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**Revised: September 1, 2023**

**Improvements by Program Driven by Assurance of Learning**

**Academic Year 2022/2023**

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# BS in Business – Significant Changes Related to AOL Assessment Process: Academic Year 2022/2023

***Bachelor of Science in Business***

**Top Significant changes made to this program driven by Assurance of Learning. Also includes structural changes influenced by input from advisory board, alumni, market need, etc.**

# INTRODUCTION AND OVERVIEW OF BS BUSINESS DEGREE

The BS Business program includes the following majors: Business & Technology, Finance, Management, Marketing Innovation & Analytics, Information Systems, Economics, and following feedback from industry and faculty, an Accounting and Analytics major was the latest major added, then a**n Accounting minor was approved as well.** After receiving feedback from faculty, students, and the BOD**,** the **Marketing major was rebranded as Marketing Innovation & Analytics** to continue to reflect a change in curriculum completed.

Students in all majors share the same core curriculum, which includes the Liberal Arts and Science Core, Business Core, and Practice Core. The BS Business program started in the academic year 2013-2014, and it took the place of BS Business & Technology, which has been running since the Fall 2000.  The reason for the change is that under BS Business & Technology, there was only one major – the Business & Technology major. **Starting fall 2016, seven majors exist that reflect well the degree of Bachelor of Science in Business.**

Since 2007, under the BS Business & Technology degree, the program followed strong assurance of learning processes that are being continued with the BS Business degree.  The goals of the program have been assessed **8-10** times depending on the goal. **Following the AOL accreditation committee’s recommendation in 2015**, to simplify the assessment process, we have begun to successfully **automate the team assessment goal (goal 2)**, and now also focus on assessing three AOL goals. Additional detailed results from goal assessments and corresponding steps taken to address those specific goals are recorded in the individual goal booklets.  **Below we have summarized more noteworthy changes** that have resulted from the AOL assessment feedback. These significant changes were also informed by other forms of feedback outside of Assessment of Learning, including student interviews and course reviews, benchmarking our programs relative to other universities, and an in-depth review of the program conducted by faculty.

# CURRICULUM CHANGES - Influenced by AOL

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| **1** | Driven by **AOL goal 1,** MGT300 -- Business communications was offered this spring 2023 for the first time. The course was developed and approved by the UCC in 2022. |
| **2** | ECON242 - Introduction to Economics for QF students was offered for the first time, which is related to BSB goal 2. |
| **3** | Associated with **AOL goal 3,** FIN420 -- A Survey of Topics in Financial Technology was offered for the first time |

# STRUCTURAL CHANGES – Influenced by Advisory Board, Alumni, market needs, etc.

|  |  |
| --- | --- |
| 1 | Derived from AOL, faculty, and student feedback, in 2022-2023, the UCC approved the delivery of BT 353 twice a week, versus once a week, to bolster student understanding and engagement. |
| 2 | Drawing on AOL, faculty, and student feedback, in 2022-2023, the UCC approved the delivery of BT100 twice a week, versus once a week, to enhance student understanding and engagement. |
| 3 |  |

**WHAT COMPETENCIES WERE MET, AND WHAT CHANGES WERE MADE BECAUSE OF DIRECT AND INDIRECT MEASURES**

**Particular competencies**: There are **particular competencies** that are needed in teamwork that AOL goal 2 attended in both BT 330 and QF. The competencies that are targeted are task management skills and relationship management skills. **Task management** skills include: clarifying roles and responsibilities of others; suggesting new approaches to solving problems; defining task priorities for work sessions and or projects. **Relationship management** skills include: working towards solutions and compromises that are acceptable to all involved; reinforcing the contributions of others; and encouraging ideas and opinions even when they differ from his/her own.

**Indirect measures**: Interviews with team members/exit surveys were conducted at the end of junior year. The interview is structured, with representative team members in BT 330 and QF. The structured interview collects information about the key identified competencies described above. The responses will be subjected to a content analysis to discover underlying themes.

**Direct measure:** Students work in teams all through the semester. Team members complete a team appraisal of their peers similar to a 360-degree assessment to evaluate AOL Goal 2, effective interaction in teams. In both BT 330 and QF classes, the direct assessment, which is reliable and valid, is completed through a survey monkey tool. A teaching assistant imports the data into an Excel file and generates an average for each team and members on key teamwork behaviors. The courses rely on teams to complete collaborative assignments, so understanding effective interaction in teams is a key to the team’s success. One key goal here is to help the student understand how they can contribute to the team in terms of ***facilitating task accomplishment* (*team leadership*) and *facilitating relationship building* (team facilitation),** which the direct teamwork assessment centers on. The feedback from the assessment enables the students to understand what behaviors they can improve to become more effective team members.

**What competencies were met:**

# The indirect measure: Interviews/exit surveys with representative team members.

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| --- | --- |
| Objective 1 | **Task management** skills |
| Key underlying themes observed | **Competency features met**: suggesting new approaches to solving problems; defining task priorities for overall projects.  **Competency features not met:**  The interviewees for the teams believed that each team should continue striving to clarify better roles and responsibilities for individual members of the team prior to each weekly cooperative assignment and ensure goals are understood by all. |
| Objective 2 | **Relationship management** skills |
| Key underlying themes observed | **Competency features met**: reinforcing the contributions of others; Sharing information with others.  **Competency features not met**:  The interviewees for the teams felt that each team should continue to improve on working towards solutions and compromises that are acceptable to everyone involved. |
| **Changes:** Corrective action | In the wake of the underlying themes uncovered from interviewee responses, the scholars will be guided to review the behavioral guidelines for *task management and relationship managing skills* to enhance these behaviors (Robbins and Judge, Organizational Behavior, 18th Edition) at the beginning of Fall 2023. The material will be provided as a pdf for class partakers too. |

# The direct measure: Team members complete a team assessment of their peers similar to a 360-degree evaluation to assess AOL Goal 2, effective interaction in teams

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| --- | --- |
| Objective 1 | *Students will be able to facilitate task accomplishment (team leadership) within the context of project teams* |
| Objective 2 | *Students will be able to facilitate relationship building (team facilitation) within the context of project teams* |
| Comments: | On the First Objective and the Second objective, the scholars either met or exceeded expectations. |
| Changes made because of direct measurements: | Even though from the results, it appears the bulk of learners met or exceeded expectations on both learning objectives, the students will be counseled to review the behavioral guidelines for *facilitating-task accomplishment and facilitating-relationship building behavior* so as to improve these behaviors (Whetten and Cameron, 2020) at the start of Fall 2023. The material will be offered as a pdf for the scholars. |

# Quantitative Finance (QF) - Significant Changes Related to AoL Assessment Process

**Top Significant changes made to this program driven by Assurance of Learning. Also includes structural changes influenced by input from advisory board, alumni, market need, etc.**

**INTRODUCTION AND OVERVIEW OF BS in Quantitative Finance**

**CURRICULUM CHANGES - Influenced by AOL**

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| --- | --- |
| **1** | Rearranged the sequence of QF103 and QF104 |
| **2** | Worked to sync QF104’s material to better line up with QF112, to be first implemented next year |
| **3** |  |
| **4** |  |

**STRUCTURAL CHANGES – Influenced by Advisory Board, Alumni, market needs, etc.**

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| --- | --- |
| 1 | Created course coordinators to maintain consistency for multiple sections with different instructors |
| 2 |  |
| 3 |  |
| 4 |  |

