Stevens Institute of Technology School of Business

**AACSB**

**ASSURANCE OF LEARNING PLAN**

Master of Science in Business Intelligence and Analytics

(BI&A)

November 29, 2023

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# INTRODUCTION: BI&A ASSURANCE OF LEARNING PLAN

**BI&A Program Competencies**

The Competency Goals for the BI&A program are listed in Table 1. The Core Goals 1 through 4 are assessed by direct measures as described below. Competency Goals BIA-1 and BIA-2 are common to all School of Business Programs. Competency Goal BIA–3 is a comprehensive exam assessing disciplinary knowledge prior to students’ participation in the required practicum course BIA 686 Applied Analytics in a World of Big Data. Goal BIA–4 tests higher-level cognitive abilities that are important for success in data analytics and is assessed in the required course MIS 631.

Indirect goals 5 and 6 are assessed in an annual survey of graduating students conducted in May each year. The survey is listed in APPENDIX B below.

**Table 1: MS in Business Intelligence and Analytics Competencies**

|  |
| --- |
| **Core Competencies (direct measures)** |
| BIA-1: Students can communicate effectively in written and oral presentations. |
| BIA-2: Students can interact effectively in teams. |
| BIA-3: Students understand and can apply a broad range of business analytic techniques. |
| BIA-4: Students can find and deploy business solutions based on analyses of large and heterogeneous data sets. |
| **Indirect Goals** |
| BIA-5: Quality of the BI&A Program |
| BIA-6: Professional Development |

Note that goals 5 and 6 do not address student competencies per se. Rather, they are aimed at discovering student satisfaction with the BI&A program (curriculum, faculty, etc.) and how the services provided by the school and program help them develop professionally. The measures for these two goals are embedded in a survey that also asks students to respond on many aspects of the program and student experience (see Appendix B below.) This survey provides information for a broad range of continuous improvement opportunities.

1. **BI&A ASSURANCE OF LEARNING ASSESSMENT PLAN**

**Table 2: BI&A ASSURANCE OF LEARNING ASSESSMENT PLAN – COMPETENCY GOALS 1 – 4**

|  |  |  |  |
| --- | --- | --- | --- |
| **COMPETENCY** | **Where and when measured?** | **How measured?** | **Criterion** |
| 1. Students will communicate effectively in oral and written presentations. [Stohr] |  | Student presentations are video taped; student essays are assessed by professionals in CAL. Feedback is provided to each individual student. Sampling: All students in the BI&A program are assessed. | For both the oral and written test, 80% of students must receive a grade of “A” or “B”.  Students receiving “C” or “D” grades are required to take online remedial  training. |
| 2. Students will be able to interact effectively in teams. [Gomez] | Assessed in the fall and spring semesters in required course  *BIA 658 Social Analytics.* | Team performance questionnaires are administered online at beginning and end of semester.  Sampling: All students in the BI&A program are assessed. | 85% of the students get a grade of GOOD or better on the final project as measured by the rubric for this Competency. |
| 3. Students understand and can apply a broad range of business analytic techniques including optimization, conceptual data modeling, data warehousing and data mining. [Asakiewicz] | A comprehensive exam comprising short questions from prior BI&A courses is administered at the beginning of each practicum course. This exam is now an automated multi-choice exam. | Questions submitted by each course owner are graded and results tallied. Sampling: All students in the BI&A program are assessed. | 85% of students get a grade of GOOD or better on the final project as measured by the rubric for this Competency. |
| 4. Students can *find* and deploy business solutions based on analyses of large and heterogeneous data sets. [Morabito]  . | Course-embedded assignment and project in required course *MIS 631/632 BI and Data Integration A*ssessed in the fall and spring semester each year. | Description: assignments and project are graded by course owners and aggregated to obtain a total score.  Sampling: All students in the BI&A program are assessed. | 85% of students get a grade of GOOD or better as measured by the rubric for this Competency |
| 5. Quality of the BI&A Program  [Stohr] | Indirect assessment. | An exit survey of graduating students  conducted in May each Year. | Average score on a 5-point scale is greater than 4.0 |
| 6. Professional Development  [Stohr] | Indirect assessment. | An exit survey of graduating students conducted in May each Year. | Average score on a 5-point scale is greater than 4.0 |

