Washington State University
MAJOR CURRICULAR CHANGE FORM - - COURSE
(Submit original signed form and ten copies to the Registrar’s Office, zip 10355)

Future Effective Date: 08/19/2013 (effective date cannot be retroactive)
☐ New course □ Temporary course □ Drop service course
☐ There is a course fee associated with this course (see instructions)

☐ Variable credit __________________
☐ Increase credit (former credit ________)
☐ Number (former number ________)
☐ Crosslisting (between WSU departments) (Must have both departmental signatures)
☐ Conjoint listing (400/500)
☐ Request to meet Writing in the Major [M] requirement (Must have All-University Writing Committee Approval)
☐ Request to meet GER in __________ (Must have GenEd Committee Approval) ☐ Fulfills GER lab (L) requirement
☐ Professional course (Pharmacy & Vet Med only) ☐ Graduate credit (professional programs only)
☐ Other (please list request)

BA course prefix 514 Business Analytics: Transforming Data into Decisions
course no. title

03 3 0 0 Admission to the MBA, Master of Accounting, or Business PhD programs.
credit lecture hrs lab hrs studio hrs prerequisite
per week per week per week

Description (20 words or less) Advanced decision-making concepts utilizing relevant datasets for data-driven problem-solving and formulating decision analyses to evaluate and recommend management action.

Instructor: KD Joshi Phone number: 335-5722 Email: joshi@wsu.edu
Contact: Cheryl Oliver Phone number: 335-2363 Email: oliverc@wsu.edu
Campus Zip Code: 4710

- Please attach rationale for your request, a current and complete syllabus, and explain how this impacts other units in Pullman and other branches (if applicable).
- Secure all required signatures and provide 10 copies to the Registrar’s Office.

Chair/date  Dean/date  General Education Com/date
Chair (if crosslisted/interdisciplinary)* Dean (if crosslisted/interdisciplinary) * Graduate Studies Com/date

All-University Writing Com/date Academic Affairs Com/date Senate/date

*If the proposed change impacts or involves collaboration with other units, use the additional signature lines provided for each impacted unit and college.
BA514: Business Analytics: Transforming Data into Decisions

**Instructor Information**
Instructor Name: TBA  
Office Location: TBA  
Contact Information: TBA  
Office Hours: TBA  
Course Prefix: BA514

**Course Information**
Catalog Name and Description: Business Analytics: Transforming Data into Decisions

Catalog Description: Apply Excel and other analytical tools to explore and analyze data in order to predict the future and prescribe managerial action.

Number of Credits: 3 Credits

Prereq: Admission to MBA program


**Course Overview**
This course is designed to equip students with knowledge and skills necessary for data-driven decision making. Good decision makers should be able to recognize and formulate decision problems, represent the essential structure of the decision situation, and analyze the problem using appropriate tools and techniques in order to recommend various courses of action. Decision making is characterized in this course as a four-step process outlined below. In this course you will learn to conduct each of these steps using a variety of analytical tools and techniques. **This course will be application oriented** where students will learn the key decision making concepts by using datasets which focus on analyzing business problems in a data-driven fashion.

1. Defining the Problem Structure: Identify the problem; prioritize relevant values, interests, and objectives surrounding the problem; and diagnose relevant causes of the problem.
2. Developing Alternatives: Generate a range of plausible solutions or alternative courses of action.
3. Evaluating Alternatives: Analyze and predict the consequences of the courses of action and assess their impact on the relevant interests and objectives.
4. Recommending Courses of Action: Provide recommendations regarding the various courses of action by keeping tradeoffs, competing interests, and uncertainty and risks in mind.
Student Learning Outcomes

At the end of the class, students will be able to:
1. Define and structure a decision problem.
2. Identify external and internal organizational sources of data available for decision making.
3. Transform data into decisions using spreadsheet engineering, modeling, and analysis skills.
4. Explore, describe, and summarize data using statistical and visualizing techniques.
5. Apply analytical tools and techniques to generate, evaluate and support courses of action based on data-driven analysis.