# MS in Business Intelligence and Analytics (BIA) – Significant Changes Related to AoL Assessment Process

**Masters of Science in Business Intelligence and Analytics (BI&A)**

**Top Significant changes made to this program driven by Assurance of Learning. Also includes structural changes influenced by input from advisory board, alumni, market need, etc.**

**INTRODUCTION AND OVERVIEW OF MS in BIA**

# CURRICULUM CHANGES - Influenced by AOL

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| **1** | Implementation of experiential learning in a foundational course in Business Analytics (BIA 580 Foundations of Business Analytics). This 3-credit course provides: a foundation in quantitative methods in statistics and mathematics, develops a competency in python to implement those principles, as well as exposure to real-world applications in finance, marketing, production, and logistics. |
| **2** | Implementation of experiential learning in a 3-credit practicum in Big Data (BIA 679 Big Data Practicum). As they enter the workforce, a significant percentage of BIA students will be directly involved with big data as technologists, managers, or users. This course builds on their understanding of the basic concepts of BI&A to provide them with the background to succeed in the evolving data-centric world, not only from the point of view of the technologies required, but also in terms of management, governance, and organization. |
| **3** | Broadened our experiential learning in AI with the course in Augmented Intelligence and Generative AI. This course provides students with a “hands-on” opportunity to build real-world business applications, as well as explore how knowledge-based AI, generative AI, and deep learning are impacting the field of big data analytics and evidence-based decision making. |

# STRUCTURAL CHANGES – Influenced by Advisory Board, Alumni, market needs, etc.

Based on discussions with the BI&A Industry Advisory Board and our own sense of trends in industry, we made several structural changes to the BI&A curriculum in 2022-23 including:

1. Changed the core curriculum from 8 courses to 9 required courses by adding BIA 580 Foundations of Business Analytics, and making BIA 658 Social Network Analytics and Visualization an elective, This means that that all students have a foundation in Business Analytics to prepare them mathematically and technically for follow-on courses in Business Intelligence and Analytics.
2. We are enhancing our offering in the area of Data Analytics with a proposed new course in Healthcare Marketing Analytics. This course will give students a stronger grounding in working with healthcare data and it uses.
3. Finally, we are actively looking at familiarizing our students in generative AI and its application in a wide range of areas.

**Indirect Measurement**

To improve our understanding of student perceptions and needs, we have conducted a detailed Exit Survey of all AY2022-23 graduating students. The results from this year’s survey have yet to analyzed but are likely to yield a number of program innovations in the spirit of continuous improvement. Going forward, we intend to conduct this survey every year.

* Analytical skills – an additional business analytics (BIA 580 Foundations of Business Analytics) was added to the core
* General knowledge of business analytics skills – the BI&A program runs a weekly seminar series featuring industry and faculty speakers in the fall, spring and summer semesters
* Communication and team skills – continue to be evaluated via BI&A Learning goals 1 and 2, respectively

# Enterprise Project Management (EPM) – Significant Changes Related to AoL Assessment Process

**Masters of Science in Project Management (EPM)**

**Top Significant changes made to this program driven by Assurance of Learning. Also includes structural changes influenced by input from advisory board, alumni, market need, etc.**

**INTRODUCTION AND OVERVIEW OF EPM PROGRAM**

# CURRICULUM CHANGES - Influenced by AOL

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| **1** | **In support of Goal 1**, We Encourage students to participate more in live Zoom discussions on weekly topics during class across all PM courses. |
| **2** | The course MGT614 will be removed from the curriculum based on the selection and comments of the students. |
| **3** | **In support of Goal 3**, Enhanced AGILE case studies/real-life examples to make connections to current events in the work world. Software projects are often managed with the AGILE methodology and some students have already experiences with this methodology. AGILE has been added as a topic to MGT609, MGT610 and MGT611. |
| **4** | **In support of Goals 3 and 4**, we added real-life project cases from the files of WebCampus - including the implementation of current eLearning technologies. (MGT 609) |
| **5** | **In support of Goals 4**, we utilized new project management game to teach project monitoring and control. The goal is to improve practical experiences, based on student feedback. (MGT 609) |

# STRUCTURAL CHANGES – Influenced by Advisory Board, Alumni, market needs, etc.

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| 1 | Participated and obtained PMI (GAC) accreditation (from 2023 to 2028) |
| 2 | We added a new faculty member to the program. The professor will teach Project Management courses. |
| 3 | We launched our [Inclusive Leadership Certificate Program](https://www.stevens.edu/inclusive-leadership) (DEI), this non-credit is available as a development opportunity to all students within the School of Business. This initiative also supports learning goals 1 and 2. |
| 4 | We are going to transition from Frank Gallucci being the board chair to Paul Magnone. |

Via direct contacts to graduating students, we learned that at least 5% of our students -motivated by the project management courses- are taking CAPM or PMP professional certifications that are offered by the PMI (Project management Institute). In addition, they reported experiential aspects (assignments, projects, simulations, collaborative learning and direct contact with industry experts) of their education were reported to be most instrumental to students' skill development, although they also valued interaction with faculty and peers.

# Master of Business Administration (MBA)

**Masters of Science in Business Administration (MBA)**

**Top Significant changes made to this program driven by Assurance of Learning. Also includes structural changes influenced by input from advisory board, alumni, market need, etc.**

**INTRODUCTION AND OVERVIEW OF MBA**

This innovative 39-48 credit MBA prepares leaders to succeed by developing skills in technology and analytics. Our MBA courses feature applied exercises that prepare students to serve as leaders who are capable of making fast, data-supported decisions. MBA coursework emphasizes collaboration through group projects and presentations and develops student creativity and critical thinking skills through the incorporation of new analytical tools and the latest research insights.

Program goals, as related to Assurance of Learning:

1. Students can communicate effectively in written and oral presentations.

2. Students can interact effectively in teams.

3. Students will be able to develop and analyze descriptive, predictive, and prescriptive models using software tools to aid in decision-making.

4. Students will be able to effectively utilize analytic problem-solving skills.

Via a survey of graduating students, the majority of graduate management student respondents (n=39) assessed, reported that their MBA experience somewhat or significantly improved their abilities (compared to their skills prior to starting their program) in relation to the program goals above and the competencies associated with them. Experiential aspects (assignments, projects, simulations, collaborative learning) of their education were reported to be most instrumental to students' skill development, although they also valued interaction with faculty and peers.