# BI&A CURRICULUM ALIGNMENT MAP

**Table 3: BI&A Curriculum Alignment Map – Goals 1 Through 4**

Courses/exercises used in the assessment of each goal are shown in bold.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Goals/** | **1: Students can** | **2: Students can** | **3: Students** | **4: Students can** |
| **Required** | **communicate** | **interact** | **understand and** | *find* **and deploy** |
| **BI&A** | **effectively in oral** | **effectively in** | **can apply a broad** | **business solutions** |
| **Courses** | **and written** | **teams** | **range of business** | **based on analyses** |
|  | **presentations.** |  | **analytic** | **of large and** |
|  |  |  | **techniques** | **heterogeneous** |
|  |  |  | **including**  **optimization,** | **data sets.** |
|  |  |  | **conceptual data** |  |
|  |  |  | **modeling, data** |  |
|  |  |  | **warehousing and** |  |
|  |  |  | **mining.** |  |
| MIS | Student team | Students work in | Students are |  |
| 631/632 | presentations | teams on database | required to create |
| Data | are graded. | project. | conceptual and |
| Manageme |  |  | logical data |
| nt |  |  | models. Students |
|  |  |  | are also required to |
|  |  |  | design relational |
|  |  |  | databases. |
| MIS | Student team presentations are graded. | Students work in | Students are |  |
| 633/634 | teams on data | required to design |
| Business | warehouse project. | an entire data |
| Intelligence |  | warehouse and |
| & Data |  | business |
| Integration |  | intelligence |
|  |  | system, including |
|  |  | dimensional |
|  |  | models, transform |
|  |  | rules, data |
|  |  | visualization, etc. |
| MIS 637 | Lead deployment | Utilize the | Determine proper | Mine identified |
| Data | of results enabling | corporate | knowledge | data sets and |
| Analytics | intelligent business | resources, | discovery | discover models, |
| & Machine | & operations | expertise, subject | algorithm(s) (data | patterns, |
| Learning | decisions, Present, | matter experts, and | mining | dependencies that |
|  | Communicate, and | systems to Access | technique(s)), | will enable |
|  | document the | the data, and work | Identify (and or | predictions and |
|  | result; Input the | with data owners | develop) software | intelligent business |
|  | extracted | to Define, | to execute the | and operations |
|  | knowledge to the | Describe, and | specified | decisions. |
|  | next iterative | clearly state | algorithm(s)/data |  |
|  | steps. | profound non- | mining |  |
|  |  | trivial business | technique(s). |  |
|  |  | and/or operations |  |  |
|  |  | questions. |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Goals/** | **1: Students can** | **2: Students can** | **3: Students** | **4: Students can** |
| **Required** | **communicate** | **interact** | **understand and** | *find* **and deploy** |
| **BI&A** | **effectively in oral** | **effectively in** | **can apply a broad** | **business solutions** |
| **Courses** | **and written** | **teams** | **range of business** | **based on analyses** |
|  | **presentations.** |  | **analytic** | **of large and** |
|  |  |  | **techniques** | **heterogeneous** |
|  |  |  | **including**  **optimization,** | **data sets.** |
|  |  |  | **conceptual data** |  |
|  |  |  | **modeling, data** |  |
|  |  |  | **warehousing and** |  |
|  |  |  | **mining.** |  |
| BIA 650 | **ASSESSMENT:** |  | Each week, | While the datasets |
| Optimizatio | A3-page project | students solve | may not be large, |
| n and | proposal paper is | homework | students are |
| Process | submitted to | problems using a | required to use a |
| Analytics | writing experts in | different | technique from the |
|  | the College of Arts | operations | course to analyze |
|  | and Letters via the | research technique | the data they have |
|  | Mgt 898 Writing | such as linear, | acquired for their |
|  | Assessment online | non-linear and | term project, |
|  | shell. Annotated | integer | prepare a term |
|  | copies of the | programming, | paper and present |
|  | essays are returned | simulation and | their solution to |
|  | to students. | genetic algorithms. | the class. |
|  | Students who fail |  |  |
|  | this assessment are |  |  |
|  | required to take |  |  |
|  | MGT 897 Online |  |  |
|  | Writing Tutorial. |  |  |
|  | Oral skills: |  |  |
|  | Individual student |  |  |
|  | presentations are |  |  |
|  | videotaped and |  |  |
|  | critiqued. |  |  |
| BIA 652 | Students complete | Students work on | Students analyze | Students collect |
| Multivariat | a final project, | their project in | the data they | data and apply |
| e Data | which is graded | teams and present | collect to answer | multivariate |
| Analytics | based on a 10-20 | the project orally | their research | analysis |
|  | minutes oral | as teams. | question. The | techniques to |
|  | presentation to | However, each | analysis involves | answer their |
|  | class and a 1000 to | individual writes | applying | research question. |
|  | 2000 words term | his or her own | multivariate | In their term paper |
|  | paper. | term paper. | analyses to find | and oral |
|  |  |  | structures in data. | presentation, |
|  |  |  |  | students will |
|  |  |  |  | visualize and |
|  |  |  |  | interpret the |
|  |  |  |  | results, and |
|  |  |  |  | provide business |
|  |  |  |  | recommendations |
|  |  |  |  | based on their |
|  |  |  |  | results. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Goals/** | **1: Students can** | **2: Students can** | **3: Students** | **4: Students can** |
