MIS530: PREDICTIVE ANALYTICS

Credit Hours: 3

Contact Hours: This is a 3-credit course, offered in accelerated format. This means that 16 weeks of material is covered in 8 weeks. The exact number of hours per week that you can expect to spend on each course will vary based on the weekly coursework, as well as your study style and preferences. You should plan to spend 14-20 hours per week in each course reading material, interacting on the discussion boards, writing papers, completing projects, and doing research.

Faculty Information: Faculty contact information and office hours can be found on the faculty profile page.

COURSE DESCRIPTION AND OUTCOMES

Course Description:

This course covers the fundamental predictive analytics and data mining approaches applied in business. It introduces basic concepts and techniques to discover patterns in data, identify variables with the most predictive power, and develop predictive models. Advanced predictive models will be examined.

Course Overview:

Welcome to MIS530, Predictive Analytics. In this course, you will learn the basics, along with some advanced topics, in predictive analytics. The topics covered in this course include research strategies, variable selection, decision-tree models, neural network models, regression modules, advanced predictive modules, supervised and unsupervised (descriptive) models, and multiple target prediction. We will also cover best practices in the selection of methods, and tools to build predictive models.

Course Learning Outcomes:

1. Examine the fundamentals of predictive analytics.
2. Demonstrate variable selection, decision tree modeling, neural networks, and regression models for predictive analytics.
3. Demonstrate comparing and combining models for predictive analytics.
4. Evaluate advanced predictive models.

PARTICIPATION AND ATTENDANCE

Prompt and consistent attendance in your online courses is essential for your success at CSU-Global Campus. Failure to verify your attendance within the first seven days of this course may result in your withdrawal. If for some reason you would like to drop a course, please contact your advisor.

Online classes have deadlines, assignments, and participation requirements just like on-campus classes. Budget your time carefully and keep an open line of communication with your instructor. If you are having technical problems, problems with your assignments, or other issues that are impeding your progress, let your instructor know as soon as possible.

COURSE MATERIALS

Required:
Abbott, D. (2014). *Applied predictive analytics: Principles and techniques for the professional data analyst.* John Wiley & Sons. ISBN-13: 978-1118727966/ ISBN-10: 1118727967

Sarma, K. (2017). *Predictive modeling with SAS Enterprise Miner: Practical solutions for business applications* (3rd ed.). Cary, North Carolina: SAS Institute. ISBN-13: 978-1629602646

SAS Institute (2017). *Advanced predictive modeling using SAS Enterprise Miner*. [Course Notes]. ISBN-13: 978-1-63526-115-8 a PDF of this resource is linked in the modules and it is also available in the Student Resources section for this course.

 Required Technology:

Please note the section at the bottom of this syllabus on "SAS Resources and Information on Certification."

Suggested:
Cordoba, A. (2014). *Understanding the predictive analytics lifecycle*. Hoboken, New Jersey: John Wiley & Sons. ISBN-13: 978-1118867105

Maisel, L., & Cokins, G. (2014). *Predictive business analytics: Forward looking capabilities to improve business performance*. Hoboken, New Jersey: Wiley Publishing. ISBN-13: 978-1118175569

Larose, D., & Larose, C. (2015). *Data mining and predictive analytics* (2nd ed.). Hoboken, New Jersey: Wiley Publishing. ISBN-13: 978-1118116197

SAS Institute. (2013). *Data mining using SAS® Enterprise Miner: A case study approach* (3rd ed.). Retrieved from http://support.sas.com/documentation/cdl/en/emcs/66392/PDF/default/emcs.pdf

Winslow, M. (2007) *Predictive modeling lifecycle.* Minneapolis, MN: Towers Perrin. Retrieved from https://www.casact.org/education/specsem/f2007/handouts/winslow.pdf

NOTE: All non-textbook required readings and materials necessary to complete assignments, discussions, and/or supplemental or required exercises are provided within the course itself. Please read through each course module carefully.

COURSE SCHEDULE

Due Dates
The Academic Week at CSU-Global begins on Monday and ends the following Sunday.
- **Discussion Boards:** The original post must be completed by Thursday at 11:59 p.m. MT and peer responses posted by Sunday at 11:59 p.m. MT. Late posts may not be awarded points.
- **Critical Thinking:** Assignments are due Sunday at 11:59 p.m. MT.

