

# BUSINESS ANALYTICS (ANOP)

## Faculty

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Organizations of all types increasingly rely on data and analytics to inform their decision making processes. To this end, both for-profit and not-for-profit organizations must have the ability to transform data into information. Business analytics (BA) is the scientific process of transforming data or quantitative models into actionable insight to improve decision-making. BA rests on three broad functional pillars: descriptive, predictive, and prescriptive analysis.

- Descriptive analytics prepares, displays, and analyzes historical data; it identifies data patterns to report trends.
- Predictive analytics forecasts future probabilities and trends, and determines relationships in data that may not be readily apparent with descriptive analysis.
- Prescriptive analytics evaluates and determines new ways to operate based upon meeting certain objectives while balancing operational constraints.

This modeling and analysis cannot be done in isolation. Across the curriculum we will address and investigate the ethical implications of both the intended and unintended use of our analysis. The BA major allows students with an interest in quantitative analysis (broadly defined) to further explore their interests in an organizational context, to appreciate the inherent broad social and ethical issues within the field, and to become effective managers in any data-driven organization. The major provides our graduates the necessary analytical and communication skills built upon a broad management education to address challenges in the 21st century.

The Business Analytics major within the Analytics & Operations Management (ANOP) department consists of the following courses:

### Business Analytics Core Curriculum Requirements

MATH 201 or MATH 192	Calculus I Topics in Calculus	1
MATH 216	Statistics I	1
ANOP 203 or CSCI 203	Introduction to Programming for Business Analytics Introduction to Computer Science	1

### BSBA Core Curriculum Requirements

#### foundational literacy requirements

MGMT 100	Exploring Management	.5
MGMT 101	Introduction to Organization and Management	1
MGMT 102	Quantitative Reasoning for Managers	1
ECON 103	Economic Principles and Problems	1

#### Managerial LITERACY REQUIREMENTS

MGMT 104	Foundations of Accounting I	1
MGMT 201	Marketing	1
MGMT 202	Operations	1
ACFM 203 or MGMT 203	Corporate Finance Managerial Finance	1

#### Integrative literacy requirements

MGMT 302	The Stakeholder Organization	1
MGMT 303	The Technological Organization	1
MGMT 304	The Strategic Organization	1

## Business Analytics Requirements

ANOP 270	Data Visualization for Business Analytics	1
or HUMN 270	Data Visualization for the Digital Humanities	
ANOP 330	Predictive Analytics	1
ANOP 350	Simulation and Forecasting for Business Analytics	1
ANOP 370	Prescriptive Analytics	1
or MATH 358	Topics in Operations Research	
ANOP 400	Business Analytics Practicum	1

**Culminating Experience** - All BSBA majors must satisfy the Culminating Experience component of the College Core Curriculum by taking a course designated as such *on campus* no earlier than the second semester of the junior year. Business Analytics majors will fulfill this by taking ANOP 400 Business Analytics Practicum. In addition, all majors will take core curriculum coursework that addresses the instruction in writing, speaking, and information literacy goals of the College Core Curriculum.

In the spring of their sophomore year, all BSBA students will, in consultation with their advisers, select a major in one of the Freeman College of Management departments and will complete the specific major requirements in addition to the BSBA core curriculum requirements. Transferring between majors within the Freeman College of Management is possible as long as the student will be able to meet all degree requirements of the new major and still graduate on schedule.

Freeman College of Management students will take core courses and courses within their specific major that incorporate learning goals:

**QUANTITATIVE [1, 6]**

- Understand and demonstrate how to analyze and use data to model and improve organizational processes.

**TECHNOLOGICAL SKILLS [4, 8]**

- Understand technology's impact on organizations and the interplay between technology and the organization.

**ORAL COMMUNICATION SKILLS [7]**

- Students will demonstrate the ability to deliver effective oral presentations in a team environment.

**WRITTEN COMMUNICATION SKILLS [7, 9]**

- Students' written work will demonstrate ability to learn from their own performances through reflective writing.