| **Required** | **communicate** | **interact** | **understand and** | *find* **and deploy** |
| **BI&A** | **effectively in oral** | **effectively in** | **can apply a broad** | **business solutions** |
| **Courses** | **and written** | **teams** | **range of business** | **based on analyses** |
|  | **presentations.** |  | **analytic** | **of large and** |
|  |  |  | **techniques** | **heterogeneous** |
|  |  |  | **including**  **optimization,** | **data sets.** |
|  |  |  | **conceptual data** |  |
|  |  |  | **modeling, data** |  |
|  |  |  | **warehousing and** |  |
|  |  |  | **mining.** |  |
| BIA 654 | Students complete | Students work on |  | Students conduct |
| Experiment | a final project, | their project in | an experiment to |
| al Design | which is graded | teams and present | answer their |
|  | based on a 10-20 | the project orally | research question. |
|  | minutes oral | as teams. | In their term paper |
|  | presentation to | However, each | and oral |
|  | class and a 1000 to | individual writes | presentation, |
|  | 2000 words term | his or her own | students will |
|  | paper. | term paper. | communicate the |
|  |  |  | results and provide |
|  |  |  | business |
|  |  |  | recommendations |
|  |  |  | based on their |
|  |  |  | results. |
| BIA 656 | Final project report | Students should | Students solve | Students will solve |
| Advanced | should be | conduct a final | forecasting | exercises and |
| Data | appropriately | group project in | problems related to | develop group |
| Analytics | written for either | which they apply | main time series | projects where |
| & Machine | an academic | one or several of | (ARMA) and | they will use large |
| Learning | audience | the algorithms | machine learning | databases, such as |
|  | (conference | explored in class | methods (boosting, | high frequency |
|  | format) or a | to solve a main | support vector | financial data, to |
|  | corporate | business problem. | machine, | forecast corporate |
|  | environment |  | Markovian | performance. |
|  | (consulting |  | models, etc.) |  |
|  | format). |  |  |  |
| BIA 658 | Students complete | Students work on | Students analyze | Students collect |
| Social | a final project, | their project in | the social network | and analyze social |
| Network | which is graded | teams and present | data they collect to | network data to |
| Analytics | based on a 10-20 | the project orally | answer their | answer their |
|  | minutes oral | as teams. | research question. | research question. |
|  | presentation to | However, each | The analysis | In their term paper |
|  | class and a 1000 to | individual writes | involves applying | and oral |
|  | 2000 words term | his or her own | social network | presentation, |
|  | paper. | term paper. | analysis | students will |
|  |  |  | techniques and | communicate their |
|  |  |  | modeling network | interpretation of |
|  |  |  | growth to find | the results and |
|  |  |  | structures in data. | provide business |
|  |  |  |  | recommendations |
|  |  |  |  | based on their |
|  |  |  |  | results. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Goals/ Required BI&A**  **Courses** | **1: Students can communicate effectively in oral and written presentations.** | **2: Students can interact effectively in teams** | **3: Students understand and can apply a broad range of business analytic techniques including optimization, conceptual data modeling, data warehousing and**  **mining.** | **4: Students can** *find* **and deploy business solutions based on analyses of large and heterogeneous data sets.** |
| BIA 660  Web Mining | Final projects require students to either write a scientific report of an analysis answering a question relevant to science or business or present a demo of a web application they  built. | **ASSESSMENT:**  Students use an automated survey to rate themselves and others on effective team performance. They complete pre- and post-assessments administered at the beginning and end  of the course. | Students will be applying many different analytic techniques acquired through the program to web data | Students will develop final projects using web data either to create a new service for customers or to answer a  (business-relevant) question of interest. |
| BIA 667  Deep Learning & Application s | Students work in a team on a class project and develop a proposal, progress update(s), final report and a final in-class presentation. Stude nts use this project to develop skills required for the entire pipeline of developing deep  learning solutions. | Students will work in a team on a class project and will develop a proposal, progress update(s), final report and a final in-class presentation. | Students are able to understand basic deep learning models constructs and their mathematical foundations, assess model performance, and explain and interpret model outcomes. | Students gain hands-on experience of applying deep learning models to solve real business problems. |
