Bachelor of Science in Business Administration - Business Analytics

Ling Li, Chair
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Business Analytics enables students to properly develop decision models and use computers to manipulate and analyze data in order to enhance decision making in a business environment. Students with a concentration in Business Analytics and Intelligence are typically employed in Business Analytics Departments. Students with Business Analytics concentrations in business functional areas are often employed in their functional area as analysts.

Business Analytics and Intelligence Concentration

Required Courses:

- IT 201 Introduction to Information Systems 3
- IT 360T Principles of Information Technology 3
- IT 205 Introduction to Object-Oriented Programming 3
- IT 363 Systems Analysis and Design 3
- IT 410 Business Intelligence 3
- IT 450 Database Concepts 3
- BNAL 301 Spreadsheet and Data Management Techniques for Decision Making 3
- BNAL 406 Advanced Spreadsheet-Based Data Analytics 3
- BNAL 407 Prescriptive Analytics of Management Science 3
- BNAL 415 Advanced Business Analytics/Big Data Applications 3
- BNAL 432 Predictive Analytics for Business 3
- BNAL 476 Simulation Modeling and Analysis for Business Systems 3

Choose one of the following international courses:

- ACCT 450 International and Advanced Accounting
- ECON 450 International Economics
- FIN 435 International Financial Management
- IT 425 Information Systems for International Business
- MGMT 361 International Business Operations
- MGMT 462 Comparative International Management
- MGMT 463 Management Seminar Abroad
- MKTG 411 Multi-National Marketing
- MSCM 370 International Shipping

Total Hours 33

* Business Analytics majors who take IT 363 will be exempt from taking IT 360T as a core course.

All major courses except the international course are included when calculating the student’s grade point average in the major.

Business Analytics Concentrations in the Business Functional Areas

Required Courses:

- BNAL 407 Prescriptive Analytics of Management Science 3
- BNAL 415 Advanced Business Analytics/Big Data Applications 3
- BNAL 476 Simulation Modeling and Analysis for Business Systems 3

Major Electives

Select two from the following:

- BNAL 301 Spreadsheet and Data Management Techniques for Decision Making
- BNAL 403 Data Visualization and Exploration
- BNAL 406 Advanced Spreadsheet-Based Data Analytics
- BNAL 432 Predictive Analytics for Business
- BNAL/MSCM 441 Supply Chain Management and Logistics
- ECON 400 Research Methods in Economics
- ECON 425 Introduction to Mathematical Economics
- FIN 413 Risk Analysis and Control
- FIN 431 Investments
- INBU 450 Global Business
- IT 363 Systems Analysis and Design
- MGMT 430 Compensation Management
- MKTG 475 Marketing Analytics
- MSCM 430 Strategic Sourcing and Purchasing Management

Select one from the following list (may not use the same course from both lists):

- ACCT 311 Managerial Accounting
- BNAL 301 Spreadsheet and Data Management Techniques for Decision Making
- BNAL 368 Internship
- BNAL 403 Data Visualization and Exploration
- BNAL 432 Advanced Spreadsheet-Based Data Analytics
- BNAL 476 Simulation Modeling and Analysis for Business Systems
- ECON 400 Research Methods in Economics
- ECON 425 Introduction to Mathematical Economics
- FIN 413 Risk Analysis and Control
- FIN 431 Investments
- INBU 450 Global Business
- IT 363 Systems Analysis and Design
- MGMT 430 Compensation Management
- MKTG 475 Marketing Analytics
- MSCM 430 Strategic Sourcing and Purchasing Management

Concentration Area Electives

Choose and complete nine credits of coursework from one of the following concentration areas:

Business Analytics in Accounting

Two approved 300-400 level ACCT courses 6

Approved International Business Requirement 3

Select one from the following:

