COURSE SYLLABUS

SAS

50 Cragwood Rd, Suite 350
South Plainfield, NJ 07080

Victoria Commons, 613 Hope Rd Building #5,
Eatontown, NJ 07724

130 Clinton Rd,
Fairfield, NJ 07004
Avtech Institute of Technology Course

Instructor: 
Course Duration: 80
Date/Time: 
Training Location: 

Course: Statistical Analysis System

Text / Lab Books

SAS® AppDev Studio
Use the Eclipse platform to support SAS applications. http://support.sas.com/rnd/appdev/V30/

Course Description

The SAS System (originally Statistical Analysis System) is an integrated system of software products provided by SAS Institute that enables the programmer to perform: data entry, retrieval, management, and mining report writing and graphics, statistical and mathematical analysis, business planning, forecasting, and decision support, operations research and project management, quality improvement, applications development, data warehousing (extract, transform, load), platform independent and remote computing.

In addition, the SAS System integrates with many SAS business solutions that enable large scale software solutions for areas such as human resource management, financial management, business intelligence, customer relationship management and more.

SAS Financial Intelligence brings unprecedented focus to your finance department and creates a level of knowledge that empowers financial experts to become trusted advisors at every level of your enterprise.

The contents of this course includes: Base SAS, Data Visualization, Enterprise Management Integration, Migration, Scalability & Performance, Statistics & Operations Research

Learning Objectives

1.0 Research Strategy
  1.1. Introduction
    1.1.1. Early History of SAS
    1.1.2. Version History
1.1.3. Components
1.1.3.1. SAS Add-In for Microsoft Office
1.1.3.2. Base SAS
1.1.3.3. SAS Enterprise Business Intelligence Server
1.1.3.4. Enterprise Computing Offer (ECO)
1.1.3.5. Enterprise Miner
1.1.3.6. ETL
1.1.3.7. SAS/ACCESS
1.1.3.8. SAS/ACCESS for PC Files
1.1.3.9. SAS/AF
1.1.3.10. SAS/ASSIST
1.1.3.11. SAS/C
1.1.3.12. SAS/CONNECT
1.1.3.13. SAS/DMI
1.1.3.14. SAS/EIS
1.1.3.15. SAS/ETS
1.1.3.16. SAS/FSP
1.1.3.17. SAS/GIS
1.1.3.18. SAS/GRAPH
1.1.3.19. SAS/IML
1.1.3.20. SAS/INSIGHT
1.1.3.21. SAS/IntrNet
1.1.3.22. SAS/LAB
1.1.3.23. SAS/OR
1.1.3.24. SAS/PH-Clinical
1.1.3.25. SAS/QC
1.1.3.26. SAS/SHARE
1.1.3.27. SAS/STAT
1.1.3.28. SAS/TOOLKIT
1.1.3.29. SAS/Warehouse Administrator
1.1.3.30. SAS Web Report Studio

1.2. Terminology
1.2.1. SAS Programs, tables, rows, columns/fields, SPSS, graphical user interfaces, application programming interfaces, statements and procedures
1.2.2. 3 major parts of SAS: DATA step, Procedure steps, and macro language
1.2.3. File structure, database-oriented fourth-generation programming languages (SQL, Focus), operating System, program loop
1.2.4. Data set, statistical analysis, macro code, imperative and procedural programming SAS/IML component
1.2.5. Preprocessing, runtime, general-purpose programming languages, information technology

1.3. Features
1.3.1. Read and write many different file formats
1.3.2. Process data in many different formats
1.3.3. SAS programming language (4GL programming language)
1.3.4. Interaction with database products through SQL (and ability to use SQL internally to manipulate SAS data sets)
1.3.5. Direct output of reports to CSV, HTML, PCL, PDF, PostScript, RTF, XML, and more using ODS
1.3.6. Interaction with the operating system
1.3.7. Fast development time, particularly from the many built-in procedures
1.3.8. Hundreds of built-in functions for manipulating character and numeric variables
1.3.9. An integrated development environment
1.3.10. Dynamic data-driven code generation using the SAS Macro language
1.3.11. Can process files containing millions of rows and thousands of columns of data
1.3.12. Read and write many different file formats
1.3.13. Process data in many different formats
1.3.14. Many built-in statistical and random number functions

