BNAL - Business Analytics

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.

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 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.
BNAL 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 an equivalent course or instructor's permission.

BNAL 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. Prerequisite: A grade of C or better in BNAL 306 or an equivalent course or permission of the instructor.

BNAL 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. Prerequisite: A grade of C or better in BNAL 306 or BNAL 606 or an equivalent course or instructor's permission.

BNAL 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 or an equivalent course or permission of the instructor.

BNAL 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.

BNAL 606. Statistics for Managers. 2 Credits.
Statistical tools for solving business problems. Topics include: sampling distributions, confidence intervals, hypothesis testing, simple and multiple regressions, and time series forecasting. Emphasis is placed on the application of the tools to business problems. The Minitab Software is used to do most of the analysis. Prerequisites: Admission to the MBA Program and MBA 600 or MBA 601, MBA 601, MBA 602, MBA 603 and MBA 604.

BNAL 610. Fundamentals of Business Analytics. 2 Credits.
This course provides students with some common tools and techniques that are deployed in business analytics. Topics include big data and related terminology, data management, working with data, and statistical and quantitative methods used in descriptive, predictive, and prescriptive analytics. Prerequisites: Admission to the MBA Program, MBA 600 and BNAL 606 or MBA 600, MBA 601, MBA 602, MBA 603, MBA 604 and BNAL 606. Pre- or corequisite: BNAL 606.

BNAL 621. Simulation Modeling for Business Systems. 3 Credits.
This course covers both the theory and application of simulation modeling and analysis to business systems. Both discrete-event and continuous simulation modeling approaches are covered, using a major commercial simulation package. Emphasis will be on the use of simulation as a tool to support business decision making. Prerequisites: MBA 600 or instructor approval.

BNAL 667. 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.

BNAL 668. Internship in Business Analytics. 1-3 Credits.
Approval for enrollment and allowable credits are determined by the department and Career Development Services in the semester prior to enrollment.

BNAL 695. Selected Topics in Business Analytics. 3 Credits.
Advanced topics in business analytics offered periodically. Prerequisites: Permission of the department chair and graduate program director.

BNAL 697. Independent Study. 3 Credits.
Affords students the opportunity to undertake independent study under the direction of a faculty member. Prerequisite: Permission of the instructor.

BNAL 711. Multivariate Statistical Methods for Business. 3 Credits.
An applied study of statistical methods including analysis of variance, cross-sectional multiple regression, time series regression, panel data methods, discriminant analysis, and generalized linear models. Data analyzed using a computerized statistical package. Emphasizes development of the student's ability to use statistics for independent research. Prerequisites: BNAL 606 or equivalent.

BNAL 712. Advanced Statistical Models in Business Research. 3 Credits.
Advanced statistical models that are commonly encountered in business research. Topics include confirmatory factor analysis as well as structural equation modeling. Emphasis is on model development as well as use of statistical software in analyzing realistic business-oriented data sets. Prerequisites: BNAL 711.

BNAL 715. Multilevel Modeling in Business Research. 1 Credit.
This course introduces the fundamentals of multilevel modeling. Alternative methods of analysis are discussed and critiqued. Use of specialized multilevel modeling software is demonstrated. Topics include a detailed discussion of the issues associated with variable centering. Applications to business research investigations are emphasized. Prerequisites: BNAL 711 or permission of the instructor.

BNAL 721. Simulation Modeling for Business Systems. 3 Credits.
This course covers both the theory and application of simulation modeling and analysis to business systems. Both discrete-event and continuous simulation modeling approaches are covered, using a major commercial simulation package. Emphasis will be on the use of simulation as a tool to support business decision making. Prerequisites: BNAL 606 or STAT 330 or MSIM 601 or BNAL 476 or BNAL 576 or BNAL 722 or BNAL 822.

BNAL 722. Agent-Based Simulation and Modeling. 3 Credits.
This course will explore both the conceptual and technical aspects of agent-based simulation, particularly as utilized for modeling of business systems. Students will learn to develop agent-based simulation models using a major commercial simulation package. Prerequisites: MBA 600 or BNAL 606 or MSIM 601 or BNAL 476 or BNAL 576 or BNAL 721 or BNAL 821.

BNAL 796. Selected Topics in Business Analytics. 1-3 Credits.
The advanced study of selected topics not offered on a regular basis.

BNAL 821. Simulation Modeling for Business Systems. 3 Credits.
This course covers both the theory and application of simulation modeling and analysis to business systems. Both discrete-event and continuous simulation modeling approaches are covered, using a major commercial simulation package. Emphasis will be on the use of simulation as a tool to support business decision making. Prerequisites: BNAL 606 or STAT 330 or MSIM 601 or BNAL 476 or BNAL 576 or BNAL 722 or BNAL 822.
BNAL 822. **Agent-Based Simulation and Modeling. 3 Credits.**
This course will explore both the conceptual and technical aspects of agent-based simulation, particularly as utilized for modeling of business systems. Students will explore the roots and literature of agent-based modeling and related fields. Students will also learn to develop agent-based simulation models using a major commercial simulation package. Prerequisites: MBA 600 or BNAL 606 or MSIM 601 or BNAL 476 or BNAL 576 or BNAL 721 or BNAL 821.