Bachelor of Science in Business Administration - Business Analytics

Ling Li, Chair
Weiyoung Zhang, Assistant Chair
Ali Ardalan, Chief Discipline Advisor

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. A student who seeks a Bachelor of Science in Business Administration degree with a major in Business Analytics from Old Dominion University must, in addition to meeting other requirements of the University, earn a minimum of 25 percent of the total number of credits required for the degree (for example, 30 credits in a 120-credit degree program) through on- or off-campus instruction. This must include a minimum of 12 credit hours of upper-level courses specifically required for the major or concentration as shown on the course lists below.

Four-Year Plan - Business Analytics Major - BSBA (http://catalog.odu.edu/undergraduate/stromecollegeofbusiness/bsbadecisionsciences/businessanalytics-bsba-fouryearplan/)

- The four-year plan is a suggested curriculum to complete this degree program in four years. It is just one of several plans that will work and is presented only as broad guidance to students. Each student is strongly encouraged to develop a customized plan in consultation with their academic advisor. Additional information can also be found in Degree Works.

Business Analytics and Intelligence Concentration

Required Courses:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>IT 201</td>
<td>Introduction to Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>or IT 360T</td>
<td>Principles of Information Technology</td>
<td></td>
</tr>
<tr>
<td>IT 205</td>
<td>Introduction to Object-Oriented Programming</td>
<td>3</td>
</tr>
<tr>
<td>IT 363</td>
<td>Systems Analysis and Design</td>
<td>3</td>
</tr>
<tr>
<td>IT 410</td>
<td>Business Intelligence</td>
<td>3</td>
</tr>
<tr>
<td>IT 450</td>
<td>Database Concepts</td>
<td>3</td>
</tr>
<tr>
<td>BNAL 405</td>
<td>Spreadsheet-Based Data Analysis for Decision Making</td>
<td>3</td>
</tr>
<tr>
<td>BNAL 407</td>
<td>Prescriptive Analytics of Management Science</td>
<td>3</td>
</tr>
<tr>
<td>BNAL 415</td>
<td>Advanced Business Analytics/Big Data Applications</td>
<td>3</td>
</tr>
<tr>
<td>BNAL 476</td>
<td>Simulation Modeling and Analysis for Business Systems</td>
<td>3</td>
</tr>
</tbody>
</table>

Choose two of the following: 6

- BNAL 403 Data Visualization and Exploration
- BNAL 432 Predictive Analytics for Business
- BNAL 495 Topics in Business Analytics

Choose one of the following international courses: 3

- ACCT 450 International and Advanced Accounting
- ECON 450 International Economics
- FIN 435 International Financial Management

Total Hours 36

* 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

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>BNAL 407</td>
<td>Prescriptive Analytics of Management Science</td>
<td>3</td>
</tr>
<tr>
<td>BNAL 415</td>
<td>Advanced Business Analytics/Big Data Applications</td>
<td>3</td>
</tr>
<tr>
<td>BNAL 476</td>
<td>Simulation Modeling and Analysis for Business Systems</td>
<td>3</td>
</tr>
</tbody>
</table>

Major Electives

Select two from the following: 6

- BNAL 403 Data Visualization and Exploration
- BNAL 405 Spreadsheet-Based Data Analysis for Decision Making
- BNAL 432 Predictive Analytics for Business
- BNAL 495 Topics in Business Analytics

Select one from the following list (may not use the same course from both lists): 3

- ACCT 311 Managerial Accounting
- BNAL 368 Internship
- BNAL 403 Data Visualization and Exploration
- BNAL 405 Spreadsheet-Based Data Analysis for Decision Making
- BNAL 432 Predictive Analytics for Business
- BNAL/MSCM 441 Supply Chain Management and Logistics
- BNAL 495 Topics in Business Analytics
- ECON 400 Research Methods in Economics
- ECON 425 Introduction to Mathematical Economics
- 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
- RMI 413 Risk Analysis and Control

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:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 450</td>
<td>International and Advanced Accounting</td>
</tr>
<tr>
<td>ECON 450</td>
<td>International Economics</td>
</tr>
<tr>
<td>FIN 435</td>
<td>International Financial Management</td>
</tr>
<tr>
<td>IT 425</td>
<td>Information Systems for International Business</td>
</tr>
<tr>
<td>MGMT 361</td>
<td>International Business Operations</td>
</tr>
<tr>
<td>MGMT 462</td>
<td>Comparative International Management</td>
</tr>
<tr>
<td>MGMT 463</td>
<td>Management Seminar Abroad</td>
</tr>
<tr>
<td>MKTG 411</td>
<td>Multi-National Marketing</td>
</tr>
<tr>
<td>MSCM 370</td>
<td>International Shipping</td>
</tr>
</tbody>
</table>

