BUSINESS INTELLIGENCE AND ANALYTICS (M.S.-BIA)

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

Graduate Study in Business Intelligence and Analytics

The Master of Science in Business Intelligence and Analytics (M.S.) 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.

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.

*Please note: In spring 2019 the M.S.-BIA degree will be on-campus only with some courses only being offered online. The new Master of Science in Analytics will be offered online in spring 2019. For more information, please call 402-280-2829.

Program Goals

1. Exhibit disciplinary knowledge in Business Intelligence and Analytics.
2. Think critically to aid decision-making.
3. Communicate professionally.
4. Commit to action that demonstrates care for others.
5. Exhibit personal habits consistent with leadership formation.

Admission

1. 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:

2. 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.

3. 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.

4. 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.

5. 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.

6. 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 61 or above.

7. 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.

8. 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 501. Managing Projects: The Fundamentals. 1.5 credit.
This course introduces the basic concepts of strategic leadership, project planning, and management. It will examine and consider the practical applications of strategic leadership, project planning, and project management. Students will then apply these concepts and principles in real-world scenarios. Based on the Project Management Institute’s PMBok Guide 5.0, participants will apply the ten knowledge areas of projects to the five project processes: 1) defining, 2) planning, 3) executing, 4) monitoring and controlling and 5) closing. The course provides a look at a leader’s role in leading projects, programs and portfolio management and the project manager’s role in projects and programs. As a cross-listed 500 level course, graduate level students will be required to complete additional assessed work as part of this course.

BIA 502. Managing Projects: The Fundamentals Lab. 1.5 credit.
The lab is an experiential learning simulation for a project introducing the application of all knowledge areas as a team executes a project through all five project processes. The lab is frequently delivered on-site as non-credit. The lab provides the introduction to the concepts for the lecture/on-line courses reflective learning processes.

BIA 600. Introduction to Programming. 1 credit.
This course is designed to provide a foundation in a programming language. This course will teach several things: the mental model of a programmer, how to problem-solve, how to devise creative solutions to problems, the terminology of technology/computers/software/hardware, and of course, some programming along the way.

BIA 604. Information Technology Concepts. 1.5 credit.
This course provides coverage of the role of key concepts and elements of information systems and their role in business organizations, emphasizing applications of information systems and the current issues facing their managers and users. Lecturers, discussions, presentations, and student work will seek to foster an understanding of the strategic importance of information systems, their impact on people and organizations, the many ways they can improve the work practices within firms, and the ways they can improve a firm’s products.

BIA 705. Mastering Project Management. 1.5 credit.
This builds on the knowledge and fundamentals learned in Managing Projects: The Fundamentals. This course features experiential learning to strengthen skills in defining, planning, executing, monitoring and controlling and closing projects in a variety of settings. More tools and methods are introduced for the ten management knowledge areas: scope, time, cost, integration, stakeholder, quality, human resources, communication, risk & procurement. More advanced topics are explored in the areas of teams and leadership, project performance management, procurement, risk management and interpersonal and soft skills for the human side of project management. Advanced study includes the use of various performance measurement systems and tracking tools to aid in scheduling and managing projects. This course is based on the PMBok 5.0, and covers the processes and knowledge areas of projects. It provides an in-depth look at project management from a leader’s role in leading projects, programs and project portfolios. It includes flexible and pragmatic review of variations and overlaps in project approaches and techniques such as waterfall, agile, scrum, and Kaizen practices to provide the participant with a practical application orientation for the pros and cons of each. A practicum approach to applying the knowledge learned to business applications is a part of the applied case study approach of this course.

BIA 706. Mastering Project Management Lab. 1.5 credit.
The lab is an experiential learning simulation for applying the concepts for Mastering Project Management. It uses both simulation and project management software apply to all knowledge areas as a team executes a project through all five project processes. The lab is frequently delivered on-site as non-credit. The lab provides the introduction to the concepts for the lecture/on-line courses reflective learning processes.