Course Outline

The students will learn to apply the key decision making concepts by using datasets/cases which focus on analyzing business problems in a data-driven fashion. More specifically, all the topics listed in this course outline will be taught using large datasets and cases which are listed under the “Potential Datasets and Cases for this Course.” Moreover, the students will also apply these tools to conduct their group project.

Week 1: Introduction to Business Analytics and Analytics in Spreadsheets
Reading: Evans, Chapters 1 and 2

A. Business Analytics
B. Spreadsheet Engineering and Analysis Using Excel
   1. Advanced Excel functions
   2. Spreadsheet add-ins for business analytics
   3. Spreadsheet engineering techniques: Designing user-friendly spreadsheets

Weeks 2 & 3: Defining the Problem & Collecting, Visualizing, Exploring Data

A. Framing the decision problem and diagnosing causes
   1. Problem tree analysis
   2. Use of business intelligence tools (OLAP & Cubes) to visualize and identify problems
   3. Ishikawa diagrams for cause and effect analysis
B. Data collection
   1. Overview of relevant internal and external secondary data sources
   2. Primary data collection methods
      a. Surveys
      b. Experiments
BA514: Business Analytics: Transforming Data into Decisions

c. Focus groups
d. Interviews
e. Delphi methods
f. Market research

C. Identifying and Defining Problems by Visualizing and Exploring Data
Effective data visualization is an important tool in the decision making process. It allows business decision makers to quickly explore and examine large amounts of data to identify and define the problems. Specifically, it exposes trends and issues efficiently, allows for effective exchange of ideas among key players, and influences the decisions pathways and outcomes. In this section, the students will learn to use various types of visual tools (Charts, Pareto analysis, Pivot (dynamic) charts) not only to identify and define the problem, but also to assess the robustness of their recommendations.

Week 4: Developing alternatives

A. Objective tree analysis
B. Gap analysis
C. Brainstorming
D. Idea generation
E. Decision-making diagram
F. PMI (plus, minus, and interesting charts)

Week 5: Probability distributions and data modeling
Reading: Evans, Chapter 5

The student will apply the following concepts to complex business situations using large data-sets.

A. Concepts of probability and its application in business decision making
B. Random variables and probability distributions
C. Data modeling and distribution fitting

Week 6: Sampling, Estimation, and Statistical Inference
Readings: Evans, Chapters 6 and 7

The student will apply the following concepts to complex business situations using large data-sets.

A. Statistical sampling
B. Estimating population parameters
C. Sampling error
D. Sampling distributions
E. Interval estimates
F. Prediction intervals
G. Confidence intervals and sample size
H. Hypothesis Testing
K. ANOVA
L. Chi-squared test for independence

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Week 7: Predictive modeling and analysis
Reading: Evans, Chapter 8

A. Logic-driven modeling
B. Data-driven modeling
C. Analyzing uncertainty and model assumptions
D. Sensitivity Analyses
E. Model analysis using the Risk Solver Platform

Weeks 8-10: Regression analysis
Reading: Evans, Chapter 9

A. Simple linear regression
B. Residual analysis and regression assumptions
C. Multiple linear regression
D. Building good regression models
E. Regression with categorical independent variables
F. Regression models with nonlinear terms
G. Transformation – especially log
H. Stepwise regression
I. Logistics regression

Week 11-13: Forecasting techniques
Reading: Evans, Chapter 10

A. Qualitative and judgmental forecasting
B. Statistical forecasting methods
   1. Moving average models
   2. Error metrics and forecast accuracy
   3. Exponential smoothing models
   4. Regression models for time series with seasonality
   5. Regression forecasting with causal variables

Week 14 & 15: Decision Analysis
Reading: Evans, Chapter 18

A. Decision making under complete uncertainty
B. Decision trees
C. The value of information
D. Utility and decision making

Group Project
BA514: Business Analytics: Transforming Data into Decisions

Students are expected to complete a group project at the end of the semester. Each student group will conduct the following activities using the analytical tools covered in this course: Explore the data to define and structure a decision problem; identify additional sources of data which can be utilized to assess and solve the defined problem; analyze, summarize and visualize the problem to generate plausible solutions; provide recommendations regarding the various courses of action by keeping tradeoffs, competing interests, and uncertainty and risks in mind. While the project topic is expected to come from students, the instructor will also provide a list of possible topics and relevant datasets.