| BIA 668  Manageme nt of AI Technologi es | Students work in a team on a class project and develop a proposal, progress update(s), final report and a final in-class presentation. | Students will work in a team on a class project and will develop a proposal, progress update(s), final report and a final in-class presentation. | Students are able to Manage the performance of an AI system and monitor its ongoing effectiveness.  Assess AI systems along dimensions of fairness, accountability, transparency, ethics, and the law. | Students gain hands-on experience of Manage AI/ML projects. Assess AI systems along dimensions of fairness, accountability, transparency, ethics, and the law. Develop a strategy for deployment of AI solutions within an organization |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Goals/ Required BI&A**  **Courses** | **1: Students can communicate effectively in oral and written presentations.** | **2: Students can interact effectively in teams** | **3: Students understand and can apply a broad range of business analytic techniques including optimization, conceptual data modeling, data warehousing and**  **mining.** | **4: Students can** *find* **and deploy business solutions based on analyses of large and heterogeneous data sets.** |
| BIA 670  Risk Manageme nt & Simulation |  |  | Students learn optimal algorithms to recognize patters in financial data and build profitable trading strategies. | Students develop their own algorithmic trading systems using large and heterogeneous databases and present a prototype of their solutions to the rest of the  class. |
| BIA 672  Marketing Analytics | Students write case analysis reports for every case and present two cases in front of the class. | All the case analyses, written as well as presentations, will be done by students in groups. |  | The emphasis of the case analysis is not only on analyzing the data but also translating the findings into actionable strategies and  business solutions. |
| BIA 674  Supply Chain Analytics | Students complete a final project, which is graded based on a 10-20 minutes oral presentation to the class and a term paper. | Students work on their final projects in teams. They prepare a report (term paper) and present the project orally as teams. | Students learn how to apply advanced analytic techniques, including mathematical modeling, predictive and prescriptive analytics, for addressing complex operations and supply chain management  problems. |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Goals/ Required BI&A**  **Courses** | **1: Students can communicate effectively in oral and written presentations.** | **2: Students can interact effectively in teams** | **3: Students understand and can apply a broad range of business analytic techniques including optimization, conceptual data modeling, data warehousing and**  **mining.** | **4: Students can** *find* **and deploy business solutions based on analyses of large and heterogeneous data sets.** |
| BIA 676  Data Streams: The Internet of Things | Students will engage in lectures through conducting literature research, writing and presenting a “survey paper" on  emerging topics. | Students will work in a team for Survey Paper as well as subject matter experts to access, clean the data | Understand and be able to execute new emerging analytics specific to streaming data | Extract knowledge and intelligence from data streams which exhibit high volume, velocity, and/or variety for real time business decisions. |
| BIA 678–  Big Data Seminar | Students take part in semester long team projects ending with written and oral presentations | Students work in small teams on semester long project | Students will, as part of their projects, be required to use several of the tools of big data for data storage  and analysis. | The datasets will represent big data in terms of volume, velocity, and/or variety. |
| BIA 679–  Big Data Practicum | Students take part in semester long team projects ending with written and oral presentations | Students work in small teams on semester long project | This course builds on their previous studies in data engineering/data science/manageme nt, to train them to think critically about the process, tools, techniques, technologies, and governance for an entire data pipeline. | Students will work in small teams to analyze an industrial problem using real data, design a solution approach using data intensive tools/ techniques along with statistical and machine learning techniques, program and execute the solution, and interpret the  solution for management. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Goals/ Required BI&A**  **Courses** | **1: Students can communicate effectively in oral and written presentations.** | **2: Students can interact effectively in teams** | **3: Students understand and can apply a broad range of business analytic techniques including optimization, conceptual data modeling, data warehousing and**  **mining.** | **4: Students can** *find* **and deploy business solutions based on analyses of large and heterogeneous data sets.** |
| BIA 686  Practicum in Analytics | Students work on assignments associated with Descriptive, Predictive, and Prescriptive analytics giving them a “hands-on’ feel for how specific problems are solved using the concepts, principals, and methods they have learned. They communicate the results of an in- depth analysis to both a technical and management audience in a series of poster sessions. |  | **Assessment:** Students are assessed in the required course *BIA 686 Practicum in Analytics* on their ability to apply key concepts, principles, and methods to strategic business problems.  Questions submitted by each course owner are graded and results tallied.  Sampling: All students in the BI&A program are assessed. | Students must describe how they will address the key challenges associated with their chosen in- depth problem.  Students must describe the process they will follow as well as provide any associated planning documents (e.g., analysis plan, methodology, etc.). Students will present a poster outlining their project’s objectives, methodology, and results at the end of the course. |