BIA 707. Project Management Capstone - PMP Exam Prep. 3 credits.
This course reviews all aspect of project management in the five processes and ten knowledge areas aligned with the PMBOK® Guide for the PMI PMP® & CAPM® Credential exam. The Project Management Professional (PMP®) is the recognized professional certification for Project Managers. It demonstrates knowledge competence in leading, managing and directing projects, programs and portfolios. This is an exam preparation and review course.

BIA 708. Project Management Capstone. 0-3 credits.
The PMI Agile Certified Practitioner (PMI-ACP)® formally recognizes your knowledge of agile principles and your skill with agile techniques. The PMI-ACP spans many approaches to agile such as Scrum, Kanban, Lean, extreme programming (XP) and test-driven development (TDD.) If you work on agile teams or if your organization is adopting agile practices, the PMI-ACP is a good choice for you. This is an exam preparation and review course.

BIA 710. Development Technologies for the Web. 3 credits.
As the interest in web sites becomes more widespread, so have peoples expectations. It is increasingly obvious that the functionality provided by HTML is insufficient. This is particularly true as more and more web sites are used to interact with databases. Many scripting and actual programming languages and environments such as CGI, Javascript, and flash are being turned to as they can provide the added functionality demanded by today’s commercial web sites. This course will explore these and other technologies and use them to create web sites. P Demonstrated proficiency in programming.

BIA 731. Information Systems Management. 3 credits.
This course provides an in-depth coverage of the role of information systems in business organizations, emphasizing applications of information systems and the current issues facing their managers and users. Lectures, discussions, presentations, and student project work will seek to foster an understanding of the strategic importance of information systems, their impacts on people and organizations, the many ways they can improve the work practices within firms, and the ways they can improve a firm’s products. Note: The program director may waive BIA 731 and require an additional BIA elective for students who have successfully completed MIS 253 or an equivalent course.

BIA 733. Systems Integration. 3 credits.
Addresses the circumstances surrounding the reliance of most organizations on information technology products and resources from many different sources, both internal and external to the organization. The concepts and methods associated with coordinating an infrastructure of hardware, software, networks, services, and training resources will be discussed and applied. Issues concerning the preparation, distribution, and evaluation of requests for proposal (RFP), contracting and acquisition of information technology products, and managing a team of vendors and contractors, will be considered and illustrated with case studies. Exercises will offer students an insight into the complexities of such topics as outsourcing, integrating legacy systems with current applications, and managing system evolution. P IC.
BIA 734. Introduction to User Experience Design. 3 credits.
Current trends in system design towards development of systems which fit in better with what humans find natural and easy to do motivate this course. The course focuses on information about human behavior, cognition, abilities and limitations, and other characteristics that are relevant to interaction with information systems. Specific strategies which apply these concepts in order to improve usability will be explored. Benefits of the incorporation of human factors into information processing systems such as less training, fewer errors, increased ability to perform complex operations, less stress, and faster work will also be discussed. Students will have the opportunity to incorporate human factor principles in an information system in order to maximize human-computer cognitive compatibility. PBIA 731 or equivalent.

BIA 735. Information Systems Project and Risk Management. 3 credits.
The role of systems analysis, decision analysis, and risk analysis in the project management process; managerial issues; analytical techniques of project management including CPM/PERT; budgeting processes; resource management; project control; use of project management software. P. Statistics.

BIA 736. Managing Information Resources. 3 credits.
This course focuses on the managerial issues faced by business and information systems (IS) managers in today’s technology rich business environment. Special emphasis is placed on information as a critical resource and on its role in policy and strategic planning. The course discusses the issues and techniques relevant to the effective management of information resources. It will take a broad perspective by examining the internal, external, and strategic planning issues involved in IS resource management. The course will also use Harvard Business School cases and other cases to explore the managerial, technical, and behavioral issues relevant to IS resource management. P. BIA 731 or equivalent.