1.4. Measurement Scales for Variables
1.5. Defining the Target
1.6. Sources of Modeling Data
1.7. Pre-Processing the Data
1.8. Alternative Modeling Strategies

2.0 Base SAS
2.1. Introduction
   2.1.1. DATA Step
   2.1.2. ODS
   2.1.3. SASr9
   2.1.4. Universal Printing
   2.1.5. XML Engine
   2.1.6. Preproduction
2.2. Getting Started with Predictive Modeling
   2.2.1. Introduction
   2.2.2. Opening SAS Enterprise Miner
   2.2.3. Creating a New Project in SAS Enterprise
   2.2.4. Miner 5.2
   2.2.5. The SAS Enterprise Miner Window
   2.2.6. Creating a SAS Data Source
   2.2.7. Creating a Process Flow Diagram
2.3. Variable Selection and Transformation of Variables
   2.3.1. Introduction
   2.3.2. Variable Selection
   2.3.3. Transformation of Variables
2.4. Building Decision Tree Models to Predict Response and Risk
   2.4.1. Introduction
   2.4.2. An Overview of the Tree Methodology in SAS
   2.4.3. Enterprise Miner
   2.4.4. Development of the Tree in SAS Enterprise Miner
   2.4.5. A Decision Tree Model to Predict Response to
   2.4.6. Direct Marketing
2.4.7. Developing a Regression Tree Model to Predict Risk
2.4.8. Risk
2.5. Neural Network Models to Predict Response and Risk
  2.5.1. Introduction
  2.5.2. A General Example of a Neural Network Model
  2.5.3. Estimation of Weights in a Neural Network Model
  2.5.4. A Neural Network Model to Predict Response
  2.5.5. A Neural Network Model to Predict Loss
  2.5.6. Frequency in Auto Insurance
  2.5.7. An Introduction to Radial Basis Functions
  2.5.8. Alternative Specifications of the Neural Network
  2.5.9. Architecture
2.6. Regression Models
  2.6.1. Introduction
  2.6.2. What Types of Models Can Be Developed Using The Regression Node?
  2.6.3. An Overview of Some Properties of the Regression Node
  2.6.6. Business Applications
2.7. Comparison of Different Models
  2.7.1. Introduction
  2.7.2. Models for Binary Targets: An Example of Predicting Attrition Models for Ordinal Targets: An Example of Predicting Accident Risk
  2.7.4. Comparison of All Three Accident Risk Models
2.8. Customer Profitability
  2.8.1. Introduction
  2.8.2. Acquisition Cost
  2.8.3. Cost of Default
  2.8.4. Revenue
  2.8.5. Profit
  2.8.6. The Optimum Cut-off Point
  2.8.7. Alternative Scenarios of Response and Risk
  2.8.8. Customer Lifetime Value
  2.8.9. Suggestions for Extending Results

3.0 Data Visualization
  3.1. Resources
  3.2. Technologies
  3.3. Products

4.0 Enterprise Management Integration
  4.1. BMC Patrol
  4.2. Hobbit Monitor
  4.3. HP Open View Operations
  4.4. IBM Tivoli
4.5. Microsoft Operations Manager
4.6. SAS Resources
4.7. Vendor Resources

5.0 Migration
5.1. Planning
5.2. Execution
5.3. PROC MIGRATE
5.4. Industry-specific Answers
5.5. National Language Support
5.6. Papers

6.0 Scalability & Performance
6.1. Papers
6.2. Grid Computing
6.3. SAS/ACCESS Software
6.4. SAS/CONNECT Software
6.5. Platform Suite for SAS
6.6. SAS OLAP Server
6.7. Scalable SAS Procedures
6.8. SPD Engine
6.9. SPD Server
6.10. ARM Tools
6.11. FULLSTIMER option

7.0 Statistics & Operations Research
7.1. Resources
7.2. Feedback
7.3. Products
7.4. Applications

8.0 SAS AppDev Studio
8.1. Reference
8.2. SAS Notes
8.3. Downloads

Prerequisite

Background in Computer Programming

Contact Hours
______ Contact Hours (Lecture ___ Hours / Lab ____ Hours)
Semester Credit Hours

__________ semester credit hours

Teaching Strategies

A variety of teaching strategies may be utilized in this course, including but not limited to, lecture, discussion, written classroom exercises, written lab exercises, performance based lab exercises, demonstrations, quizzes and examinations. Some quizzes may be entirely or contain lab based components. A mid-course and end course examination will be given.