**MORAL REASONING [3, 5]**

- Students will demonstrate the ability to articulate a moral argument, drawing on and applying insights from ethical theory.

**FOUNDATIONAL KNOWLEDGE: FINANCE [1, 6]**

- Students will demonstrate the mastery of key concepts in financial literacy.

**FOUNDATIONAL KNOWLEDGE: MARKETING [1, 4, 6]**

- Students will demonstrate mastery of key Marketing concepts.

**INTEGRATIVE/SYNTHESIS SKILLS [1, 2]**

- Students will demonstrate the ability to evaluate, identify, and understand different organizational perspectives and be able to integrate and synthesize diverse information.

Numbers in parentheses reflect related Educational Goals of Bucknell University.

**Courses**

**ANOP 203. Introduction to Programming for Business Analytics. 1 Credit.**

**Offered Either Fall or Spring; Lecture hours:3**

Overview of programming tools and methods for analytics. Students solve computational and modeling problems using Python. This foundation of programming logic will help students understand advanced analytic tools in the upper-level Business Analytics courses. Not open to students who have taken CSCI 203.

**ANOP 270. Data Visualization for Business Analytics. 1 Credit.****Lecture hours:3**

An introduction to the principles of data visualization. Students use software tools to effectively create tables, charts, figures, infographics, and exhibitions to aid in oral or written communication of quantitative insights. Prerequisite: MGMT 102 or MATH 216 or PSYC 215.

**ANOP 310. Independent Study in Analytics and Operations Management. 1 Credit.****Offered Either Fall or Spring; Lecture hours:Varies,Other:3**

Independent Study in Analytics and Operations Management. Prerequisite: permission of the instructor.

**ANOP 311. Supply Chain Analytics. 1 Credit.****Offered Either Fall or Spring; Lecture hours:3**

In this course students will learn basic concepts in quantitative supply chain modeling and simulation. Students learn methods that are used extensively in business organizations to solve large, structured problems. Prerequisite: MATH 216 or MGMT 102 or PSYC 215.

**ANOP 315. Special Topics in Analytics and Operations Management. 1 Credit.****Offered Either Fall or Spring; Lecture hours:3**

Special Topics in Analytics and Operations Management. Prerequisite: permission of the instructor.

**ANOP 330. Predictive Analytics. 1 Credit.****Offered Either Fall or Spring; Lecture hours:3**

Study and apply methods for efficient data collection, management, and mining using large-scale datasets. Topics include prediction and classification methods, clustering, and association rules. Prerequisites: MGMT 102 or MATH 216 or PSYC 215 and ANOP 203 or CSCI 203.

**ANOP 350. Simulation and Forecasting for Business Analytics. 1 Credit.****Offered Either Fall or Spring; Lecture hours:3**

Study of statistical modelling and simulation techniques for data and model-based forecasting (Time Series, Smoothing Methods, Regression, ARIMA, Simulation, etc.) using a variety of software tools. Prerequisites: MGMT 102 or MATH 216 and ANOP 203 or CSCI 203.

**ANOP 370. Prescriptive Analytics. 1 Credit.****Offered Either Fall or Spring; Lecture hours:3**

An introduction to decision modelling and analysis using optimization models and solution methodologies. Prerequisites: MGMT 102 or MATH 216 and ANOP 203 or CSCI 203.

**ANOP 390. Honors Course in Analytics and Operations Management. 1 Credit.****Offered Either Fall or Spring; Lecture hours:3**

Honors Course in Analytics and Operations Management. Prerequisite: permission of the instructor.

**ANOP 400. Business Analytics Practicum. 1 Credit.****Offered Either Fall or Spring; Lecture hours:3**

A culminating experience course where student teams collaborate with external clients in the private, public, and non-profit sectors to work on a semester long project leveraging the skills and concepts acquired within the Business Analytics major. Prerequisite: open only to senior Business Analytics majors or by permission of the instructor.