



Assisting institutions of higher learning incorporate SAS technology into their academic programs

# Data Mining Certificate Program

*“As competitive as the job market is now, students of all ages are demanding the latest technology from their business schools. Our partnership with SAS allows us to provide our students with the skills they need when they enter or re-enter the job market.”*

**Tom Bohannon**

Assistant Vice President  
Office of Information Management and Testing Services  
Baylor University

*“By partnering with SAS, I believe we can more quickly provide an educational experience for our students to meet the growing marketplace demand.”*

**Mike Hardin**

Professor of Statistics  
Department of Information Systems,  
Statistics and Management Science  
University of Alabama

*“The Data Mining Certificate provides students with the statistical knowledge and SAS programming experience they need to make an immediate impact in the world of business. It provides prospective employers with a benchmark for measuring data mining skills in the analytical world.”*

**Morgan Wang**

Director of Data Mining Program  
University of Central Florida

Because SAS is the world's leading developer of business intelligence analytical software and the market leader in data mining, individuals with strong SAS skills are in great demand. To better assist universities develop a curriculum incorporating SAS data mining expertise, SAS Higher Education Consulting has developed the data mining certificate program. The certificate will give students a competitive advantage in the marketplace. The certificate documents students' course work utilizing SAS' award winning data mining technology. Both the university and SAS believe this knowledge will enable them to have an immediate impact in the business world.

Designed using pre-existing courses, or ones developed in consultation with SAS Higher Education Consulting, SAS will co-sponsor the certificate, provided the program meets the requirements listed on the reverse side. Upon completion of the program, students will earn the certificate, which will be administered and distributed by your institution.

**The certificate must include a minimum of 12 semester hours of course credit or the equivalent and must cover the topics listed below:**

### **Business Perspective**

The program should address data mining from a business perspective and should address problem definition, team building, and solution strategies including data sources, business objectives, and implementation requirements.

### **Data Warehousing/Data Preparation**

Before data analysis and predictive modeling can begin, the data must be available for use. Therefore, data mining must begin with a basic understanding of where the data is stored and how it can be brought together for analysis purposes. To that end, the program must include a data warehousing/data preparation component that consists of:

- Basic data warehousing methodology
- Importing data into the SAS System
- Basic macro and SQL programming
- Data cleansing
- Data exploration and visualization
- Missing value imputation

### **Statistics**

A thorough knowledge of the statistical techniques used in data mining is essential to an informed use of those techniques. As a result, the program must include:

- An introduction to probability
- Statistical sampling techniques
- Linear and logistic regression
- Decision trees
- Neural networks
- Unsupervised modeling, such as cluster analysis and market basket analysis

Some coverage of SAS analytical procedures, such as SAS/STAT, SAS/QC, and SAS/ETS should be an integral part of the statistical component of the program.

### **Data Mining Using Enterprise Miner**

The final aspect of the program is hands-on experience with data mining. This part of the program should include some discussion of data mining methodology and should incorporate the use of SAS Enterprise Miner, including, as a minimum, extensive use of the following nodes:

- Input Data Source
- Sampling
- Data Partition
- Variable Selection
- Mosaic Plot and/or Insight
- Association
- Transform Variables
- Replacement
- Regression
- Tree
- Neural Network
- Assessment

Throughout the program, students should be involved in hands-on analysis of data. The program should culminate with the completion of one or more major data mining projects. The results of these data mining projects should be presented in a formal manner to ensure that the student has first-hand experience in delivering the findings to a group of their peers and upper management representatives.

## **About SAS Higher Education Consulting:**

The SAS Higher Education Consulting group is located within the Education Division at SAS. Headquartered in Cary, North Carolina, Higher Education Consulting works with universities and community colleges from around the country to incorporate SAS technology into their curricula. In addition to the Data Mining Certificate Program,

SAS Higher Education Consulting can provide a number of other services, including curriculum consulting, co-authorship of academic publications, academic trainer's kits, higher education pilot programs and access to the SAS Learning Edition, a personal learning copy of SAS.

## **Contact Us**

To learn more about SAS Higher Education Consulting or the Data Mining Certificate Program contact us at **1-800-333-7660**, email us at **training@sas.com**, or visit us on the Web at **www.sas.com/heconsulting**.



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