**ETHICS**

|  |  |
| --- | --- |
| BIA 650 Process Analytics and Optimization | Students enrolled in BIA 650 are required to take Mgt 899 Online Ethics quiz for no credit. A lecture on ethics given in the course reinforces concepts on ethical reasoning that are presented in the quiz. |
| BIA 652 Multivariate Analytics | A portion of one lecture is devoted to discussion of a case study. In this case it is related to the use of Personally Identifiable Information (PII) for informal investigation purposes. |

# BI&A CORE COMPETENCIES - OBJECTIVES AND RUBRICS

**Table 4: BI&A Core Competencies, Objectives and Rubrics**

Note: Goals BIA–1 and BIA–2 are the same in all School of Business degree programs.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **BIA COMPETENCY GOAL-1: RUBRIC 1** | | | | | |
| **GOAL** | Our students will communicate effectively in writing and oral presentations. | | | | |
| **Objective 1** | *Students will be able to write effectively* | | | | |
|  | **Trait** | **Poor** | **Good** | **Excellent** | **Score** |
|  | **Value** | **0** | **5** | **10** |  |
| Trait 1: | Logical flow | Unclear introduction or conclusion. Does not use a sequence of material to lead reader through the paper.  Draws illogical conclusions | Develops ideas through effective use of paragraphs, transitions, opening & concluding statements.  Generally well structured to suggest connection between sub-topics. | Maintains clear focus, uses structure to build the paper's conclusions. Presents analysis using sequence of ideas, clarity of flow and continuous voice or point of view. |  |
| Trait 2: | Grammar and sentence structure | Frequently uses inappropriate grammar and incomplete or poorly structured sentences, Which interfere with comprehension. | Generally complies with standard English and grammar and sentence usage. | Sophisticated use of English language, using varied sentence structured, phrasing and cadence. Grammar is error-free |  |
| Trait 3: | Spelling and word choice | Frequent misspellings. Poor or limited choice of words for expression ideas. | Has proofread or checked spelling and uses vocabulary correctly. Minor errors. | Demonstrates good use of words to support written expression of topic. Spelling is error-free. |  |
| Trait 4: | Development of ideas | Many unsupported statements offered. Uses flawed or unclear reasoning. | Most statements supported, ideas explained with examples and written with sufficient explanation. | Shows thoughtful reasoning and explores alternatives. Uses existing supported ideas to develop well-formed, readable output. |  |

**Criterion: Does not meet expectations: 0–20; Meets: 21-40; Exceeds: 41-50**

**Table 4: BI&A Core Competencies, Objectives and Rubrics (continued)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **BIA COMPETENCY GOAL-1: RUBRIC 2** | | | | | |
| **GOAL** | Students will communicate effectively in written and oral presentations. | | | | |
| **Objective 2** | *Students can deliver presentations effectively.* | | | | |
|  | **Trait** | **Poor** | **Good** | **Excellent** | **Score** |
|  | **Value** | **0** | **5** | **10** |  |
| Trait 1: | Organization and logic | Fails to introduce topic, no evidence of or poor logical flow of topic, does not manage time. | Prepares listeners for sequence and flow of topic. Loses place occasionally. Maintains pace, without need to rush. | Engages listeners with overview, guides listeners through connections between sections, uses time to good effect. |  |
| Trait 2: | Voice and body language | Cannot be heard well due to volume, mumbling, speed, rote delivery, heavily accented English. Turns away from audience or uses distracting gestures, such as scratching or  tugging clothing. | Clear delivery with well- modulated voice and self- carriage. | Exemplary delivery, using voice and gestures as part of medium. Uses vocal and physical resources to aid in communicating topic. |  |
| Trait 3: | Use of slides to enhance communications | Misspelled, too busy, too many slides for allotted time, poor use of graphics like charts. | Readable, containing reasonable amount of material per slide, good use of graphics or illustrations | Well written and designed, used as support to verbal content presentation. |  |
| Trait 4: | Ability to answer questions | Does not answer questions that are asked | Responds to questions well and provides sufficient response | Responds convincingly and addresses all aspects of question. Knows own material thoroughly. |  |
| Trait 5: | Content | Does not satisfy assignment requirements. Misuses theory or selects poor examples. | Provides good analysis of subject, satisfying intent of assignment and demonstrating knowledge. | Shows evidence of strong research and highly competent use of analyses to reach conclusions and recommendations. |  |

**Criterion: Does not meet expectations: 0 – 20; Meets: 21-40; Exceeds: 41-50**

**Table 4: BI&A Core Competencies, Objectives and Rubrics (continued)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **BI&A COMPETENCY GOAL – 2: RUBRIC 1** | | | | |
| **BIA 2** | **Students can interact effectively in teams.** | | | |
| **Students score themselves and other students in their team from 0 to 5 on each of the following traits.** | | | | |
| **Team Leadership** | | **0-3** | **3.1-4** | **4.1-5** |
| 1. Anticipates problems and develops contingency plans | |  |  |  |
| 2. Recognizes interrelationships among problems and issues | |  |  |  |
| 3. Suggests new approaches to solving problems | |  |  |  |
| 4. Organizes information into meaningful categories | |  |  |  |
| 5. Helps others to draw conclusions from the facts | |  |  |  |
| 6. Defines task priorities for work sessions and or overall projects | |  |  |  |
| 7. Ensures that goals are understood by all | |  |  |  |
| 8. Clarifies roles and responsibilities of others | |  |  |  |
| 9. Reviews progress throughout work sessions/life of a project | |  |  |  |
| 10. Summarizes the team's position on issues | |  |  |  |
| **Objective 1 average** | |  |  |  |