BIA 738. Emerging Technologies. 3 credits.
According to Moore’s law, the amount of information storable in one square inch of silicon has roughly doubled yearly every year since the technology was invented. This phenomenon is causing numerous new and promising advances in information technology. Businesses capitalizing early on the adoption of some of these key technologies stand to gain significant competitive advantage. Unfortunately, organizations are in a quandary with respect to the identification, use and management of these emerging technologies. The primary focus of this course will be on the identification, acquisition, management and use of emerging technologies. P. BIA 731 and BIA 782.

BIA 740. Data Mining Techniques for Business. 3 credits.
Advances in information and data capture technologies have accelerated the rate at which organizations are able to gather large volumes of data pertaining to customers, suppliers, competitors, and other entities of interest. These databases are rarely tapped for the wealth of information they may hide. The purpose of this course is to deal with the issue of extracting information and knowledge from large databases. The extracted knowledge is subsequently used to support human decision-making with respect to summarization, prediction, and the explanation of observed phenomena (e.g. patterns, trends, and customer behavior). Techniques such as visualization, statistical analysis, decision trees, and neural networks can be used to discover relationships and patterns that shed light on business problems. This course will examine methods for transforming massive amounts of data into new and useful information, uncovering factors that affect purchasing patterns, and identifying potential profitable investments and opportunities. P. Statistics.

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-passerger profiles. Faster computers and algorithms have becomes 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. BIA 741 and BIA 782 or IC.

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. Similarly, simulation tools assist the decision-maker in estimating risk and uncertainty within the context of their problem area. 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 deterministic and probabilistic analytical tools that can be applied in various industries such as finance, marketing, production, transportation, supply chain, human resource management and healthcare. Specifically, students will have a "working knowledge" of linear programming, non-linear programming and integer programming models, decision analyses and decision trees, and risk analyses with Monte Carlo simulation. Sensitivity analyses and "what if" scenarios will be examined throughout the course. Brief lectures, simulations, problem-solving, cases and discussions of real-world issues will be used to facilitate learning. P. BIA 741; strong familiarity with MS Excel 2010 or later, or IC.

BIA 760. Strategic Leadership in IT. 3 credits.
A study of how technology, especially information technology, can be used as an essential component of the global strategy of an enterprise. Emphasis is on linking technology policy with corporate strategy and identifying technology options that will ensure the most effective execution of organizational strategy. Electronic commerce is examined as a strategic technology application. Topics also include external and internal strategic analysis, technology forecasting, benchmarking, corporate intelligence, knowledge management and planning and control strategies. Strategic technology planning is examined from a historical perspective; concepts essential to technology security and information assurance are introduced. This course will also cover the analysis of the role of the chief information or technology officer in leading the new fast-paced, information age organization.
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.

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 731 or BIA 762.

BIA 765. Information Systems and Data Analytics in Healthcare. 3 credits.
This course explores the current healthcare environment through both the payer and provider perspectives. Using strategic tools, data analytics, and information systems, students will gain insight into innovative and practical techniques for combating and exploiting current healthcare industry challenges and opportunities via technology.

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 731 or IC.

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: BIA 741 or IC.

BIA 775. Managing Business Transformations and Innovations. 3 credits.
This course provides insights and strategies for managing IT-driven business transformation and innovations. Students will glean a perspective of the strategic value and role of IT in triggering and promoting business change and how to manage this process. Case analysis and student-participation approaches are used to bring out key issues and approaches germane to business transformation. P: BIA 760.

BIA 780. Applications of Artificial Intelligence. 3 credits.
This course will provide a survey of the theory and applications of artificial intelligence in the business decision environment, with an emphasis on artificial neural networks. Students will engage in reviews of current expository and research literature in the area and will attain hands-on experience with computer packages supporting the creation of these types of systems. Neural network design projects will be required of all students. P: Calculus and demonstrated proficiency in programming.