Method of Evaluating Students

Grade Distribution

<table>
<thead>
<tr>
<th>Class Attendance</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mid Term</td>
<td>30</td>
</tr>
<tr>
<td>Finals</td>
<td>50</td>
</tr>
<tr>
<td>Special Projects</td>
<td>10</td>
</tr>
<tr>
<td>Makeup Projects</td>
<td>10</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100%</td>
</tr>
</tbody>
</table>

Grading Policy

At the end of each course, each student is assigned a final grade as follows:

<table>
<thead>
<tr>
<th>Point Range</th>
<th>Interpretation</th>
<th>Grade</th>
<th>Quality Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>90 – 100</td>
<td>Excellent</td>
<td>A</td>
<td>4.0</td>
</tr>
<tr>
<td>80 – 89</td>
<td>Very Good</td>
<td>B</td>
<td>3.0 – 3.9</td>
</tr>
<tr>
<td>70 – 79</td>
<td>Average</td>
<td>C</td>
<td>2.0 – 2.9</td>
</tr>
<tr>
<td>60 – 69</td>
<td>Poor</td>
<td>D</td>
<td>1.0 – 1.9</td>
</tr>
<tr>
<td>Below 60</td>
<td>Failure</td>
<td>F</td>
<td>0</td>
</tr>
<tr>
<td>N/A</td>
<td>Withdrawal</td>
<td>W</td>
<td>0</td>
</tr>
<tr>
<td>N/A</td>
<td>Pass</td>
<td>P</td>
<td>0</td>
</tr>
<tr>
<td>N/A</td>
<td>Incomplete</td>
<td>I</td>
<td>0</td>
</tr>
</tbody>
</table>

A student earning a grade of D or above is considered to have passed the course and is eligible to pursue further studies. A student receiving a grade of F has failed the course. A failed course must be repeated and passed to meet Avtech Institute’s graduation requirements, in addition to an overall program GPA of 2.0.
Requirements for Successful Completion of the Course
At a minimum, students must achieve the following:

- A passing grade of D or above
- Completion of all required examinations
- Submission of all required lab exercises and projects and;
- Adherence to the school attendance policy.

Equipment Needed
Industry standard desktop computer for lab exercises.

Equipment Breakdown
Lab room
Videos and Projector

Library Assignments
To be determined by the instructor.

Portfolio Assignment
Student program outcome portfolios are required to demonstrate student competencies. In conjunction with your course structure, please select a project/paper that best demonstrates what you have learned in this course and add it to your program portfolio.

Course Policies

Disruptive Behavior
Disruptive behavior is an activity that interferes with learning and teaching. Inappropriate talking during class, surfing inappropriate website, tardiness, cheating, alcohol or drug use, use of cell phone, playing loud music during class, etc. all disrupt the learning process.

Copyright Infringement
Specific exemptions to copyright infringement are made for student use in the context of learning activities. Graphic design students often download images from the Internet, or scan images from publications. As long as this work is for educational purpose, and subject to faculty permission, this is not a problem.

Plagiarism
Faculty cannot tolerate the misrepresentation of work as the student’s own. This often involves the use by one student or another student’s design, whether voluntarily or involuntarily. In the event that plagiarism is evident and documented, all students involved in the conscious decision to misrepresent work must receive an F as the grade for the project. A second occurrence may result in suspension for the rest of the quarter, and return to the school only after a review by the Academic Standards Committee.
**Attendance**

**Attendance and Lateness**

In education and the workplace, regular attendance is necessary if individuals are to excel. There is a direct correlation between attendance and academic success. Attendance is mandatory. All students must arrive on time and prepared to learn at each class session. At the faculty member’s discretion, students may be marked absent if they arrive more than 15 minutes late to any class. More than five absences in a class that meets twice per week or more that two absences in a class that meets once per week may result in a failure.

**Make-Up Work**

**Late Projects and Homework**

All projects and homework must be handed in on time. Homework should be emailed to your instructor if you are going to miss a class. Work that is submitted one week late will result in the loss of one full grade; and work that is submitted two weeks late will result in the loss of two full grades; more than two weeks late you will receive a failing grade on the project.