

BUSINESS INTELLIGENCE AND ANALYTICS (BIA)

Program Director: Dr. Ravi Nath
Program Office: Harper Center

Graduate Study in Business Intelligence and Analytics

The Master of Science (M.S.) in Business Intelligence and Analytics (BIA) degree is a 33 credit hour program. The course of study provides a creative synergy between technology and management and is designed to meet the demands of the constantly evolving business-technology environment. Students learn to be responsible leaders who will shape how information technology drives business success. M.S.-BIA degree will be on-campus only with some courses only being offered online.

Technology touches every aspect of business, and graduates of the M.S.-BIA program are prepared to set the pace, bringing a values-centered perspective to the business world.

Program Learning Goals and student learning outcomes

Program Mission: To prepare students for leading roles in business intelligence and analytics.

Creighton-formed business leaders will:

PLG 1: Exhibit disciplinary knowledge in Business Intelligence and Analytics.

SLO 1A: Apply the principles of information analysis and interpretation.

SLO 1B: Apply the principles of database design, administration and implementation.

SLO 1C: Critique the role of information and analytics in supporting business processes and functions.

PLG 2: Think critically to aid decision-making.

SLO 2A: Apply problem-solving skills in diagnosing and addressing business challenges.

PLG 3: Communicate professionally.

SLO 3A: Effectively communicate analytical conclusions in written and visual formats.

SLO 3B: Articulate assumptions, analyses and interpretations of data in an oral format.

PLG 4: Commit to action that demonstrates care for others.

SLO 4A: Analyze a business ethics situation and propose a course of action.

SLO 4B: Demonstrate knowledge of strategies to work effectively with others on diverse project teams.

PLG 5: Exhibit personal habits consistent with leadership formation.

SLO 5A: Reflect on and articulate the relationships among personal values, professional obligations, and social responsibilities.

Admission

- Eligibility for Admission:** Applicants for admission to the M.S. program must have a baccalaureate degree, regardless of the undergraduate field of study, and an acceptable level of scholarship from an accredited institution of higher education, along with the following documents:
- Application:** A completed application form, personal essay discussing how a master's degree fits in with an applicant's career plans and which aspects of Creighton's M.S. program are most appealing, current resume, and a non-refundable application fee.
- Recommendations:** Two recommendations are required. The recommendations should be completed by persons other than family members who are capable of assessing an applicant's performance in an academic or work setting.
- Transcripts:** One official transcript must be sent from each institution of collegiate rank attended by the applicant. Transcripts should be sent directly from the collegiate institution to the Enrollment Services, Harper Center, 2500 California Plaza, Omaha, NE 68178. All such transcripts become the property of Creighton University.
- Graduate Management Admissions Test (GMAT):** The Graduate Management Admission Test (GMAT) is not required for applicants who have work experience and a minimum 3.00 cumulative GPA across all institutions attended. If the applicant's cumulative GPA is less than 3.00, the GMAT is required. For applicants without work experience, and for all applicants to the MIMFA and MFIN programs, a minimum 3.50 cumulative GPA is required for the GMAT waiver. All international students whose undergraduate degree was not granted by a US institution will be required to submit a GMAT score. Regardless of the applicant's cumulative GPA, the admissions committee reserves the right to require an applicant to submit a GMAT score if there are concerns regarding the applicant's work experience and/or the student's achievement across all math, statistics, economics and finance courses previously completed.
- Test of English as a Foreign Language:** The Graduate School requires all students who are native speakers of languages other than English to demonstrate competence in English. International applicants who received their baccalaureate degree from an accredited institution from the following countries are not required to show proficiency in English; Australia, Canada, Barbados, Bahamas, Bermuda, British Virgin Islands, Cayman Islands, Dominica, Grenada, Guam, Ireland, Jamaica, Marshall Islands, New Zealand, St. Kitts, St. Lucia, Scotland, Singapore, Trinidad and Tobago, United Kingdom, United States, and Virgin Islands. There are 3 test scores that can be used to demonstrate competence in English. Only one of the three must be provided. 1) **TOEFL:** score of 90 or above on the Internet-based Test (TOEFL iBT) with no section below 20. 2) **IELTS:** overall band score of at least 6.5 with no section below 6. 3) **Duolingo:** score of 110 or above.
- Financial Ability:** All international applicants must provide a "Certification of Available Finances" form in order for the I-20 form to be issued by the Office of International Programs if an applicant is admitted to the program.
- Prerequisites:** Applicant to the M.S.-BIA program must show demonstrated proficiency in computer programming, either through a class or work experience and evidence that they have completed at least one statistics course in their undergraduate degree that included correlation and regression. Students without such a class may complete instead a non-credit statistics tutorial offered by the college for a fee.