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.
Organizations must manage their data resources effectively in order to remain competitive. The efficient design, deployment, use and management of database systems requires an understanding of the fundamentals of database management systems, techniques for the design of databases and principles of database administration. This course emphasizes the fundamentals of database modeling, design, and development, the languages and utilities provided by database management systems, and the techniques for implementing and managing database systems. Although primary emphasis will be on relational database management systems, the object-oriented and distributed models will also be examined. P: BIA 731 or IC. Note: The program director may waive BIA 782 and require an additional BIA elective for students who have successfully completed MIS 354 or an equivalent course.

BIA 784. User Interface Design for the Web. 3 credits.
Everything we used is designed by someone else. Any person who wants to design for others must develop a high degree of sensitivity of the nuances of good and bad design. This course specifically targets such nuances with respect to humans, information systems and interfaces. The human and task factors that must be considered and explicitly incorporated into user interfaces will be explored. Future trends in user interfaces will also be discussed. P: BIA 734 and BIA 788.

BIA 785. Wireless Technologies and Mobile Commerce. 3 credits.
This course will explore the impact of wireless and mobile e-commerce on the ways in which business is conducted in this electronic era, as well as the technologies involved in developing systems that will support this way of doing business. The course aims to provide the student with a balanced coverage on both the managerial and technical issues relevant to wireless and mobile e-commerce. P: One semester of a programming language or equivalent experience in C, C++, Java, Visual Basic or some or some other modern programming language.
BIA 787. Business Process Management. 3 credits.
As Jack Welch put it "The power of your company is contained in the processes themselves." This course is designed to provide the student with the tools they need to effectively analyze, improve, and redesign business processes to improve business performance. Students will learn and use business process management techniques such as business modeling, six sigma techniques and change management. Case studies, practical hands on experience with business process modeling techniques and tools will be used in class to prepare the student for a business process management project in which the students will work with a company or public institution to evaluate their current processes and develop process recommendations for this institution, a plan to implement these changes and a change management plan to gain the buy in of the employees and stakeholders. P. BIA 731 or IC.

BIA 788. Business Information Analysis and Process Design. 3 credits.
This course is an applied study of the process of information systems development using project management techniques. Lectures, discussions, readings and exercises will address the areas of information analysis, requirements determination, detailed logical design, physical design, implementation planning, computer technology, project management and organizational behavior. Through regular deliverables associated with the cumulative project file of a running case, students will follow a widely used structured development methodology (the data flow diagramming approach) in conducting team-oriented systems analysis and design projects. P: BIA 731 or equivalent.

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 790. Information Technology Projects. 3 credits.
In this course the student undertakes a significant research project under the guidance of a faculty mentor. The project will deal with topics in information technology that are significant value to businesses. Established research methodologies will be used in identifying, examining, synthesizing, and disseminating information. P. IC.

BIA 792. Database Warehousing and Advanced Database Systems. 3 credits.
This course explores data management and integration through the lens of data warehousing, data processing techniques, and emerging database systems. It also surveys the new frontiers data management and introduces techniques and tools used to transform data into actionable information. P. Knowledge of Database concepts or IC.

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.

BIA 799. Master's Thesis. 1-3 credits.
Students wishing to pursue the thesis option for satisfaction of degree requirements are responsible for identifying a BIA faculty member who is willing to supervise the thesis. Acceptance of thesis supervision responsibility is at the sole discretion of the faculty member. Hence, the thesis option may not be available for all interested students. Prior to enrollment in the thesis course a written proposal for the thesis must be approved by a majority of the BIA program faculty. Pursuant to a defense of the thesis, the completed thesis must be approved by a majority of the BIA program faculty before a grade is assigned. Thesis students will be required to enroll in BIA 799 in two consecutive semesters, normally their final two semesters in the program. Only three of these hours may be used toward the fulfillment of elective course requirements.