- ACCT 450 International and Advanced Accounting
- ECON 450 International Economics
- FIN 435 International Financial Management
- IT 425 Information Systems for International Business
- MGMT 361 International Business Operations
- MGMT 462 Comparative International Management
- MGMT 463 Management Seminar Abroad
- MKTG 411 Multi-National Marketing
- MSCM 370 International Shipping
The minor in Business Analytics requires five courses (15 hours) comprised of:

**Business Analytics Minor**

- BNAL 301 Spreadsheet and Data Management Techniques for Decision Making 3
- OPMT 303 Operations Management 3

**One of the following:** 3
- BNAL 407 Prescriptive Analytics of Management Science
- BNAL 476 Simulation Modeling and Analysis for Business Systems

**Two of the following:** 6
- BNAL 403 Data Visualization and Exploration
- BNAL 406 Advanced Spreadsheet-Based Data Analytics
- BNAL 407 Prescriptive Analytics of Management Science
- BNAL 415 Advanced Business Analytics/Big Data Applications
- BNAL 432 Predictive Analytics for Business
- BNAL 476 Simulation Modeling and Analysis for Business Systems

At least two of the five courses must be completed through courses offered by Old Dominion University, and a 2.00 overall grade point average is required exclusive of prerequisite courses. Business majors who want to make themselves more marketable may choose a minor in Business Analytics by taking three additional courses.

**BUSINESS ANALYTICS Courses**

**BNAL 206. Business Analytics I. 3 Credits.**

An introduction to methods of business analytics. Topics are concentrated in descriptive analytics, which include descriptive statistics, normal and binomial distributions, decision making under uncertainty and under risk, decision analysis incorporating sample information, sampling distributions and Central Limit Theorem, interval estimation, and hypothesis testing. Business and economic applications are emphasized. Computer software, as a tool for problem solving, is utilized where appropriate. Prerequisites: A grade of C or better in MATH 162M or placement into a higher level math course.

**BNAL 301. Spreadsheet and Data Management Techniques for Decision Making. 3 Credits.**

Data management and analysis for business decision making. Topics include data validation, a variety of functions such as lookup, logical, math, text, and financial functions, pivot tables, data models, and Monte Carlo simulation. Emphasis is on preparing descriptive, predictive, and prescriptive information to enhance effectiveness of management’s decisions. Prerequisites: ACCT 201, BNAL 206, and a declared major in the University or permission of the Dean's Office.

**BNAL 306. Business Analytics II. 3 Credits.**

Advanced descriptive and predictive analytics topics include advanced hypothesis testing, analysis of frequency data, correlation analysis, simple and multiple regression, and time series forecasting. Prescriptive analytics topics include linear programming formulation and managerial analysis, and distribution models. PERT/CPM models are also covered. Computer software is utilized throughout the course. Emphasis is on the interpretation of the various outcomes of the application of business analytics tools. Prerequisites: MATH 200, BNAL 206 and a declared major in the University or permission of the Dean's Office.

**BNAL 367. Cooperative Education. 1-3 Credits.**

Approval for enrollment and allowable credits are determined by the department and Career Development Services in the semester prior to enrollment. Prerequisites: Junior standing and a declared major in the University or permission of the Dean's Office.
BNAL 380. Internship. 1-3 Credits.
Approval for enrollment and allowable credits are determined by the department and Career Development Services in the semester prior to enrollment. (Qualifies as a CAP experience.) Prerequisites: BNAL 306 and a declared major in the University or permission of the Dean's Office.

BNAL 369. Practicum. 1-3 Credits.
Approval for enrollment and allowable credits are determined by the department CAP adviser and the Career Development Services in the semester prior to enrollment. Student participation in a professional work experience. (Qualifies as a CAP experience.) Prerequisites: BNAL 206 and BNAL 306 and a declared major in the University or permission of the Dean's Office.

BNAL 403/503. Data Visualization and Exploration. 3 Credits.
This course introduces students to concepts and processes, technologies, and methodologies that are commonly used in data visualization that an organization may use to enhance its descriptive, predictive, and prescriptive methods for making fact-based decisions. Prerequisite: A grade of C or better in BNAL 306 or permission of the instructor.