**CURRICULUM CHANGES - Influenced by AOL**

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| **1** | **In support of Goal 1**, We Encourage students to participate more in live Zoom discussions on weekly leadership skills topics during class and structured the team presentation deliverable. We also added clarity on instructions/requirements for graded assignments (MGT 612). |
| **2** | **In** **Support of Goal 1**, Class participation based on case discussions made a significant (20%) component of course evaluation (MGT 699). |
| **3** | **In support of Goal 3**, Enhanced case studies/real-life examples to make connections to current events in the work world. Several case studies in the course have a technology component (MGT 699). Case studies were updated for the course MGT 506. |
| **4** | **In support of Goal 3** and the other goals we developed and are launching our Online MBA Immersion Course: Future of Work (FoW) in the Fourth Industrial Revolution (4IR): Implications for Leaders & Organizations. |
| **5** | **In Support of Goal 4**, Students analyzed the creative problem-solving skills and other abilities of a leader. (MGT 612) |
| **6** | **In support of learning goals 1 and 2**, We made significant revisions to MGT 695 Leading Creative Collaboration the revisions put more emphasis on collaborative communications skills. |

**STRUCTURAL CHANGES – Influenced by Advisory Board, Alumni, market needs, etc.**

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| 1 | Hosting our first Immersion for the Online MBA program in September 2023. Our Online MBA students will have the opportunity to network and meet with other MBA students. |
| 2 | We launched our [Inclusive Leadership Certificate Program](https://www.stevens.edu/inclusive-leadership) (DEI), this non-credit is available as a development opportunity to all students within the School of Business. This initiative also supports learning goals 1 and 2. |
| 3 | We obtained STEM designations for all MBA degree concentrations, and this will allow three years of OPT. |
| 4 | We are going to transition from Frank Gallucci being the board chair to Paul Magnone. |

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| Goal | Competencies | Direct Measure | Indirect Measure | Outcome |
| MBA – 1. Students can communicate effectively in written and oral presentations. | Written communication competencies include: logic flow and organization, grammar & sentence structure, syntax, idea development.  Verbal communication competencies include clear articulation of ideas, presentation capability and confidence, appropriate use of visual aides, transitions, time management, and ability to engage the audience. | Each student in *MGT 635 Managerial Judgment and Decision Making* produced two copies of a 4-page essay that was specified by the instructor and used also as part of the normal course requirements. | Self-Assessment of skills development | **Written Communication**:  The vast majority of students met or exceeded expectations. Compared to previous years, there was a slight increase in their overall ability to convey their ideas in an orderly, logical way.    Writers are strongly encouraged to seek assistance from the Writing & Communication Center on campus to refine and improve their proofreading abilities. Faculty are encouraged to allow students extra class time to submit their documents for peer review. When appropriate, instructors should give out samples of documents (both academic and professional) to model professional-level writing for all students. In several courses, however, we instead focus on providing detailed assignment outlines and encourage students to submit work for review prior to submitting their final versions.    **Verbal Communication**:  Students easily met or exceeded expectations.    During the past year, our efforts to reduce overall class sizes helped provide students with more opportunities to speak in front of the class, to gain experience and confidence. Students are also encouraged to visit the Writing & Communication Center for extra help developing slides and practicing their oral delivery |
| MBA – 2. Students can interact effectively in teams. | Task Management    Relationship Management skills | Student groups in *MGT 699 Strategic Management* work in teams throughout the semester. The students were assessed at the end of the semester, for effective team interaction using self and peer evaluations, similar to a 360-degree feedback. | Interviews with representative team members about the students’ teamwork competencies. | **Task & Relationship Management**:  The majority of students met or exceeded expectations on these competencies. Compared to the previous year, the overall, score on the facilitate task accomplishment objective improved. In particular, most of the traits’ scores on the facilitate task accomplishment objective improved, while two of the trait scores remained similar.    Although, a content analysis of the assessment results revealed that Relationship Management competencies tend to be stronger than task management.  Those few who did not meet expectations were advised to review the behavioral guidelines for facilitating-task accomplishment (Whetten & Cameron – Developing of Managerial Skills, 2020) at the beginning of Spring 2023. The material is provided as a pdf for the students. |
| MBA 3 -- Our students will be able to develop and analyze descriptive, predictive, and prescriptive models using software tools | The student demonstrates their ability to: - Use descriptive and predictive techniques  - Use Tableau Software  (Load data , develop Visualizations | This goal is assessed inBIA 500/600 Business Analytics: Data, Models & Decisions, which is a required course in the MBA program. | A combination of exam results and project evaluations are used to judge student competence | We were pleased with the fact that 95 percent of the students assessed (n=24) met or exceeded expectations on these competencies |
| MBA 4 --students can effectively utilize analytic problem solving skills. | - Adopt a **long-term view** in the proposal of solutions to analytical problems on strategic issues  - Formulate proposals in which the different elements of the solution show **consistency** among them  **Integrate** different sources of information to expand the decision set to find the best solution to each analytical problem.  -- Find solutions that are **realistic** and can be **implemented** (common sense). | This goal is assessed in EMT 715 (Strategic Business Management) / MGT 699 (Strategic Management); a required core course in the MS in MBA curricula. | The assessment includes individual-level evaluation as well as team-level exercises that are continuously used as a mechanism for the development of analytical skills. | 100 percent of the students assessed met or exceeded expectations on these competencies. In particular there was a slight improvement from the previous year with regard toto the third competency - find realistic, implementable solutions. |

# Master of Science in Information Systems (MSIS) - Significant Changes Related to AoL Assessment Process

**Masters of Science in Information Systems (MSIS)**

**Top Significant changes made to this program driven by Assurance of Learning. Also includes structural changes influenced by input from advisory board, alumni, market need, etc.**

**INTRODUCTION AND OVERVIEW OF MSIS**

# CURRICULUM CHANGES - Influenced by AOL

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| **1** | Several changes were made to MIS730:   * Discussed the concept of generative AI as a set of tools useful in information systems design and development processes. * Discussed the history of such tools, from genetic algorithms to LLMs and diffusion models. * Demonstrated the use of both text and image-based AI models, including GPT and Midjourney. * Showed the use of GPT for generation of code, and discussed possible uses in prototyping. * Added new textbook “Shrivastava, Saurabh and Neelanjali Srivastav. Solutions Architect's Handbook: Kick-start your career as a solutions architect by learning architecture design principles and strategies, 2nd Edition, Packt, 2022 This books provides a very good structure on the various responsibilities a Solutions Architect needs to play and the many areas this role must interact with in an organization to successfully integrate large IS systems |
| **2** | MIS760 was updated as follows:  updated 20 articles used throughout the semester on all subjects e.g., Tesla strategies; CIO role in 2023; Business modules; leadership; cloud computing; etc |
| **3** | MIS 201 was updated to include:   * Discussions on the responsible use of Generative AI. The same will be incorporated during the Fall 2023 semester for content creation. |
| **4** | BT 416 was updated in the following manner:   * Added Camunda 8.0 as BPM Platform. Added assignment that required completion of Camunda training (incl. external certification through Camunda). * Reduced UIPath RPA module to overview due to time constraints. * Added exercise that requires calls to OpenAI API from workflow implementation. * Discussed deployment scenarios for AI APIs. |
| **5** | MIS 714 was completely refreshed:   * Added case studies on   + Dabbawalla System   + IDEO   + Babcom   + Lemonade Insurance * Added Customer Letter writing exercise. * Added discussion of AI platforms in service scenarios (eg. Chatbots). * For MIS714 A section, added case studies on   + IDEO   + OTIS (A) & (B)   + Added multiple mini-cases     - Amazon Pill-Pack - Process Simplification     - Amazon One-Medical/GoForward - Process Redesign     - Business Ecosystems - Finding a Niche     - Disney Magic-Pass     - McDonalds - Customer-Experienced Focused Data Architecture (Personas, IoT data, Customer Experience metrics) |
|  | There were no curriculum changes to MIS631/632 or MIS633/634. Also, no contests or surveys. We may have a major change next semester, but not this year. |
|  | MIS637 was updated as follows:  Many emerging applications such as IoT, holographic, metaverse, and healthcare demand ultra-low latency and local computing. They also require fast and reliable connections, and intelligent decisions to determine what tasks should be done at the either device, edge, fog, or cloud according to the requirements of applications. Thus, the update that was made to the course is: “AI-Enabled End-to-End Device-Edge-Fog-Networks-Cloud Convergence, and Emerging Applications such as IoT, Metaverse, Healthcare, and Transportation.” |
|  | MIS699 was modified to include new case studies on crowdsourcing, metaverse, cryptocurrencies, as well as a new “digital innovation pitch” competition that uses the semester-long class project to provide students with a hands-on experience in innovation and business planning. |

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# STRUCTURAL CHANGES – Influenced by Advisory Board, Alumni, market needs, etc.