**Measures: 0-3 Does not meet expectations; 3.1–4 Meets expectations; 4.1– 5 Exceeds expectations**

**An overall average greater then 4.0 across all measures is considered satisfactory.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **BI&A COMPETENCY – 2: RUBRIC 2** | | | | |
| **BIA 2** | **Students can interact effectively in teams.** | | | |
| **Students score themselves and other students in their team from 0 to 5 on each of the following traits.** | | | | |
| **Team Facilitation** | | | | |
| **Students score themselves and other students in their team from 0 to 5 on each of the following traits.** | | | | |
|  | | **0-3** | **3.1-4** | **4.1-5** |
| 11. Conveys interest in what others are saying | |  |  |  |
| 12. Encourages ideas and opinions even when they differ from his/her own | |  |  |  |
| 13. Works towards solutions and compromises that are acceptable to all involved | |  |  |  |
| 14. Shares credit for success with others | |  |  |  |
| 15. Cooperates with others | |  |  |  |
| 16. Encourages participation among all participants | |  |  |  |
| 17. Shares information with others | |  |  |  |
| 18. Reinforces the contributions of others | |  |  |  |
| 19. Involves others in decisions that affect them | |  |  |  |
| 20. Encourages others to express their views even when they are contrary to his/her own | |  |  |  |
| **Objective 2 Average** | |  |  |  |

**Measures: 0-3.0 Does not meet expectations; 3.1–4.0 Meets expectations; 4.1– 5.0 Exceeds expectations Goal: 85% of students meet or exceed expectations.**

**Table 4: BI&A Core Competencies, Objectives and Rubrics (continued)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **BI&A CORE COMPETENCY-3: RUBRIC** | | | |  | |
| **BIA 3** | **Students understand and can apply a broad range of business analytic techniques including optimization, conceptual data modeling, data warehousing and data mining.** | | | | | |
| **Objective 1** | *Students demonstrate disciplinary understanding of the key business analytic techniques and methods used in data management and data mining, process analytics and optimization, as well as multivariate analysis.* | | | | | |
|  | **Trait** | **Poor** | **Good** | **Excellent** | |  |
|  | **Value** | **0** | **5** | **10** | |  |
| Trait 1: | The student demonstrates an understanding of Data Management (MIS630) | Limited command of business analytic techniques used in this area | Good command of business analytic techniques used in this area | Strong command of business analytic techniques used in this area | |  |
| Trait 2: | The student demonstrates an understanding of Data Warehousing and Business Intelligence (MIS636) | Limited command of business analytic techniques used in this area | Good command of business analytic techniques used in this area | Strong command of business analytic techniques used in this area | |  |
| Trait 3: | The student demonstrates an understanding of Process Analytics and Optimization (BIA650) | Limited command of business analytic techniques used in this area | Good command of business analytic techniques used in this area | Strong command of business analytic techniques used in this area | |  |
| Trait 4: | The student demonstrates an understanding of Data Analytics & Machine Learning (MIS637) | Limited command of business analytic techniques used in this area | Good command of business analytic techniques used in this area | Strong command of business analytic techniques used in this area | |  |
| Trait 5: | The student demonstrates an understanding of Multivariate Data Analysis (BIA652) | Limited command of business analytic techniques used in this area | Good command of business analytic techniques used in this area | Strong command of business analytic techniques used in this area | |  |

**Criterion: Score below 25 is “below expectations”; between 25 and 40 is “meets expectations”; and greater than 40 is “exceeds expectations”.**

**Table 4: BI&A Core Competencies, Objectives and Rubrics (continued)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **BI&A CORE COMPETENCY 4: RUBRIC** | | | |
| **BIA4** | **Students can find and deploy business solutions based on analyses of large and heterogeneous data sets.** | | | |
| **Objective 1** | Students use analytical methods to find solutions for business problems that involve large and heterogeneous data sets | | | |
|  | **Trait** | **Poor** | **Good** | **Excellent** |
|  | **Value** | **0** | **5** | **10** |
| Trait 1: | Student identifies and understands time series methods involved in the analysis of large and heterogeneous data sets | Does not identify any time series method | Identifies one time series method | Identifies one or more appropriate time series methods |
| Trait 2: | Student identifies and understands machine learning methods involved in the analysis of large and heterogeneous data sets | Does not identify any machine learning method | Identifies one machine learning method | Identifies one or more appropriate machine learning methods |
| Trait 3: | Student adapts and/or applies time series and/or machine learning methods to analyze and identify solutions for business problems | Does not apply any method | Adapts and/or applies a method | Adapts and/or applies at least one relevant method |

**Criterion: Does not meet expectations: 0 – 14; Meets: 15-19; Exceeds: 20-30**

1. **INDIRECT GOALS – SURVEY MEASURES**

**Table 5: BI&A Indirect Goals**

|  |
| --- |
| **BI&A COMPETENCY GOAL-5: QUALITY OF THE BI&A PROGRAM** |
| **5-point Likert Scale:** 1. Poor 2. Fair Good 3. Good 4. Very good 5. Excellent |
| 1. Overall quality of BI&A program |
| 2. Quality of faculty who taught courses you took in program |
| 3. Accessibility of faculty when you needed advice or help with assignments |
| 4. Extent to which BI&A program has kept up with latest developments in analytics, data science and AI |
| 5. Academic standard of BI&A degree |
| 6. Relevance of program for your chosen career |
| 7. Practical signiﬁcance of what you learned in program |