BNAL 406. Advanced Spreadsheet-Based Data Analytics. 3 Credits.
This course introduces students to the use of advanced data modeling in spreadsheets and self-service business intelligence tools to analyze data and make business decisions in Excel. Power Pivot and the DAX language are used to extract meaningful information from large data sets. Power Query is introduced as an ETL tool, and the Power BI Desktop is used for visualization purposes. These topics are then applied to analyze problems in predictive analytics. Examples include advanced multiple regression and classification techniques in data mining. Prerequisites: A grade of C or better in BNAL 301, BNAL 306, and a declared major in the University or permission of the Dean’s Office.

BNAL 407/507. Prescriptive Analytics of Management Science. 3 Credits.
Students are introduced to prescriptive analytics through formulation and solution of mathematical models, with a particular focus on optimization models. The business use of the models, as well as their limitations, is emphasized. Topics include linear, integer, non-linear programming, network models, genetic algorithms, decision analysis, and project management models. Prerequisites: A grade of C or better in BNAL 306 and a declared major in the University or permission of the Dean's Office or the instructor.

BNAL 415/515. Advanced Business Analytics/Big Data Applications. 3 Credits.
This course addresses advanced business analytics techniques and the application of such techniques to large data sets. Some alternative business analytics strategies are introduced. Descriptive, predictive, and prescriptive models are included. Topics covered in this course include data visualization and exploration, cluster analysis, and developing and calibrating predictive models for big data. Applications of multivariate, logistic, and probit regression to business analytics are discussed. Software packages such as SAS/JMP/SPSS may be used. Prerequisites: A grade of C or better in BNAL 306 and a declared major in the University or permission from the Dean's Office.

BNAL 432/532. Predictive Analytics for Business. 3 Credits.
Predictive analytics techniques for business. Applications include both shorter term forecasting for sales and operations management as well as forecasting for long term planning. Emphasis is on statistical methods to obtain and evaluate forecasts. Statistical models are implemented using standard software such as MINITAB, EXCEL, R, and/or Python. Prerequisites: BNAL 306 and a declared major in the University or permission of the Dean’s Office.

BNAL 441. Supply Chain Management and Logistics. 3 Credits.
Supply chain management integrates all activities associated with the flow of materials and information from product start to customers. Examples include order processing, warehousing, inventory management, transportation and logistics, and the costs and information systems supporting these activities. Particular application is made to global logistics systems supporting port and maritime activities. Supply chain relationships can be improved through effective integration of management and via such technologies as the World Wide Web, electronic data exchange, and enterprise resource planning (ERP). (Cross-listed with MSCM 441.) Prerequisites: OPMT 303 and a declared major in the University or permission of the Dean's Office.

BNAL 476/576. Simulation Modeling and Analysis for Business Systems. 3 Credits.
Simulation modeling is an integral part of the analytics revolution, enabling the creation of models that can represent the variability that exists in many real business systems. This course covers the theory and application of simulation modeling, with an emphasis on how simulation provides predictive and prescriptive analytics to support business decision-making. Topics include simulation fundamentals, the project life-cycle, model development, input and output analysis, verification and validation, and the presentation of a simulation study. We utilize a major commercial simulation software package for assignments and class projects. Prerequisites: OPMT 303 with a grade of C or better and BNAL 306 with a grade of C or better, senior standing and a declared major in the University or permission of the Dean's Office.

BNAL 495. Topics in Business Analytics. 3 Credits.
Selected advanced topics in decision sciences. Taught on an occasional basis. See the course schedule for the particular topic being taught each semester. Prerequisites: Senior standing and a declared major in the University or permission of the Dean's Office.

BNAL 497. Independent Study. 1-3 Credits.
Affords students the opportunity to undertake independent study under the direction of a faculty member. Prerequisites: Permission of department.