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| 1 | MSIS is working on implementing a mentorship program with alumni 2-5 years after graduation. Working with the other programs and COPA, the MSIS program is assisting in developing industry specific lists and will try to match mentors based on the industry each student is interested in working in. It is very important students begin understanding the different careers, positions, and skill sets required to succeed in each industry.  This especially applies to students who intend to take up a concentration in BIA. The analytics required for retail/fashion might include social networking analytics and supply chain analytics, whereas these might not make as much sense in a commercial banking organization. In a banking environment, multivariate analytics and blockchain may be more appropriate to take, given students have four electives they can take as part of the MSIS degree.  The MSIS Program Director will be working with COPA to ensure resumes are tuned for the target industry. Industry panels will be established with alumni that represents multiple areas of focus/responsibility to educate students on how new products and services are delivered through collaboration and complimentary skills is a team structure; through product, technology, and human centered design, supported by data and process changes in the company, industry and integration with cloud products, services, and capabilities. |
| 2 | The Network and Communications Management Services Masters Program is currently being sunsetted. Classes are continuing for students currently in the program. We are discussing the possibility moving several of these classes to create a four course Network and Communications concentration within the MSIS degree. There is a great demand for business students who are also well versed in the major technological shifts occurring today in telecommunications (5G and other wireless systems); cloud computing and services, 3rd party cyber security services; the Internet-of-Things, AI and smart devices, as well as compliance, privacy, and management of these complex, ecosystems. |
| 3 | MGT 609 – Project Management is a required course for the MSIS Program. We believe all graduates will be asked to manage projects, increasing over time with their increasing responsibilities. Our students will benefit from the Structural Changes outlined above by the Management Program with their closer ties with the Project Management Institute. |

**WHAT COMPETENCIES WERE MET AND WHAT CHANGES WERE MADE BECAUSE OF DIRECT AND INDIRECT MEASURES**

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| **Goal** | **Competencies** | **Direct Measure** | **Indirect Measure** | **Outcome** |
| **IS - 1: Students can communicate effectively in written and oral presentations.** | **Students will be able to write effectively**   * Logical Flow * Grammar & Sentence Structure * Spelling & Word Choice * Development of Ideas   **Students will be able to deliver presentations effectively**   * Organization & Logic * Voice Quality * Physical Presence * Use of Slides to Enhance Communication * Transitions/Time Management/Q&A | Assessments of writing and oral presentations | Exit survey | An overwhelming majority of students in the graduate program met or exceeded expectations in their written communication. Students also continue to do well with the structural and organizational aspects of presenting. |
| **IS - 2: Students can interact effectively in teams** | **Adopt a personal development mindset / be able to systematically assess one's own team leadership skills and abilities**   * Knowledge of individual difference factors impacting team leadership effectiveness * Self-awareness * Personal development planning * Behavioral improvement   **Recognize determinants of team and interpersonal effectiveness within and across organizations**   * Understanding of concepts and constructs at individual, group and organizational levels of analysis * Diagnostic ability | Peer evaluation survey | Exit survey | The vast majority of students perform well in both team leadership as well as interpersonal effectiveness within teams. |
| **IS – 3: Students will be able to formulate and articulate plans to align business and IT** | **Students recognize the role of the CIO as a corporate executive and leader and the IT organization as a contributor to the strategic direction of the firm.**   * The student learns to think strategically beyond the IT function alone – ability to see the big picture * The student understands how to develop an IT strategy that aligns with the business strategy – problem solving ability * The student demonstrates creative, analytic and innovative thinking * The student articulates the way in which technology enables business strategy i.e., drives business improvement and leads to a competitive advantage * The student demonstrates how they would forge a partnership with the business – leadership ability * The document is well written, demonstrating good communication skills | Written assignment | Exit survey | Students have excellent capacity to formulate and articulate plans to align business and IT. |

# MS Management (MSM) - Significant Changes Related to AoL Assessment Process

**Masters of Science in Management (MSM)**

**Top Significant changes made to this program driven by Assurance of Learning. Also includes structural changes influenced by input from advisory board, alumni, market need, etc.**

**INTRODUCTION AND OVERVIEW OF MSM**

The master's degree in Management helps students with limited exposure to business to round out their résumés with practical instruction that teaches them how leadership, innovation, economics and strategy shape and define the roles they'll play in industry. Employers see graduates of the Stevens Management program as ideal job candidates who need little training, as their education prepares them to create an immediate impact at work.

Program goals, as related to Assurance of Learning:

1. Students can communicate effectively in written and oral presentations.
2. Students can interact effectively in teams.
3. Students will understand how a firm uses technology for competitive advantage in satisfying its business strategy.
4. Students will be able to effectively utilize analytic problem-solving skills.

Via a survey of graduating students, the majority of graduate management student respondents assessed, reported that their MSM experience somewhat or significantly improved their abilities (compared to their skills prior to starting their program) in relation to the program goals above and the competencies associated with them. Experiential aspects (assignments, projects, simulations, collaborative learning) of their education were reported to be most instrumental to students' skill development, although they also valued interaction with faculty and peers.  It should be noted, however, that due to low enrollments in this program, our sample size was 13.

**CURRICULUM CHANGES - Influenced by AOL**

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| **1** | **In** **Support of Goal 1**, Class participation based on case discussions made a significant (20%) component of course evaluation (MGT 699). |
| **2** |  |
| **3** |  |
| **4** |  |

