23,100 | $23,100 |
| OOS FT $ | $693,000 | $1,559,250 | $1,905,750 | $2,252,250 | $2,598,750 |
| OOS PT $ (FT Tuition * .10) | | $2,310 | $2,310 | $2,310 | $2,310 |
| OOS TUITION COLLECTED | $693,000 | $1,561,560 | $1,908,060 | $2,254,560 | $2,601,060 |
| | | | | | |
| NYS FT (>= 12 credits) | 10 | 12.5 | 15 | 17.5 | 20 |
| NYS <12 credits | | 10 | 12.5 | 15 | 17.5 |
| NYS FT TUITION | $11,350 | $11,350 | $11,350 | $11,350 | $11,350 |
| NYS FT $ | $113,500 | $141,875 | $170,250 | $198,625 | $227,000 |
| NYS PT $ (FT Tuition * .10) | | $1,135 | $1,135 | $1,135 | $1,135 |
| NYS TUITION COLLECTED | $113,500 | $143,010 | $171,385 | $199,760 | $228,135 |
| | | | | | |
| **TOTAL TUITION (OOS+NYS)** | $806,500 | $1,704,570 | $2,079,445 | $2,454,320 | $2,829,195 |
| **Personnel Expense** | $(438,900) | $(599,508) | $(768,658) | $(902,731) | $(1,068,421) |
| **NET** | $367,600 | $1,105,062 | $1,310,787 | $1,551,589 | $1,760,774 |

*Institutional Support*

The proposed MSIS program has the support of the faculty of the Computer Science Department. It has been approved the Graduate Committee of the Watson School and the Graduate Council. The Watson School is providing significant financial commitment for the program and it will cover the $140,000 cost to prepare for the launch of the program. The Provost's office has also agreed to cover all the personnel expenses for the program starting from Year 1.

*Operating Plan*

Before the Program Director is hired, the MSIS Program Development Committee (it consists of five tenured faculty members in the Computer Science Department) will lead the preparation for the launch of the proposed program. After the Program Director is hired (one semester before the program launch), a new graduate committee will be created for this program to help and work with the Program Director. Initially, this new graduate committee will have most existing faculty members. As more faculty members are hired for the MSIS program, the committee will consist of more faculty members for the MSIS program. We now provide more details about our operating plan for several tasks.

**Curriculum Design**

The MSIS program is a 30 credit hour program, generally requiring two years. Students may choose from three tracks, focusing on cybersecurity, applied data science, or web-based information systems – or they may opt to not select any specific focus. There are three required courses, and a required

termination project course; on the advice of the external evaluators, there is an emphasis on providing students with maximum flexibility in selecting courses that meet their interests. We anticipate that some students in the MSIS program will be working professionals, taking courses over a longer duration as time permits. As some students may enter the program without adequate background in computer science, there are two optional practicum courses designed to build computer science skills, and to complement the required courses taken during the first year.

This design is already in place as part of the proposal of the MSIS program. This design will be revisited 2-3 years after the launch of the program to see if any change should be made. By that time, the first batch of students would have graduated from the program.

**Course Development**

The proposed program has a number of new courses. The proposal includes preliminary syllabi for all of these new courses. After the program gains final approval, there is a need to fully develop these syllabi and have the courses approved by the Graduate Council. The faculty members who will be hired to teach these courses should help shape the syllabi of the courses. We plan to offer these courses initially as special topics courses, which do not need the approval of the Graduate Council, and make them permanent afterwards. In this way, the new faculty members can help finalize the course syllabi.

**Recruitment**

The expected student body for the MSIS program will be reflective of students recruited regionally, nationally, and internationally. However, we anticipate the enrollment to a substantial number of students from New York State and the northeast region.

We plan to advertise the program both on campus and off campus as well as in targeted international markets (e.g., India). We expect that some of the students in the program will come from students finishing their undergraduate degrees on campus, including graduating students from our Double-Diploma Program in Information Systems. A marketing campaign using social media platforms, for example, Facebook, will help us recruit. Internationally, we will utilize agencies we have used before for recruiting for the MSCS program to recruit for the MSIS program.

The graduate program in Computer Science is dominated by international students, who comprise 90% of this group. While it is anticipated that many students attracted to the MSIS program will be international, the department will still seek to maximize diversity and will encourage students from underrepresented minority (URM) groups to enroll. To recruit students from historically URM groups into the proposed MSIS program, we plan to take the following measures. We will publicize this program at institutions that have a large number of URM undergraduate students and seek help from computing/IT organizations for women and URM groups such as AWC (Association for Women in Computing), ACM-W (ACM Committee on Women in Computing), CWIT (Center for Women and Information Technology), IAAMCS (Institute for African-American Mentoring in Computing Sciences) and Hispanics in Computing, for recruiting women and URM students. We will also attend, make presentations, and recruit from events organized by the Anita Borg Institute for Women and Technology such as the annual Grace Hopper Celebration (GHC) for women in computing. GHC 2019 had more than 25,000 attendees, including students from our department. We will continue to work with Monica Majors, Director of Diversity Programs & Initiatives of the Watson School, as we have done before, on inviting promising URM undergraduate students to visit the department to increase

application and enrollment. We will work with the graduate recruiting team in the Thomas J. Watson School of Engineering and Applied Science to organize events on campus, such as open house and informational presentations, to get students from diverse background interested. We will continue to utilize scholarship programs such as the Clifford D. Clark Fellowship program and the GEM fellowship program to encourage qualified URM undergraduate students to apply and enroll. We will also work with the Division of Diversity, Equity and Inclusion to help recruit URM students.

