BNAL - Business Analytics

BNAL 206 Business Analytics I (3 Credit Hours)
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 Credit Hours)
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 Credit Hours)
Approval for enrollment and allowable credits are determined by the department. Additional support may be provided by the Monarch Internship and Co-Op Office 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 Credit Hours)
Approval for enrollment and allowable credits are determined by the department. Additional support may be provided by the Monarch Internship and Co-Op Office in the semester prior to enrollment.
Prerequisites: BNAL 306 and a declared major in the University or permission of the Dean's Office

BNAL 369 Practicum (1-3 Credit Hours)
Approval for enrollment and allowable credits are determined by the department in the semester prior to enrollment; additional support may be provided by the Monarch Internship and Co-Op Office 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 Credit Hours)
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.
Prerequisites: A grade of C or better in BNAL 306 or permission of the instructor

BNAL 405 Spreadsheet-Based Data Analysis for Decision Making (3 Credit Hours)
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 Credit Hours)
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 Credit Hours)
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 430/530 Probability and Statistics (3 Credit Hours)
This course provides a foundational understanding of probability and statistics in a business context. Students learn to analyze data, make informed decisions, and solve business problems using statistical techniques. 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.
Prerequisites: Instructor permission

BNAL 432/532 Predictive Analytics for Business (3 Credit Hours)
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 476/576 Simulation Modeling and Analysis for Business Systems (3 Credit Hours)
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 Credit Hours)
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 Credit Hours)
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 Credit Hours)
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.
Prerequisites: 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 Credit Hours)
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 or an equivalent course or permission of the instructor

BNAL 515 Advanced Business Analytics/Big Data Applications (3 Credit Hours)
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 or BNAL 606 or an equivalent course or instructor's permission

BNAL 530 Probability and Statistics (3 Credit Hours)
This course provides a foundational understanding of probability and statistics in a business context. Students learn to analyze data, make informed decisions, and solve business problems using statistical techniques. 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.
Prerequisites: Admission to the MBA program OR approval by the MBA program office

BNAL 532 Predictive Analytics for Business (3 Credit Hours)
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 Credit Hours)
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 630 Intelligent Systems & Business Analytics (3 Credit Hours)
This course explores the intersection of intelligent systems and business analytics. Students gain insights into leveraging artificial intelligence and data analysis techniques to drive informed decision-making and solve complex business problems. Topics include descriptive analytics, predictive analytics, prescriptive analytics, AI, machine learning, and real-world case studies in various industries.
Prerequisites: BNAL 530 OR MBA 600 and BNAL 606

BNAL 667 Cooperative Education (1-3 Credit Hours)
Approval for enrollment and allowable credits are determined by the department. Additional support may be provided by the Monarch Internship and Co-Op Office in the semester prior to enrollment.

BNAL 668 Internship in Business Analytics (1-3 Credit Hours)
Approval for enrollment and allowable credits are determined by the department. Additional support may be provided by the Monarch Internship and Co-Op Office in the semester prior to enrollment.

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

BNAL 697 Independent Study (3 Credit Hours)
Affords students the opportunity to undertake independent study under the direction of a faculty member.
Prerequisites: Permission of the instructor

BNAL 711 Multivariate Statistical Methods for Business (3 Credit Hours)
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 Credit Hours)
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 Hour)
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 and Supply Chain Systems (3 Credit Hours)
This course covers both the theory and application of simulation modeling and analysis to business, supply chain, and logistics 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, supply chain, and logistics decision making.
Prerequisites: BNAL 606 or STAT 330 or MSIM 601 or BNAL 476 or BNAL 576 or BNAL 722, or BNAL 822, or instructor's permission

BNAL 722 Agent-Based Simulation and Modeling (3 Credit Hours)
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

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

BNAL 821 Simulation Modeling for Business and Supply Chain Systems (3 Credit Hours)

This course covers both the theory and application of simulation modeling and analysis to business, supply chain, and logistics 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, supply chain, and logistics decision making.

Prerequisites: BNAL 606 or STAT 330 or MSIM 601 or BNAL 476 or BNAL 576 or BNAL 722 or BNAL 822, or permission of the instructor or department

BNAL 822 Agent-Based Simulation and Modeling (3 Credit Hours)

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