**STRUCTURAL CHANGES – Influenced by Advisory Board, Alumni, market needs, etc.**

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| --- | --- | --- | --- | --- | --- |
| 1 | We launched our [Inclusive Leadership Certificate Program](https://www.stevens.edu/inclusive-leadership) (DEI), this non-credit is available as a development opportunity to all students within the School of Business. This initiative also supports learning goals 1 and 2. | | | | |
| 2 | We are going to transition from Frank Gallucci being the board chair to Paul Magnone. | | | | |
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| MSM – 1. Students can communicate effectively in written and oral presentations. | | Written communication competencies include: logic flow and organization, grammar & sentence structure, syntax, idea development.  Verbal communication competencies include: clear articulation of ideas, presentation capability and confidence, appropriate use of visual aides, transitions, time management, and ability to engage the audience. | Each student in *MGT 609 Project Management* produces two copies of a 4-page essay that is specified by the instructor and used also as part of the normal course requirements. | Self-Assessment of skills development | **Written Communication**:  The vast majority of students met or exceeded expectations. Compared to previous years, there was a slight increase in their overall ability to convey their ideas in an orderly, logical way.    Writers are strongly encouraged to seek assistance from the Writing & Communication Center on campus to refine and improve their proofreading abilities. Faculty are encouraged to allow students extra class time to submit their documents for peer review. When appropriate, instructors should give out samples of documents (both academic and professional) to model professional-level writing for all students. In several courses, however, we instead focus on providing detailed assignment outlines and encourage students to submit work for review prior to submitting their final versions    **Verbal Communication**:  Students easily met or exceeded expectations.    During the past year, our efforts to reduce overall class sizes helped provide students with more opportunity to speak in front of the class, to gain experience and confidence. Students are also encouraged to visit the Writing & Communication Center for extra help developing slides and practicing their oral delivery | |
| MSM – 2. Students can interact effectively in teams. | | Task Management    Relationship Management skills | Student groups in *MGT 699 Strategic Management* work in teams throughout the semester. The students were assessed at the end of the semester, for effective team interaction using self and peer evaluations, similar to a 360 degree feedback. | Interviews with representative team members about the students’ teamwork competencies. | **Task & Relationship Management**:    The bulk of students reached or exceeded expectations on both learning objectives. Still, the students will be advised to review the behavioral guidelines for facilitating-task and facilitating-relationship building behaviors (Robbins and Judge, Organizational Behavior, 18th Edition) at the start of 2023-2024. The material will also be provided as a pdf for the scholars. | |

# MS Technology Management (MSTM/EMBA) - Significant Changes Related to AoL Assessment Process

**Masters of Science in Technology Management/Executive MBA (MSTM/EMBA)**

**Top Significant changes made to this program driven by Assurance of Learning. Also includes structural changes influenced by input from advisory board, alumni, market need, etc.**

**INTRODUCTION AND OVERVIEW OF MS TECHNOLOGY MANAGEMENT (MSTM/EMBA)**

The MSTM and EMBA degrees recognize that executive-level courses must offer a strong technology perspective to be relevant in a fast-changing world. Our courses in marketing, finance, strategy, and operations emphasize the use of analytical tools that are changing how decisions are made in these disciplines. The faculty teach students to approach problems with entrepreneur-like flexibility and use emerging technologies to become an innovator who brings greater sophistication and efficiency to the enterprise. The cohort format of this program fosters teamwork and collaborative learning.

Program goals, as related to Assurance of Learning:

1.Students can communicate effectively in written and oral presentations.

2.Students can interact effectively in teams.

3.Students will understand how a firm uses technology for competitive advantage in satisfying its business strategy.

4.Students can identify, assess, launch, and lead organizational strategic initiatives in a technology-based environment for the creation of new business models (i.e., corporate entrepreneuring) in a large corporation including both sustaining and disruptive businesses.

Via a survey of graduating students, the majority of respondents assessed reported that their MSTM/EMBA experience somewhat or significantly improved their abilities (compared to their skills prior to starting their program) in relation to the program goals above and the competencies associated with them. Experiential aspects (assignments, projects, simulations, collaborative learning) of their education were reported to be most instrumental to students' skill development, although they also valued interaction with faculty and peers.  It should be noted, however, that due to low enrollments in this program, our sample size was 5.

**CURRICULUM CHANGES - Influenced by AOL**

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| **1** | In support of learning goals 1 and 2, we made significant revisions to EMT 695 Leading Creative Collaboration. The revisions put more emphasis on collaborative communications skills. |

**STRUCTURAL CHANGES – Influenced by Advisory Board, Alumni, market needs, etc.**

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| 1 | We launched our [Inclusive Leadership Certificate Program](https://www.stevens.edu/inclusive-leadership) (DEI), this non-credit is available as a development opportunity to all students within the School of Business. This initiative also supports learning goals 1 and 2. |
| 2 | Hosting our first Immersion for the Online MBA program in September 2023 and inviting all MBA students to Network together. |
| 3 | Due to low enrollment challenges, we are putting a pause on this program in order to do market research and to explore curriculum revision opportunities. We are also looking for potential revisions to program delivery that could potentially make the program more viable. |
| 4 | We conducted a review of 10 other technology management programs to consider ways in which our own curriculum was similar and different.   key recommendations form this review include: 1) highlighting our program’s emphasis on innovation management in the digital era. 2) Reorganizing course sequencing to better distinguish how the MSTM degree is separate from and yet also integrated into the EMBA study program. |
| 5 | We are going to transition from Frank Gallucci being the board chair to Paul Magnone. |

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| Goal | Competencies | Direct Measure | | Indirect Measure | | Outcome | |
| MSTM/EMBA – 1. Students can communicate effectively in written and oral presentations. | Written communication competencies include logic flow and organization, grammar & sentence structure, syntax, idea development.  Verbal communication competencies include clear articulation of ideas, presentation capability and confidence, appropriate use of visual aides, transitions, time management, and ability to engage the audience. | | Embedded in design assignment in all required courses.  ***EMT 635:*** ***Managerial Judgment & Decision Making*** is the course of assessment for written communication and ***EMT 696: Human-Centered Design Thinking*** is the course of assessment for the oral presentation. | | Self-Assessment of skills development | | **Written Communication**:  The majority of students in this program who participated in the writing assessment in Summer 2022 met or exceeded expectations. This is on par with how these students scored in previous assessments. Scores were generally consistent across the four Learning Goals, but there were slight increases in Goals 1 and 4, which rate the writer’s overall ability to convey their ideas in an orderly, logical way. Goals 2 and 3, which assess more word- and sentence-level writing issues, was slightly weaker, and is likely attributable to this being a very international cohort.    Writers are strongly encouraged to seek assistance from the Writing & Communication Center on campus to refine and improve their proofreading abilities. Faculty are encouraged to allow students extra class time to submit their documents for peer review. When appropriate, instructors should give out samples of documents (both academic and professional) to model professional-level writing for all students.  **Verbal Communication**:  Students in this program easily exceeded expectations in the ability to deliver effective presentations. Organization and logic were generally strong, and information was delivered in a way that was both clear and impactful. The use of smooth transitions and time management were also strong. Overall, areas relating to the speaker’s physical presence and voice quality were the weakest, but still effective. This is an element that can be taught but is only internalized by repeated exposure to public speaking. Slide creation was generally strong, but many presentations still suffered from cramped data and small text, which made it a bit hard on the audience. |
| MSTM/EMBA – 2. Inspire, motivate and lead teams and groups of technical professional and knowledge workers for maximum utilization of the organization’s human capital and continuous growth of its employees. | Competencies assessed include Self-awareness -Effectively uses all self-awareness dimensions-introspection, interaction and expansion to describe personal leadership qualities and aspirations.  Personal development planning – (self-regulation, self-management, learning agility) Uses self-management and self-regulation principles to articulate personal development objectives.  Interpersonal effectiveness (supportive communication; influencing, conflict management) | | The main assessment exercise used for the Direct Measure is entitled U’ Inc. or Skills Analysis paper. Using a corporation as a metaphor, students are required to prepare a detailed analysis of their personal “mission, vision, assets, and liabilities”, when it comes to managing and leading collaboratively. This assignment is embedded within EMT 740 Team Leadership Development. | | Survey of graduating students | | **Self-awareness -** This skill was well understood. (reflected in Skills Analysis papers and development plan reports.)  **Personal development** (self-regulation, self-management, learning agility) - These skills were well understood (reflected in development plan reports).  **Interpersonal effectiveness** (supportive communication; influencing, conflict management) - These skills were well understood (reflected in Skills Analysis papers development plan reports.)    This was another strong cohort. Although they were a small group, their backgrounds were varied. They were highly committed to their self-development work and were consistently well prepared for class. One benefit of the small class sizes is that we are able to provide each student with more coaching and developmental support as they engage in their self-reflection and subsequent development planning. As was the case last year, I will continue to focus on building in class course time for development planning work. It was helpful and enriched the quality of their development efforts and the way they applied course concepts. |