**Business Analytics in Economics**

Two approved 300-400 level ECON courses | 6
ECON 450 | International Economics | 3

**Business Analytics in Finance**

Two approved 300-400 level FIN courses | 6
FIN 435 | International Financial Management | 3

**Business Analytics in International Business**

ECON 450 | International Economics | 3
FIN 435 | International Financial Management | 3
MKTG 411 | Multi-National Marketing | 3

**Business Analytics in Information Technology** *

Two approved 400-level IT courses | 6
Approved International Business Requirement | 3

**Business Analytics in Management**

Two approved 300-400 level MGMT courses | 6
MGMT 361 | International Business Operations | 3
MGMT 462 | Comparative International Management |

**Business Analytics in Marketing**

One approved 300-400 level MKTG course | 3
MKTG 411 | Multi-National Marketing | 3
MKTG 475 | Marketing Analytics | 3

**Business Analytics in Maritime and Supply Chain Management**

Two approved MSCM courses | 6
MSCM 370 | International Shipping | 3

**Electives**

200-400 Level Business Elective ** | 3
300-400 Level Business Elective ** | 3

**Total Hours** | 33

---

*International Business requirement for grade point calculation only. Note that only students who are also majoring in IT are permitted to use it as a functional area in the business analytics major.

**Can be any 200-400 or 300-400 level course offered by the Strome College of Business except ECON 200S, providing that the student has the appropriate prerequisites.

---

Courses included in the calculation of the 2.00 grade point average for the major are: BNAL 405, BNAL 415, BNAL 476, and all courses taken from the major elective and concentration area elective listings.

---

**Business Analytics Minor**

The minor in Business Analytics requires five courses (15 hours) comprised of:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BNAL 405</td>
<td>Spreadsheet-Based Data Analysis for Decision Making</td>
<td>3</td>
</tr>
<tr>
<td>OPMT 303</td>
<td>Operations Management</td>
<td>3</td>
</tr>
</tbody>
</table>

**One of the following:** | 3

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BNAL 407</td>
<td>Prescriptive Analytics of Management Science</td>
<td></td>
</tr>
<tr>
<td>BNAL 476</td>
<td>Simulation Modeling and Analysis for Business Systems</td>
<td></td>
</tr>
</tbody>
</table>

**Two of the following:** | 6

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BNAL 403</td>
<td>Data Visualization and Exploration</td>
<td></td>
</tr>
<tr>
<td>BNAL 407</td>
<td>Prescriptive Analytics of Management Science</td>
<td></td>
</tr>
<tr>
<td>BNAL 415</td>
<td>Advanced Business Analytics/Big Data Applications</td>
<td></td>
</tr>
<tr>
<td>BNAL 432</td>
<td>Predictive Analytics for Business</td>
<td></td>
</tr>
<tr>
<td>BNAL 476</td>
<td>Simulation Modeling and Analysis for Business Systems</td>
<td></td>
</tr>
<tr>
<td>BNAL 495</td>
<td>Topics in Business Analytics</td>
<td></td>
</tr>
</tbody>
</table>

To receive a minor, the student must achieve a minimum overall cumulative grade point average of 2.00 in all courses specified as a requirement for the minor exclusive of 200-level courses and prerequisite courses. At least two of the five courses must be completed through courses offered by Old Dominion University. 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 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 368. 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.

Bachelor of Science in Business Administration - Business Analytics
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 405. Spreadsheet-Based Data Analysis for Decision Making. 3 Credits.
The spreadsheet has become one of the most widely used analytical tools in the modern business environment. This course covers spreadsheet (e.g., Microsoft Excel) capabilities and business applications, with a focus on the use of spreadsheets for modeling, data analysis, and business decision support. Topics include concepts such as functions, pivot table, macros, analytical utilities, database connections, and interactive interfaces. Modeling and analysis in several areas such as forecasting, investment, quality, and sales are covered. Prerequisites: BNAL 306 with a grade of C or better.

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 short 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.