Acceptance to the M.S. Program is granted to applicants who clearly demonstrate that they have high promise of succeeding in graduate business study. Interviews are not required as part of the admission process.

Degree Programs

- M.S., Business Intelligence and Analytics (M.S.-BIA) (<http://catalog.creighton.edu/graduate/graduate-programs-courses/business-intelligence-analysis/business-intelligence-analytics-ms/>)
- M.S., Analytics (<http://catalog.creighton.edu/graduate/graduate-programs-courses/business-intelligence-analysis/analytics-ms/>)
- MBA/MS-BIA Dual Degree (<http://catalog.creighton.edu/graduate/graduate-programs-courses/master-business-administration/mba-bia-dual-degrees/>)

Graduate Certificate in Business Analytics

- Business Analytics (<http://catalog.creighton.edu/graduate/graduate-programs-courses/business-intelligence-analysis/graduate-certificate-business-analytics/>)

Courses

BIA 603. Python Programming for Analytics. 3 credits.

This course is designed to provide a foundation in Python, focusing on how it is used for data analytics. This course will teach several things: the mental model of a programmer, how to problem-solve using computational thinking, how to devise creative solutions to problems, the terminology of technology/computers/software/hardware, and of course, some programming along the way. Popular data analytics libraries will also be incorporated, including Pandas, Numpy, and SciPy. No programming experience is expected.

BIA 729. Statistics for Data Scientists. 3 credits.

Properly applying statistical methodology to the analysis of business data benefits from a firm grasp of statistical concepts and techniques. This course strives to bring depth to the data scientist's toolbox of statistical methods by introducing the fundamental mathematical and statistical concepts underpinning modern statistical methods of data analysis.

BIA 741. Introduction to Business and Data Analytics. 3 credits.

The course provides an overview of business analytics as well as introduces and reinforces the concepts common to all modern statistical methods. Coverage includes sampling, confidence, hypothesis testing, and simple linear regression.

BIA 742. Predictive Analytics. 3 credits.

Organizations are gathering and storing massive amounts of data, from individual medical records to airline-passenger profiles. Faster computers and algorithms have become available to visualize and transform this data into information for improved decision-making. Specifically, this ability allows organizations to fully tap into these capabilities to glean valuable insights, patterns, and trends. Deployment of predictive analytics allows organizations to predict future outcomes by studying the relationships among variables from existing data. This course discusses the process of developing, evaluating, and deploying predictive models in an application-oriented environment. The course is applied in nature and extensively uses examples, readings, and hands-on exercises to reinforce the concepts. P. Statistics or instructor consent; and BIA 782.

BIA 746. Applications of Optimization Modeling. 3 credits.

Quite often, decision-making challenges involve several options or alternative courses of action, thereby making it cumbersome for the decision-maker to choose the "right" decision. Determining the best alternative is especially difficult in circumstances involving uncertainty and risk. Optimization modeling tools help the decision-maker find the optimal solution through a systematic approach of formulating the problem, solving it with the appropriate quantitative tool(s) and interpreting the results. Accordingly, the overarching purpose of this class is to help students improve their quantitative skills and make better decisions with the aid of mathematical modeling tools. This course introduces students to the basics of optimization modeling and analyses. Specifically, students will have a working knowledge of linear, non-linear and integer programming models in a variety of business contexts. In addition, sensitivity analyses and "what if" scenarios will be examined. Brief lectures, problem-solving, and discussions of real-world issues will be used to facilitate learning. P. Statistics or instructor consent.

BIA 755. Data Wrangling. 1.5 credit.

Methodologies and tools for acquiring data from multiple sources and combining them to create useable data sets are critical to fully harness the potential of big data and analytics. Topics such as data validation, handling missing data, data acquisition and web scraping are discussed. P. ANX 603 or Coding experience or IC.

BIA 762. Survey of Business Intelligence and Analytics. 3 credits.