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| Goal | Competencies | Direct Measure | Indirect Measure | | Outcome |
| MSTM/EMBA – 4. Identify, assess, launch, and lead organizational strategic initiatives in a technology-based environment for the creation of new business models in a large corporation including both sustaining and disruptive businesses. | Be able to develop a business model for a new product or service and understand the associated political and organizational constraints which are associated with gaining social and financial capital. This includes  1) Be able to gain support of the organization for a new product or service.  2) Be able to present a compelling business model innovation to a group of executives at the conclusion of the course. | This learning goal assessment takes place in course EMT 752: Corporate Entrepreneuring. Other courses are also involved in this assessment exercise:  EMT 741 Innovation Management Process, EMT 642: Marketing Management in Technical Organizations, and the final capstone course EMT 798: Integration & Application of Technology.    In EMT 752, students are challenged to propose a corporate entrepreneurship project in their company. They are assessed not only on the content of their proposals but also on whether they succeed in having their proposals implemented (see objective 2 trait 1). A high percentage of these proposals are actually funded. | | Survey of graduating students | All six students assessed met or exceeded expectations. The business model innovation process was generally followed, however further customer discovery was needed on several projects.We will **c**ontinue to work with students on how to develop and present a compelling business case.  This includes further explaining and working with students regarding the pitfalls of inadequate customer discovery and an inadequate analysis of the competitive landscape. |

# MS Finance (MFIN) - Significant Changes Related to AoL Assessment Process

**Top Significant changes made to this program driven by Assurance of Learning. Also includes structural changes influenced by input from advisory board, alumni, market need, etc.**

**INTRODUCTION AND OVERVIEW OF MS Finance**

The Finance curriculum provides you with a rigorous study of the terminology, methods and application areas of economics, finance and financial technology. Classes will prepare you to apply technology for financial analysis, forecasting and management; assess the financial health of an organization; develop plans that address financial management needs of an organization; and lead business and technology teams.

**Core curriculum**

**Prerequisites**

Prerequisite courses are intended for students who do not have training or prior coursework in accounting, finance and statistics. Students who have passed the CFA level 1 exam are exempt from all prerequisites; students who have not passed the exam will work with their advisor to determine which courses they may waive.

* FIN 523 Financial Management
* FIN 500 Financial and Managerial Accounting
* BIA 652 Multivariate Data Analysis

A prerequisite course in business writing and communication also is required. This can be fulfilled through a MOOC.

**Economics core**

* FIN 616 Managerial Economics
* MGT 700 Econometrics

**Finance core**

* FIN 629 Fixed Income Analysis
* FIN 627 Investment Management
* FIN 638 Corporate Finance
* FIN 510 Financial Statement Analysis
* FIN 628 Derivatives

**Informational, Computational and Quantitative Core**

Choose any three of the following 1-credit lab courses.

* FE 511 Introduction to Bloomberg and Thomson Reuters
* FE 515 Introduction to R
* FE 517 Introduction to SAS
* FE 520 Introduction to Python

**Specialization**

A unique feature of this degree is the ability to customize the curriculum to best suit your career interests. Students can select from the concentrations below or, if desired, select four elective courses in any areas of their choosing, such as management science, financial engineering, mathematics, statistics and computer science.

**Investment Banking and Valuation**

Choose any four of the following courses.

* FIN 530 Investment Banking
* FIN 620 Advanced Financial Econometrics
* FIN 688 Mergers, Acquisitions and Other Corporate Restructuring
* FIN 526 Venture Capital and Private Equity
* FIN 648 International Finance
* FIN 540 Sustainable Finance

**Financial Analytics and Risk**

* FIN 620 Advanced Financial Econometrics
* FA 631 Investment, Portfolio Construction and Trading Analytics
* FA 636 Advanced Risk Analytics

You may also choose one of the following:

* BIA 656 Advanced Data Analytics and Machine Learning
* FE 590 Statistical Learning in Finance

**Wealth Management**

Choose any four of the following.

* FIN 620 Advanced Financial Econometrics
* FIN 658 Wealth Management Principles and Practices
* FIN 550 Financial Planning and Risk Management
* FA 631 Investment, Portfolio Construction and Trading Analytics
* FIN 555 Retirement and Estate Planning
* FIN 540 Sustainable Finance

**Certified Financial Planner**

* FIN 555 Retirement and Estate Planning
* FIN 550 Financial Planning and Risk Management
* FIN 565 Financial Plan Development
* FIN 560 Federal Taxation of Individuals

**Capstone experience**

The capstone consulting experience at Stevens ensure you are able to apply your new skills in tacking a real industry problem for a partner company. Working with a team of students, under the guidance of a faculty advisor, you'll meet with managers in the finance industry to frame a finance problem, then devise and present a formal solution to leadership. The capstone consists of two courses:

* MGT 808 Consulting Training Course (not for credit)
* MGT 809 Industry Capstone Experience

# CURRICULUM CHANGES - Influenced by AOL

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| **1** | **Goal 1 of the MFIN program: Students can communicate effectively in written and oral presentations** influenced the decision to encourage faculty teaching in the program to emphasize project presentations in their courses. In **FIN 627 – Investment Management**, **FIN 628 – Derivatives**, and **FIN 658 –** **Wealth Management** the relative weight of project presentations increased as a percentage of the final grade to encourage students to consciously improve their communication & presentation skills |
| **2** | **Goal 2 of the MFIN program: Students can interact effectively in teams** prompted us to design our team-based projects to ensure that students not only get technical skills but also leadership and teamwork skills. The class project teams in **FIN 627** and **FIN 628** were extensively coached to work well together in teams, and the role of the team captain was highlighted. There were two meetings with the teams and the instructor during the semester, and students were encouraged to come forward with teamwork and leadership issues, which were then addressed through open discussion and most often resolved before the end of the semester. |
| **3** | **Goal 3 of the MFIN program: Students will achieve mastery of the technical and basic quantitative methods required for the Finance domain** guided our hiring of instructors with on-the-job expertise in the quantitative methods used in Finance, who could effectively transmit this knowledge to students. **FIN 629 – Corporate Finance**, **FIN 627 – Investment Management**, **FIN 638 – Corporate Finance**, and **MGT 700 – Econometrics** had the benefit of being offered under these instructors in the last academic year. |
| **4** | **Goal 4 of the MFIN program: Students are able to implement financial solutions to improve the performance of financial or non-financial businesses** informed guidance to faculty encouraging practical application through case studies, projects, and experiential learning, which have been made part of courses. |

# STRUCTURAL CHANGES – Influenced by Advisory Board, Alumni, market needs, etc.

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| 1 | Emphasized the Ethics component. Made use of the CFA Institute’s Ethics resources in the **FIN 627 –** **Investment Management**, **FIN 628 – Derivatives**, and **FIN 658 – Wealth Management** |
| 2 | Introduced a new elective course: **FIN 640 – Renewable Energy Finance** |

Direct and Indirect measurements helped us improve teamwork skills. Instructors provide the direct measurements and industry practitioners who observe team project presentations provide feedback as a means of indirect measurements. To further work on and improve this, we encourage expansion of team membership. For example, teams now have a maximum of five members, up from four last year, in core courses that offer a class project. This makes team dynamics more complex, and require better teamwork.