Potential Datasets and Cases for this Course
The following datasets and cases will be used to illustrate the practical application of the concepts discussed in class and for homework assignments. Some of these datasets may also be used for group projects.

Datasets
The following datasets can be used to cover the concepts listed above. For instance, Manufacturing and Marketing OLAP Cubes (which are available on CB Server), Excel Slicer, and Share PointServer can be used to cover the data visualization and problem identification concepts.

1. MaxMin Manufacturing OLAP Cubes (available on CB Server)
2. MaxMin Marketing OLAP Cubes (available on CB Server)
3. Dillard's Department Store Database (available at University of Arkansas's Enterprise Systems)
4. Hallux Productions Database (available at University of Arkansas's Enterprise Systems)
5. Sam's Club Database (available at University of Arkansas's Enterprise Systems)
6. Tyson Frozen Foods Database (available at University of Arkansas's Enterprise Systems)
7. Census data and Crime Data (available from ICPSR Consortium)
8. Stock Market datasets
9. Small application oriented datasets included in the recommended book

Cases related to Decision Making
1. Lorex Pharmaceuticals case
2. Kendall Crab and Lobster case
3. Hidden Traps in Decision Making
BA514: Business Analytics: Transforming Data into Decisions

5. What You Don't Know About Making Decisions
6. Kendall-Vetmat
7. Testing, Monitoring, and Adjusting Strategic Objectives Through Data Analytics at Northwestern Mutual
8. Big Data: The Management Revolution
9. Fashion Channel: Market Segmentation
11. Cases included in the recommended book

Course Grades, Policies & Regulations

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**WSU Disability Statement:** DDP and the Disability Resource Center (DRC) work together to provide reasonable accommodations for students who have documented disabilities and who are registered both with DDP and the DRC. DDP’s liaison to the DRC will assist you in getting started. To begin this process, contact DDP (800-222-4978 or distance@wsu.edu). It is important that you notify DDP as soon as possible of your needs or that you suspect that you may need accommodation so DDP can initiate the process with DRC and facilitate accommodation. Late notification may cause the requested accommodations to be unavailable. All accommodations must be approved through Disability Resource Center [http://www.drc.wsu.edu](http://www.drc.wsu.edu).

**Academic Integrity:** Academic integrity is the cornerstone of the university. You assume full responsibility for the content and integrity of the academic work you submit. You may collaborate with classmates on assignments; however, the guiding principle of academic integrity shall be that your submitted work, examinations, reports, and projects must be your own work. Any student who violates WSU’s standard of conduct relating to academic integrity ([Academic Integrity Standards and Procedures at http://www.conduct.wsu.edu/](http://www.conduct.wsu.edu/)) will be referred to the Office of Student Conduct and may fail the course.

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**WSU Safety Statements:**
Washington State University is committed to maintaining a safe environment for its faculty, staff, and students. Safety is the responsibility of every member of the campus community and individuals should know the appropriate actions to take when an emergency arises. In support of our commitment to the safety of the campus community the University has developed a Campus Safety Plan, [http://safetyplan.wsu.edu](http://safetyplan.wsu.edu). It is highly recommended that you visit this web site as well as the University emergency management web site at [http://oem.wsu.edu/](http://oem.wsu.edu/) to become familiar with the information provided.
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Academic Integrity: Academic integrity is the cornerstone of the university. You assume full responsibility for the content and integrity of the academic work you submit. You may collaborate with classmates on assignments; however, the guiding principle of academic integrity shall be that your submitted work, examinations, reports, and projects must be your own work. Any student who violates WSU’s standard of conduct relating to academic integrity (Academic Integrity Standards and Procedures at http://www.conduct.wsu.edu/) will be referred to the Office of Student Conduct and may fail the course.

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