Bachelor of Science in Business Administration - Business Analytics

Ling Li, Chair
Kelly Alvey, 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.

Business Analytics and Intelligence Concentration

<table>
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<tr>
<th>Required Courses:</th>
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<tbody>
<tr>
<td>IT 201 or IT 360T</td>
<td>Introduction to Information Systems/Principles of Information Technology 3</td>
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<tr>
<td>IT 205</td>
<td>Introduction to Object-Oriented Programming 3</td>
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<td>IT 363</td>
<td>Systems Analysis and Design 3</td>
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<tr>
<td>IT 410</td>
<td>Business Intelligence 3</td>
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<td>IT 450</td>
<td>Database Concepts 3</td>
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<td>BNAL 406</td>
<td>Spreadsheet Modeling and Analysis for Business Decisions 3</td>
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<tr>
<td>BNAL 407</td>
<td>Management Science 3</td>
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<tr>
<td>BNAL 415</td>
<td>Advanced Business Analytics/Big Data Applications 3</td>
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<tr>
<td>BNAL 432 or BNAL 403</td>
<td>Forecasting/Data Visualization and Exploration 3</td>
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<tr>
<td>BNAL 476</td>
<td>Simulation Modeling and Analysis for Business Systems 3</td>
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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

Free Elective 3

Total Hours 33

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

Courses included in the calculation of the 2.00 overall grade point average for major coursework for graduation are: IT 450, IT 410, BNAL 406, BNAL 407, BNAL 415, BNAL 432, and BNAL 476.

Business Analytics Concentrations in the Business Functional Areas

<table>
<thead>
<tr>
<th>Required Courses</th>
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<tr>
<td>BNAL 407</td>
<td>Management Science 3</td>
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<tr>
<th>Major Electives</th>
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<td>Select one from the following:</td>
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<tr>
<td>BNAL 403</td>
<td>Data Visualization and Exploration 3</td>
</tr>
<tr>
<td>BNAL 406</td>
<td>Spreadsheet Modeling and Analysis for Business Decisions 3</td>
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<tr>
<td>BNAL 432</td>
<td>Forecasting 3</td>
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Select one from the following list (may not use the same course from both lists):

- ACCT 311 Managerial Accounting
- BNAL 368 Internship
- BNAL 403 Data Visualization and Exploration
- BNAL 406 Spreadsheet Modeling and Analysis for Business Decisions
- BNAL 432 Forecasting
- 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

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

**Business Analytics in Economics**

Two approved 300-400 level ECON courses 6

Approved International Business Requirement 3

**Business Analytics in Finance**

Two approved 300-400 level FIN courses 6

Approved International Business Requirement 3
The minor in Business Analytics requires five courses (15 hours) comprised of:

### 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 or MGMT 462 Comparative International Management 3

### 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
- Free Elective 3
- 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 decision sciences 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 major course work for graduation are: BNAL 407, BNAL 415, BNAL 476, 6 hours from major electives and 9 hours from functional area electives.

### Business Analytics Minor

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

- BNAL 306 Statistical Data Analysis and Management Science 3
- OPMT 303 Operations Management 3

**One of the following:**
- BNAL 403 Data Visualization and Exploration 3
- BNAL 407 Management Science 3
- BNAL 476 Simulation Modeling and Analysis for Business Systems 3

**Two of the following:**
- BNAL 403 Data Visualization and Exploration 6
- BNAL 406 Spreadsheet Modeling and Analysis for Business Decisions 3
- BNAL 407 Management Science 3

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. Probability, Decision Analysis and Business Statistics. 3 Credits.**
An introduction to methods of probability assessment and statistical inference. Topics 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. Statistical Data Analysis and Management Science. 3 Credits.**
Quantitative methods for solving business problems. Topics include advanced hypothesis testing, analysis of frequency data, correlation analysis, simple and multiple regression, time series forecasting, linear programming formulation and managerial analysis, distribution models, and PERT/CPM models. Computer software, as a tool for problem solving, is utilized throughout the course. Emphasis is on the interpretation of the varied aspects of quantitative solutions. 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.

**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 processes, technologies, and methodologies that are commonly used in understanding data to be able to effectively analyze the data. Emphasis is placed on data visualization. Prerequisite: A grade of C or better in BNAL 306 or permission of the instructor.

**BNAL 406. Spreadsheet Modeling and Analysis for Business Decisions. 3 Credits.**
This course introduces students to the use of spreadsheet modeling and self-service business intelligence tools to analyze data and make business decisions in Excel. Course topics include advanced Excel functions and tables. Power Pivot and the DAX language are used to extract meaningful information from large data sets. These topics are then applied to analyze problems in predictive analytics. Examples include advanced multiple regression and classification techniques in datamining. Prerequisites: A grade of C or better in BNAL 306 and a declared major in the University or permission of the Dean's Office.
BNAL 407/507. Management Science. 3 Credits.
Students are introduced to the 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, and genetic algorithms. Extensive analysis of results using duality theory and other techniques is incorporated to aid in the decision making process. Prerequisites: A grade of C or better in BNAL 306 and a declared major in the University or permission of the Dean’s Office.

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. Forecasting. 3 Credits.
Techniques for preparing business forecasts. 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 or EXCEL. 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.
Methods and techniques of digital computer simulation of business systems utilizing knowledge of data processing, statistics, probability theory and operations research. Areas of application include systems that experience waiting problems. Topics include the methodology for the construction of computer simulation models, model verification, validation, and analysis of results. This course also includes/qualifies as a CAP experience. 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.