We feel confident that we can recruit a class of 40 full-time students in the first year and also meet the enrollment targets for future years. First, the society has a great demand for information systems professionals and jobs are available in this field so the program can naturally attract students. Secondly, we already have potential application pools for this program. For the past three years, the Computer Science Department has received approximately 1,000 MS applications each year. Out of these applicants, 25% did not have the necessary background for the MSCS program. However, their background matches the requirements for the proposed MSIS program. So, we expect to have an initial pool of 200-250 applications per year for the proposed program. The applicant pool is also expected to grow once the program is instituted and advertised. If the acceptance and yield rates for the applications to the new program are similar to those of the MSCS program, the above pool of applications will be able to yield 40 students. Therefore, a large application pool will be available for the first two cohorts of the proposed program. The CS Department also has a joint double-diploma bachelor's degree program in Information Systems with Istanbul Technical University. This program has about 80 students. Each year about 20 students successfully graduate from this program. Some of these students had expressed interest in continuing with the proposed MS IS program, if it were offered. In addition, a significant number of applications are expected from other programs on Binghamton University campus.

**Admissions Requirements**

Applicants to this program must hold either a baccalaureate or a graduate degree, but may come from any area. A goal of the program is to develop students with interdisciplinary training; skilled both in an area that has interested them previously, and in the use of information systems to leverage their domain specific knowledge. We anticipate that many students who are interested in the program will have prior work experience

All students applying to the program submit their application materials through the Graduate School (i.e., Slate). A completed online application, academic transcript(s), two letters of recommendation, current resume, and a personal statement are the minimum requirements to apply. GRE/GMAT scores are strongly preferred but may not be required in all cases, such as students who have significant work experience in related fields. Students are expected to have a GPA of 3.0 or above. International applicants must also submit results from either TOEFL (minimum score of 80) or IELTS (minimum score in 6.5 with no band below 5).

**Staffing**

Over the first 5 years of the proposed MSIS program, 7 faculty members (3 tenure-track and 4 lecturers), 1 IT staff and 1 administrative assistant will be hired to run this program. In addition, a growing number of TAs will be allocated to support this program. By Year 5, the number of TAs will reach 12. The hiring schedule for each of the first five years was provided earlier.

With personnel searches for the MSIS program, the Computer Science Department will encourage applications from women and underrepresented minorities, to build a diverse and vibrant faculty. The department has been actively working to recruit faculty members from women and URM groups. To enhance our effort, a subcommittee in future search committees will be formed to focus on identifying candidates from women and URM groups. The initial goals will be on exploring the CRA (Computing Research Association) database, identifying women and URM senior researchers and postdoctoral candidates at other institutions and directly encouraging them to apply, and developing guidelines to evaluate the diversity statements of all applicants to open faculty positions. We will seek help from computing/IT organizations for women and URM groups such as AWC, ACM-W, CWIT, IAAMCS and Hispanics in Computing, for recruiting women and URM faculty members. Some of these organizations have successfully helped women and URM students get tenure-track faculty positions.

To improve faculty retention, and to maximize the chance that newly hired faculty members meet tenure criteria, the department provides support in a number of ways. Each junior faculty member has two senior faculty members as mentors. Faculty mentors as well as other senior faculty members of the department provide assistance to junior faculty in many areas, including teaching, guidance on research directions, identification of funding opportunities, proposal reviews, and PhD student recruiting. For faculty with special needs such as the need to care for young children or manage disabilities, the department gives careful consideration to teaching schedules and committee assignments. The department also helps with the two-body problem of some faculty members. Once we have URM faculty members, we plan to organize a workshop on best practices in helping them succeed with tenure and retaining them.

**Program Evaluation**

Program assessment will include the following components.

- Each course will be assessed by students using the Binghamton University (or a variant) SOOT (Student Opinion of Teaching) form. This form assesses the course and faculty on ten items. There is also a place for extensive comments. The form will be administered through our Learning Management System, MyCourses. These assessments will be shared with the program director.

- Each course will also be assessed in accordance with the general Middle States process. Each learning outcome will be assessed, weaknesses will be identified, and when applicable, actions to address each weakness will be proposed and followed up.

- A program outcome survey of all graduating students will be administered. This survey will be given to the students before they graduate and will ask them to provide program-level feedback – program content, its coordination across courses, program management, placement services, technology, etc.

- Program learning goal outcome will be assessed in courses as outlined in the curricular map. The proportion of students who are at, below and above expectations will be documented. The faculty evaluation committee will meet annually to assess the measures and take steps in various courses to improve the performance.

- Informal feedback from employers after placement of students will be requested about one year after the completion of the program.

- Survey of alumni from this program will be conducted biennially to get their feedback on the effectiveness of the curriculum and course offerings.