Business Intelligence (BI) and Data Analytics are at the forefront of modern business management and have become key components in accomplishing strategic and operational goals. This course explores the fundamental sources of BI and surveys the new frontiers of data management and analytics, while introducing techniques and tools used to transform data into actionable information. P. BIA 762.

BIA 764. Data Governance. 3 credits.

This course explores data governance, and why it is essential to data and analytics-driven organizations. The elements of data governance (e.g., principles, policies, functions, metrics, technology, tools, etc.) are discussed, along with the process of designing, deploying and sustaining an effective data governance program. Additionally, students will explore master data management (MDM), data quality, and security, privacy, and regulatory compliance topics, identifying the impact of each on effective data governance and data strategy execution. P. BIA 762.

BIA 766. Graduate Internship. 1-3 credits.

This course is intended to provide graduate-level credit for significant program-related practical experience, coupled with a research component that utilizes the context of this practical experience as its primary vehicle of inquiry. Students must work a minimum of 150 hours for the sponsoring employer during the semester. In addition, the student must complete a research project related to this work, which has been planned and carried out under the direction of a graduate faculty supervisor, with the approval and cooperation of the sponsoring employer. The student's internship employment and faculty supervision for the research component must be arranged before registration for the course will be allowed. The course is graded Satisfactory/Unsatisfactory and only 3 hours of internship credit may be used to satisfy graduation requirements. P. IC and approval of the Associate Dean for Graduate Business Programs.

BIA 770. Cybersecurity. 3 credits.

This course will provide students with a solid technical understanding of cybersecurity or computer security. Students will gain an understanding of security concepts and explore a variety of technical tools that cover a wide range of security topics including governance, network security, database security, application security, cryptography, access controls, and incident and disaster response. P. BIA 762.

BIA 772. Data Visual Analysis and Visualization. 3 credits.

Information Visualization is an active, hot area in BIA. The presence of big data in business today, along with the need for fast, accurate, and timely decisions based on information make information or data visualization critical. However, this is a new field for business. It is in its infancy, and that means while there are good examples of it out there, there are more bad examples. As a result, there is much to be learned. P. Statistics or Instructor consent.

BIA 775. Ethics in Data Analytics. 1.5 credit.

Students will be introduced to the concept of big data ethics, and become familiar with some of the key types of ethical challenges in this area, as well as ethical precepts and moral codes to give them guidance. From this course students should be able to identify ethical considerations and reason critically to arrive at moral decisions with issues surrounding big data, particularly privacy and confidentiality, responsible use of data, and accurate representation of data and avoidance of algorithmic bias.

BIA 781. Machine Learning. 3 credits.

This course is designed to provide students with a foundation in machine learning as used in business analytics. Machine learning, while not a new field, has become of increasing interest to business due to its ability to provide predictive ability. Topics covered include machine learning approaches to prediction, classification and clustering. P. BIA 762 or instructor consent.

BIA 782. Database Management Systems. 3 credits.

Introduction to business database applications. Includes data modeling, relational database design techniques and data collection, storage, manipulation, and retrieval strategies. Introduction to NoSQL and other Big Data concepts. P. BIA 731 or Instructor Consent.

BIA 789. Seminar:Advanced Topics in Information Technology Management. 1-3 credits.

The content of this course will vary depending on the topic and instructor. With the permission of the instructor, the course can be repeated one time for credit, provided the course content is different. P. The prerequisites will depend on the course content.

BIA 792. Database Warehousing and Advanced Database Systems. 3 credits.

This course provides the principles and concepts for planning, designing, implementing, and using data warehouses. We study the importance of planning the data warehouse project; architecture and infrastructure considerations; dimensional modeling; data extraction, transformation, and loading; and how information is delivered to the user via business intelligence applications. We also explore some evolving topics and trends related to data and database systems. P. Knowledge of database concepts or Instructor consent.

BIA 794. Business Intelligence & Analytics Readings. 3 credits.

This course is a readings course where students study books, current articles, and position papers about a specific chosen BIA topic. This course seeks to expand students' thinking and provides an opportunity for self-reflection. This is accomplished by reading, analyzing, sharing, reflecting and then reformulating the way we look at things/concepts in the Business Intelligence & Analytics realm. The readings will vary depending upon the theme/topic. P. Instructor Consent.

BIA 795. Independent Study and Research. 1-3 credits.

This course is for the study of topics that do not enjoy regular course offerings. P. IC and approval of the M.S.-BIA Program Director.