# 10.MS Financial Engineering (FE) - Significant Changes Related to AoL Assessment Process

**Masters of Science in Financial Engineering (FE)**

**Top Significant changes made to this program driven by Assurance of Learning. Also includes structural changes influenced by input from advisory board, alumni, market need, etc.**

**INTRODUCTION AND OVERVIEW OF MS FINANCIAL ENGINEERING**

# CURRICULUM CHANGES - Influenced by AOL

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| **1** | FE 800 projects come from a diverse group now: BofA Wealth Management, BofA Trading, Jefferies, etc. – that helps give students skills to solve problems in the industry |
| **2** | Emphasis on teamwork in class projects |
| **3** | Expanded the set of electives, i.e., reintroduced FE 571 – Quant HF strategies, taught by an accomplished BofA MD, and also all our FinTech offerings, i.e., FA 691+FA 692 (=FA 690), and the blockchain course taught by Bakrac |
| **4** | revamped FE 529 informed by the industry need for Deep Leaning skills and fast GPU computations |

# STRUCTURAL CHANGES – Influenced by Advisory Board, Alumni, market needs, etc.

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| 1 | Created course coordinators to maintain consistency for multiple sections with different instructors |

# 11.MS Financial Analytics (FA) - Significant Changes Related to AoL Assessment Process (MS Financial Technology and Analytics from Spring 2024).

**We have modified the name of the program from Master of Science in Financial Analytics (MSFA) to Master of Science in Financial Technology and Analytics (MSFTA). This change is to become effective in Spring 2024.**

**The reason for the change is to capture the essence of the FinTech spine that permeates through the entire program. We had a certificate in FinTech and after careful deliberation and feedback from alumni and faculty decided that merging the two programs is better than creating a whole new Masters’ degree.**

**INTRODUCTION AND OVERVIEW OF MS FINANCIAL ANALYTICS**

The MS in Financial Technology and Analytics program is designed for science, technology, engineering, and math (STEM) students who are pursuing careers in the financial industry. The program focuses on recent development in financial services from fundamental data processing to machine learning, decentralized finance, and fintech. Targeting on broader financial services and financial technology industry, program graduates are expected to be able to handle complex financial data, build advanced analytical models, deliver effective visualization product, and utilize cloud-based data-driven analytics technology.

# CURRICULUM CHANGES - Influenced by AOL

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| **1** | Changed requirements to multiple courses to better streamline the flow of students with various backgrounds. |
| **2** | Introduced several new courses:  FA 591 Blockchain Technologies & Decentralized Finance  FA596 Digital Payment Technologies and Trends  Created two new 1.5 credit courses:  FA 691 Deep Learning for Finance  FA 692 Natural Language Processing for Financial Applications.  These courses count as satisfying the degree requirements for the 3-credit course: FA 690 Machine Learning in Finance. The new courses encapsulate the essence of the material taught in FA 690 much better. They are interchangeable from the pedagogical perspective. |

# STRUCTURAL CHANGES – Influenced by Advisory Board, Alumni, market needs, etc.

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| 1 | We removed the former concentrations in the program and introduced two new concentrations. The students are required to choose one of the two concentrations in their first semester.  The common core courses (required for everyone in the FTA):  FA 582 Foundations of Financial Data Science  FE 513 Lab: Practical Aspects of Database Design  FA 590 Statistical Learning in Finance  FA 800 Special Projects in Financial Technology and Analytics  The Financial Technology core courses (required for FinTech concentration):  FA 595 Financial Technology (FinTech)  FA 591 Blockchain Technologies & Decentralized Finance  FA 596 Payment Systems, FinTech, and Future Payment Trends    The Financial Data Science stream (required for the Data Science concentration)  FA 541 Applied Statistics with Applications in Finance  FE 535 Introduction to Financial Risk Management  FA 542 Time Series with Applications to Finance  This way the FTA students have much more liberty with electives to customize the degree to suit their target positions. |

**During each of the fall and spring semesters we organized an alumni meeting with all the current students and we used the opportunity to gather feedback about the program.**

# PHD Programs- Significant Changes Related to AoL Assessment Process

**Doctor of Philosophy in Business Administration**

Key modifications to this program, guided by Assurance of Learning, encompass noteworthy alterations to its structure, incorporating adjustments prompted by input from the advisory board, alumni, market requirements, and other relevant factors.

**INTRODUCTION AND OVERVIEW OF DOCTOR OF BUSINESS ADMINISTRATION**

The Business Administration Ph.D. program offered by the SSB readies students to become diligent and reflective researchers capable of creatively applying technology and quantitative methods to craft innovative solutions and formulate novel mathematical models for tasks like asset pricing, risk management, and portfolio optimization. This doctoral program revolves around the School of Business faculty's three key research areas: Finance, Information System and Analytics, and Entrepreneurship and Innovation Management. Upon program completion, students will possess the readiness to lead research endeavors within academia and institutions.

The current set of Assurance of Learning (AoL) objectives within the Doctorate program mirrors the school's aspiration to empower students to conduct advanced research and effectively communicate their findings to a broader audience. The curriculum undergoes adaptations to remain aligned with current research methodologies and practical usability. Students are actively encouraged to refine their public speaking capabilities and showcase their research at both internal and external research seminars.

Program goals, as related to Assurance of Learning:

*1.* ***Goal 1***. Students are proficient in articulating ideas coherently through written and spoken presentations, and they excel in organizing research papers.

1. ***Goal 2****.* Graduates of the Ph.D. program attain expertise in the fundamental knowledge and research methodologies relevant to their primary area of study.
2. ***Goal 3***. Ph.D. students demonstrate capacity to identify and develop a research project for their dissertation in a timely fashion and effectively disseminate knowledge through classroom teaching.

**CURRICULUM CHANGES - Influenced by AOL**

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| **1** | We have amplified the program's responsiveness to feedback, encompassing contributions from students as well as perspectives from both academia and industry. With an academic lens, we've enriched the program's global perspective by incorporating global economic issues in tandem with those particular to the United States. Furthermore, we've cultivated stronger interdisciplinary unity within the curriculum by guaranteeing that every student interacts with fundamental management principles through a course like MGT 712 (adjusted based on additional feedback), and acquires insights into the realm of information system technology via MIS 735 (adapted based on further feedback). |
| **2** | We introduced the following two new courses last year. We took student feedback and improved the deliverables of these two courses:   * MGT 712 Survey of Management and Organization Theories * FIN 735 The Perspective on Technology Management |
| **3** | Last year, we effectively orchestrated a "brown bag" seminar series tailored for our third- and fourth-year PhD students, and we expanded the scope of this series to encompass second year students as well. During these seminars, students deliver presentations on their research, elucidating its pertinence to their specific field of study and underlining its significance in addressing tangible real-world challenges. We extend invitations to experts from within the discipline, the institution, and beyond, with the aim of sharing knowledge across a wider community of researchers and practitioners. |
| **4** | We encouraged and provided resources to our students, urging them to take the opportunity to present their research findings at both local and international conferences and workshops. Our primary objective behind this encouragement was to facilitate the dissemination of the unique and innovative aspects of their research. By participating in these academic events, our students not only had the chance to exhibit their original ideas and discoveries but also contributed to the broader scholarly community by allowing others to gain insights and practical applications from their research endeavors. This collaborative exchange of knowledge not only enriched the academic discourse but also fostered a culture of mutual learning and advancement in their respective fields of study. |

**STRUCTURAL CHANGES – Influenced by Advisory Board, Alumni, market needs, etc.**

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| 1 | We have formed sub-committees of advisory board where PhD students also take part and opt-in cutting edge research ideas from top-notch practitioners. (Learning from the public). |

The students are interacting with the business community much more than they used to do before. This helps them to get feedback on how practitioner think, what problems they are facing and allow them to use the feedback to design the research projects.