**This goal is assessed using question 12 of the BI&A Exit Survey in APPENDIX B below.**

**An overall average greater than 4.0 across all measures is considered satisfactory.**

|  |
| --- |
| **BI&A COMPETENCY GOAL-6: PROFESSIONAL DEVELOPMENT** |
| **5-point Likert Scale:** 1 (Not Satisﬁed) 2 3 4 5 (Very Satisﬁed) |
| 1. Overall, how satisﬁed were you with the how the BI&A program improved your professional skills? |
| 2. How satisﬁed are you with the experiences provided by the BI&A student club? |
| 3. How satisﬁed are you with the career services provided by the School of Business (i.e., COPA)? |
| 4. How satisﬁed are you with the career services provided by the university? |
| Conditional on attendance:  **5-point Scale:** 1 Not useful 2 Somewhat useful 3 Useful 4 Very useful 5 Extremely useful |
| 5. How useful were the software bootcamps? |
| 6. How useful was the Professional Webinar Series? |

**This goal is assessed in question13, 15, 17, 18, 19 and 20 of the BI&A Exit Survey in APPENDIX B below.**

**An overall average greater than 4.0 across all measures is considered satisfactory.**

* 1. **TEMPLATE FOR RESULTS OF BI&A CORE COMPETENCY ASSESSMENTS**

**(direct measures)**

The results of the competency assessments carried out to date are included below.

**Explanation**

Each Core Competency has a number of learning objectives. Performance on each objective is measured using a rubric that in turn contains a number of desired “traits”. Students are scored individually on each trait.

The grading sheets for each student are used to develop a *Summary Results Sheet* for each Competency objective. A selection of these Summaries is included below.

The first table in the Summary Results Sheet for a learning objective and trait gives the counts of students falling in each of the three categories:

* Does not meet expectations
* Meets expectations
* Exceeds expectations

The right-hand column in the table is used to record the average score of the students on each trait. This table provides an indication of the relative performance of students on each trait.

The second table on each sheet provides the counts of students who fall in each of the above three categories for the overall learning objective.

The person doing the assessment provides explanatory comments and recommendations at the bottom of the Results Summary Sheet. The recommendations suggest content or pedagogy changes for the next time the course is given.

An example template for the Assessment of Competency 1 is shown on the following page.

**APPENDIX A**

**EXAMPLE TEMPLATE FOR RECORDING RESULTS**

**--------------------------------**

**RESULTS OF CORE COMPETENCY ASSESSMENT**

**PROGRAM: BI&A (Master of Science in Business Intelligence and Analytics) COMPETENCY #1: Our students will be effective communicators.**

**LEARNING OBJECTIVE # 2: Students will be able to deliver presentations effectively. ASSESSMENT DATE: ASSESSOR:**

**NO. OF STUDENTS TESTED: COURSE:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Number of Students** | | |  |
| **Competency Traits** | **Not Meet Expectat- ions** | **Meet Expectat**  **-ions** | **Exceed Expectat- ions** | **Avg. Grade on Trait** |
| **1: Organization and logic** |  |  |  |  |
| **2: Voice and body language** |  |  |  |  |
| **3: Use of slides to enhance communication** |  |  |  |  |
| **4: Ability to answer questions** |  |  |  |  |
| **5: Content** |  |  |  |  |
| **Average Grade (Maximum 10)** | | | |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Total Students by Category**  (Based on Average score across all traits) | **Not meet expectations** | **Meet Expectations** | **Exceed Expectations** |
|  |  |  |  |

**COMMENTS:**

**REMEDIAL ACTIONS:**

# APPENDIX B

**BI&A Graduate Exit Survey**

The BI&A Program conducts a *Graduate Exit Survey* at the end of the spring semester each year. The survey is sent to all BI&A students who have graduated in the prior academic year.

The objectives of the BI&A Graduate Exit survey are to:

* + 1. Collect data on the permanent contact information of each student to increase the effectiveness of our alumni outreach.
    2. Collect background information on students’ experiences in the program in terms of internships earned and events in which they participated.
    3. **To obtain feedback on the BI&A curriculum including the graduates’ assessment of individual courses. (Competency Goal 5.)**
    4. **Assess student opinion on the efficacy of ancillary services provided by the program such as software bootcamps, professional webinars and placement services. (Competency Goal 6.)**
    5. To collect information on how the curriculum and other aspects of the program can be improved.

The survey provides an assessment of the overall impact of the program in meeting its educational goals and providing a meaningful and enjoyable student experience.