In the spirit of Total Quality Management, the director and the faculty review committee will review all feedback annually and take corrective actions to improve the program. The findings of these assessments will be shared with the deans and the program faculty.

### *Program Design*

The proposed MSIS program is a 30 credit hour program. Among them, 9 come from required courses, 18 from electives and 3 from a termination project. The table below shows the required courses and the current electives.

| Required | Credits | Electives | Credits |
|---|---|---|---|
| IS501 Information Systems I: Python and Data Mining (New) | 3 | IS505 Software Project Management (New) | 3 |
| IS502 Information Systems II: Management of Systems (New) | 3 | IS531 Enterprise Network Security (New) | 3 |
| IS532 Database Systems (from MSDA program) | 3 | IS533 Web Based Information Retrieval and Search (New) | 3 |
| | | IS535 Applied Data Mining (New) | 3 |
| IS595 Termination Project | 3 | IS536 Applied Machine Learning (New) | 3 |
| | | IS537 Tools for Data Science (New) | 3 |
| | | IS541 Mobile Applications for Social Networks (New) | 3 |
| | | IS542 OO Design in Java + Design Patterns (New) | 3 |
| | | IS544 Web-based Programming (New) | 3 |
| | | IS553 Blockchain and Beyond (New) | 3 |
| | | IS554 Data Analytics for Security (New) | 3 |
| | | IS558 Web and Database Security (New) | 3 |
| | | IS559 Information Systems Security (New) | 3 |
| | | MIS523 Information Systems Analysis and Specification (from SOM) | 3 |
| | | CS Electives (based on standing) | 3 |
| | | IS500A Information Systems Practicum I (not counted towards degree requirement) | 3* |
| | | IS500B Information Systems Practicum II (not counted towards degree requirement) | 3* |
| **Total required credits: 30** | | | |

Students may choose from three tracks, focusing on cybersecurity, applied data science, and web-based information systems – or they may opt to not select any specific track. To support these tracks, each course in the MSIS program is designated with one or more tracks as shown in the table below.

Tracks: C – Cybersecurity, D – Applied Data Science, W – Web Based Information Systems

| Course Title (Required Courses) | Track | Credits | Potential Faculty |
|---|---|---|---|
| IS501 Information Systems I (New) | C,S,D | 3 | **New Lecturer(s)**; backups: Madhusudhan Govindaraju, Michael Lewis |
| IS502 Information Systems II (New) | C,S,D | 3 | **New Lecturer(s)**; backups: Patrick Madden, Kenneth Chiu |
| IS503 Systems Infrastructures (New) | C,S,D | 3 | **New Lecturer(s)**; backups: Kanad Ghose, Kartik Gopalan |
| IS542 OO Design in Java + Design Patterns | C,S,D | 3 | **New Tenure-track faculty**; backups: Madhusudhan Govindaraju, Les Lander |
| IS532 Database Systems (from MSDA program) | C,S,D | 3 | **New Tenure-track faculty**; backups: K.D. Kang, Weiyi Meng |
| | | | |
| **Course Title (Elective Courses)** | **Track** | **Credits** | **Potential Faculty** |
| IS558 Intro to Information System Security | C | 3 | **New Tenure-track faculty**; backups: Ping Yang, Guanhua Yan |
| IS544 Web-based Programming | S,D | 3 | **New Lecturer(s)**; backups: Zerksis Umrigar |
| IS551 Systems Programming | S | 3 | **New Tenure-track faculty**; backups: Zerksis Umrigar, Kenneth Chiu |
| IS535 Intro Data Mining (New) | D | 3 | **New Tenure-track faculty**; backups: Zhongfei (Mark) Zhang, Lei Yu |
| IS546 Intro Machine Learning (New) | D | 3 | **New Tenure-track faculty**; backups: Lei Yu, Arti Ramesh |
| MIS523 Information Systems Analysis and Specification (from SOM) | S, D | 3 | SOM faculty |
| IS545 Software Engineering | S | 3 | **New Lecturer(s)**; backups: Rose Williams |
| IS580C Software Security | C | | **New Tenure-track faculty**; backups: Aravind Prakash |
| IS541 Mobile Application Development | C,S | 3 | **New Lecturer(s)**; backup: Patrick Madden |
| CS Electives (based on standing) | | 3 | CS faculty |
| IS505 Software Project Management (New) | C,S,D | 3 | **New Lecturer(s);** backup: Merwyn Jones |
| IS531 Enterprise Network Security | C | 3 | **New Tenure-track faculty**; backups: Guanhua Yan |
| **Course Title (Project Courses)** | | **Credits** | **Potential Faculty** |
| IS595 Project Course – Track Related | C,S,D | 3 | **New Lecturer(s)** |

Students pursuing a particular track must take at least three courses from that track, beyond the required MSIS core courses.

Two optional practicum courses will be offered to provide coverage of fundamental concepts in information systems to students with less background in computing. The two practicum courses do not count towards the MSIS degree.

While we anticipate that most students will complete the program in four semesters (with the final semester having a light course load to allow students to focus on the termination project), it is possible to complete the program in three semesters.