The students are communicating to the business community and able to enhance their knowledge about the logic and techniques of solving various business problems.

We encourage our students to participate in international conference to understand the global perspective on certain business problems, rather than restricting them to the domestic issues.

**Doctor of Philosophy in Financial Engineering**

Top Significant changes made to this program driven by Assurance of Learning. Also includes structural changes influenced by input from advisory board, alumni, market need, etc.

**INTRODUCTION AND OVERVIEW OF PHD FE DEGREE**

The Financial Engineering Ph.D. program is a rigorous academic endeavor aimed at equipping students to embark on careers as future researchers within the realm of financial engineering and its interconnected fields. This program is a unique fusion of science and engineering principles situated within the context of a business school. Its distinctiveness lies in its focal point on cultivating students into pioneering researchers who approach the emerging challenges within the financial landscape with a profound problem-solving orientation.

Structured around six pivotal realms of research, the doctoral program delves into algorithmic and high-frequency trading, asset pricing and behavioral finance, portfolio optimization, systemic risk, mathematical finance, and financial analytics and innovation.

Beginning from 2017, the program has diligently embraced robust assurance of learning processes. This initiative has led to the establishment of three primary objectives:

**CURRICULUM CHANGES - Influenced by AOL**

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| **1** | Guided by the aspirations of Assurance of Learning goal #1, we have introduced assessment forms during our regular weekly Ph.D. colloquium sessions. During these sessions, Ph.D. students present their ongoing research, and their faculty advisors meticulously evaluate their proficiency in communicating their research orally. |
| **2** | In alignment with the objectives outlined in Assurance of Learning goal #2, we have instituted a comprehensive Ph.D. preliminary examination, which takes place at the culmination of the first year and the commencement of the second year of the Ph.D. program. The intention behind this examination is to ascertain that students have acquired a firm grasp of essential foundational knowledge before progressing to the subsequent stages of their research journey. This strategic initiative has been implemented to guarantee the students' preparedness, ultimately enabling them to achieve their degree within the anticipated timeframe. |
| **3** | Guided by the imperatives set forth in Assurance of Learning goal #3, we have undertaken the approach of appointing senior Ph.D. students in their final year to independently lead and instruct at least one course. This strategic decision is designed to enhance their competencies in teaching and communication, ultimately equipping them with the requisite skills for their forthcoming careers in academia. |
| **4** | We create a supportive environment for our students, providing resources and motivation for them to share their research at local and international conferences and workshops. Our goal is to widely disseminate their innovative findings. Participating actively in these events allows our students to present their unique ideas and contribute to the broader scholarly community. This knowledge exchange enhances academic discussions and fosters mutual learning and progress within their fields. |

**STRUCTURAL CHANGES – Influenced by Advisory Board, Alumni, market needs, etc.**

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| 1 | Using AOL, we support and fund final-year PhD students to attend and present their research at significant conferences in their field. This serves as an indirect measure of their oral communication skills. Moreover, passing the qualification exam mandates PhD students to present at least once during the weekly PhD colloquium. We track and document the number of oral presentations delivered by each student. |
| 2 | Using AOL, we track the quantity of working papers, publications, and referred conference papers for qualified PhD students. Additionally, we gauge their progress indirectly by surveying the topics covered in the PhD colloquiums, which helps assess the extent of their knowledge and advancements. |

**Doctor of Philosophy in Data Science**

Top Significant changes made to this program driven by Assurance of Learning. Also includes structural changes influenced by input from advisory board, alumni, market need, etc.

**INTRODUCTION AND OVERVIEW OF DOCTOR OF DATA SCIENCE**

The Doctor of Data Science program offers an advanced and comprehensive educational experience designed to equip students with the expertise and skills needed to excel in the rapidly evolving field of data science. This program is structured to provide a deep understanding of data analysis, interpretation, and utilization across diverse industries and domains.

Students enrolled in the Doctor of Data Science program will embark on an immersive journey of learning, research, and practical application. The curriculum encompasses a blend of rigorous coursework, hands-on projects, and collaborative research opportunities. By delving into topics such as machine learning, data mining, statistical analysis, and data visualization, students will gain a robust foundation in both foundational theories and cutting-edge techniques.

The program places a strong emphasis on research and innovation. Students will have the chance to work closely with esteemed faculty members who are leaders in the field of data science. This collaboration enables students to engage in groundbreaking research projects, contributing to the advancement of knowledge in areas such as predictive modeling, artificial intelligence, and big data analytics.

Furthermore, the Doctor of Data Science program fosters a dynamic learning environment through industry partnerships, guest lectures, and real-world projects. This exposure ensures that students are well-prepared to address complex challenges faced by industries today. Graduates of the program will possess the critical skills necessary to make data-driven decisions, transform businesses through insights, and drive innovation in a data-centric world.

# CURRICULUM CHANGES - Influenced by AOL

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| **1** | We adeptly coordinated a seminar series known as the "brown bag" sessions, designed especially for our Data Science PhD students in their third and fourth years of study. In these engaging research seminars, students take the podium to present their ongoing research endeavors, highlighting how their work directly relates to their chosen field of study and emphasizing its profound relevance in tackling practical, real-world issues. To enrich these sessions, we extend invitations to experts hailing from both our academic discipline and beyond, fostering a diverse exchange of insights and ideas. The overarching objective is to facilitate the dissemination of knowledge across a broader spectrum of researchers and practitioners, thereby cultivating a dynamic learning and networking environment. |
| **2** | We fostered a supportive environment for our students, equipping them with the necessary resources and motivation to seize the opportunity and showcase their research findings at both local and international conferences and workshops. Our principal aim in providing this encouragement was to facilitate the widespread dissemination of the distinctive and inventive elements of their research.  Through active participation in these academic gatherings, our students not only had the platform to present their original concepts and discoveries but also made significant contributions to the broader scholarly community. By sharing their work, they enabled fellow researchers to gain valuable insights and practical applications from their research undertakings. This collaborative exchange of knowledge not only enhanced the depth of academic discourse but also nurtured a culture of reciprocal learning and progress within their respective fields of study. |
| **3** | We organized a “Ph.D. Showcase Day” for Data Science Ph.D. students where we area-expert faculty members give feedback on the research question and also on the ethical component of the research. Data used in research may be biased, leading to biased models and results. If these biased models are used to make decisions that affect individuals’ lives, it can result in unjust outcomes and reinforce existing inequalities. Algorithms and models developed in data science might inadvertently discriminate against certain groups due to biases present in the data. This can perpetuate systemic discrimination and exacerbate societal disparities. |

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