Exit Survey | BI&A Program | 2023 May

**Dear BI&A Graduate,**

**Congratulations on your graduation from the BI&A program!**

**Please take a few minutes to complete this questionnaire. Your input will help us keep the program relevant and in the forefront of business analytics and data science programs nationally.**

**On behalf of the faculty and staﬀ of the BI&A program, best wishes for your future career. Stay in touch! We are always interested in your accomplishments!**

**Warm regards, Chris and Ted**

Personal Data

Exit Survey | BI&A Program | 2023 May

1. CWID
   * 2. Last Name, First Name (e.g., Smith, John)
   * 3. Permanent Contact Information

Stevens email Address:

Permanent email address (e.g., gmail) :

Mobile Phone Number:

LinkedIn Address:

1. Were you a full-time or part-time student?

 Full-time Part-time

1. Are you:

 Currently Employed?  Still looking for a job?

 Going back to your home country?

1. What concentration did you choose in the BI&A Program?

 Data Analytics  Data Science/AI  Big Data

 No speciﬁc concentration

1. How many months did it take to complete your MS degree? (e.g., 12, 15, 18 ,21, 24. )
2. Did you obtain an internship in industry while you were enrolled in the BI&A program? (For international students this means that you were enrolled in the BIA 702 CPT course for one or more semesters.)

 Yes  No

Prior Experience

Exit Survey | BI&A Program | 2023 May

1. What was your undergraduate degree major?

 Business Administration

 Management Information Systems

 Social Science (e.g., Economics, Psychology, Political Science )

 Computer Science, Computer Engineering.  Statistics, Mathematics

 Engineering (e.g., Civil Engineering, Mechanical, industrial, )

 Science (e.g., Physics, Chemistry , )

Other (please specify)

1. Did you earn a master's degree before entering the BI&A Program?

 MBA degree

 Other (please specify)

1. Were you employed in industry prior to joining the BI&A program? In each case, state the approximate number of months of employment

Number of months you were employed as an intern?

Number of months you were employed as a full-time employee?

Quality of BI&A Program

Exit Survey | BI&A Program | 2023 May

\* 12. Please rate your overall experience in the BI&A program in each of the following areas:

Poor Fair Good Very good Excellent



The overall quality of the BI&A program

The quality of the faculty who taught the courses you took in the program



The accessibility of the faculty when you needed advice or help with assignments

The extent to which the BI&A program has kept up with the latest developments in analytics, data science and AI



The academic standard of the BI&A degree

The relevance of the

program for your      chosen career



The practical signiﬁcance of what you learned in the program

Professional Preparation

Exit Survey | BI&A Program | 2023 May

\* 13. Overall, how satisﬁed were you with the how the BI&A program improved your professional skills?

1 (Not Satisﬁed) 2 3 4 5 (Very Satisﬁed)



1. Did you attend any of the BI&A Program's one-day software bootcamps

 Yes No

1. (If you answered yes to the above question) how useful were the software bootcamps?

1 Not useful 2 Somewhat useful 3 Useful 4 Very useful 5 Extremely useful



1. Did you attend any of the talks/roundtables in the BI&A Program's Professional Webinar Series?

 Yes  No

1. (If you answered yes to the above question) how useful was the Professional Webinar Series?

1 Not useful 2 Somewhat useful 3 Useful 4 Very useful 5 Extremely useful



1. How satisﬁed are you with the experiences provided by the BI&A student club?

1 Not Satisﬁed 2 3 Satisﬁed 4 5 Very Satisﬁed



1. How satisﬁed are you with the career services provided by the School of Business (i.e., COPA)?

1 Not Satisﬁed 2 3 Satisﬁed 4 5 Very Satisﬁed



1. How satisﬁed are you with the career services provided by the university?

1 Not Satisﬁed 2 3 Satisﬁed 4 5 Very Satisﬁed



BI&A Curriculum

Exit Survey | BI&A Program | 2023 May

1. Did you ﬁnd the BI&A program academically challenging?

3 Moderately

1 Not challenging 2 challenging 4 5 Very challenging



1. Is the amount of work required to be successful in the program reasonable?

1 Very reasonable 2 3 Reasonable 4 5 Unreasonably high



1. Which speciﬁc courses in the program were most valuable?



1. Which speciﬁc courses in the program could be improved or eliminated?



1. List any topic areas you think should be added to the program:



Overall Satisfaction with the BI&A Program

Exit Survey | BI&A Program | 2023 May

\* 26. Overall, how satisﬁed were you with the BI&A program?

1 (Not Satisﬁed) 2 3 4 5 (Very Satisﬁed)



1. Did the BI&A program improve your career prospects?

1 Not at all 2 3 Somewhat 4 5 Very much



1. I enjoyed my time in the BI&A program?

1 Not at all 2 3 Somewhat 4 5 Really enjoyed it



1. How likely is it that you would recommend the BI&A Program to others?

5 I will deﬁnitely

1 Not likely 2 3 Likely 4



recommend the BI&A program to others

1. Any concluding thoughts?



Exit Survey | BI&A Program | 2023 May

**Thanks for completing the survey. Best wishes for your future career!**