Module 1

Readings

- Chapter 1 in *Applied Predictive Analytics: Principles and Techniques for the Professional Data Analyst*
- Chapter 1 in *Predictive Modeling with SAS Enterprise Miner: Practical Solutions for Business Applications*
- Chapter 1 in *Advanced Predictive Modeling Using SAS®Enterprise Miner™*
  - SAS Enterprise Miner Prediction Setup pages 1-5 through 1-8
  - Review setup pages 1-9 through 1-26
  - Prediction Basics pages 1-27 through 1-30
- Araz, O., Olson, D., & Ramirez-Nafarrate, A. (2019). Predictive analytics for hospital admissions from the emergency department using triage information. *International Journal of Production Economics*, 208, 199-207.
- Chalcraft, J. (2018). Drawing ethical boundaries for data analytics. *CA Information Management*, *52* (1), 18-25

Discussion (25 points)

Critical Thinking (25 points)

Option 1: **Setting up the SAS Enterprise Miner Connection and My Experience**

SAS Enterprise Miner will be used in this course. You will need to set up your account and the connection to the course for this week's CT assignment.

See the link here to access the SAS Enterprise Miner connection instructions.

Once the connection is complete. You will need to demonstrate that you can run SAS Enterprise Miner on your machine.

See the link here to access the instructions on running SAS Enterprise Miner OnDemand.

1. To demonstrate that you can run SAS Enterprise Miner on your machine, submit a step-by-step description with screenshots, each step describing how you went about setting up the connection and getting the SAS Enterprise Miner running on your system.
2. Also include in your submission descriptions of at least two challenges that you experienced while setting up SAS Enterprise Miner**.**

   Note: The first screen shot should show the SAS website in the browser, showing your course enrollment and the other screenshot should show each step you followed to setup the SAS Enterprise Miner and have it running on your system. **DO NOT** submit generic screenshots taken from the internet or other documents. It must be screenshots of your own computer screen. The date must be visible in the screen shots to confirm that the software is current and running on your system.

Requirements:

- Your paper should be two pages long, not counting the title page and reference page.
- Your paper must be formatted according to CSU-Global Guide to Writing & APA.
- If you need assistance with your writing style, start with the links under the Research Help and Writing Help tabs on the CSU-Global Library's homepage.

Review the **Module 1 Critical Thinking rubric** for full details on how you will be graded on this assignment.

Option 2: **Setting up the SAS Enterprise Miner Connection and What I Want to Learn**
SAS Enterprise Miner will be used in this course. You will need to set up your account and the connection to the course for this week's CT assignment.

See the link here for the SAS Enterprise Miner connection instructions.

Once the connection is complete. You will need to demonstrate that you can run SAS Enterprise Miner on your machine.

See the link here for the instructions on Running SAS Enterprise Miner OnDemand.
1. To demonstrate that you can run SAS Enterprise Miner on your machine, submit six screen shots. The first screenshot should be the SAS website screen showing your course enrollment, and the second screenshot should show the SAS Enterprise Miner running on your system. **DO NOT** submit generic screenshots taken from the internet or other documents. It must be screenshots of your own computer screen. The date must be visible in the screen shots to confirm that the software is current and running on your system. The remaining four (4) screen shots should be of the Enterprise Miner's *Create New Project* dialog. Each of these four screen shots should include one for each page of Create New Project Step 1 of 4.

   Tip: The first dialog for the *Create New Project* will be titled "**Create New Project—Step 1 of 4 Select SAS Server**"

2. Also, access Enterprise Miner's data exploration functionality by first going to the main menu. From the main menu go to: Actions -> Add Node -> Explore. You will see a list of data exploration functions (e.g., StatExplore, LinkAnalysis) that can be used in the Enterprise Miner. Using at least two paragraphs, describe any four of these functions that you might be interested in using.

   Note: The first screen shot should show the SAS website in the browser, showing your course enrollment. **DO NOT** submit generic screen shots taken from the internet or other documents. It must be screenshots of your own computer screen. The date must be visible in the screen shots to confirm that the software is current and running on your system.

Requirements:
- Your paper should be two pages long, not counting the title page and reference page.
- Your paper must be formatted according to CSU-Global Guide to Writing & APA.
- If you need assistance with your writing style, start with the links under the Research Help and Writing Help tabs on the CSU-Global Library's homepage.

Review the **Module 1 Critical Thinking rubric** for full details on how you will be graded on this assignment.
Portfolio Milestone (25 points)
Option 1: **Using Predictive Analytics to Solve Industrial Challenges**
Read the "Industrial" Portfolio Project assignment from Week 8 and create a brief, one-page summary of your final paper. This should mainly include a potential business predictive analytic problem that you could include in your final paper, including the name(s) of the predictive algorithms that will be used. Also, discuss why you chose the particular problem and justify how the specific predictive algorithms identified would attempt to solve the business problem identified.

Note*:* As you learn more about the common methodological approach commonly used, you may need to modify your final approach to this problem. Also in this assignment, a final solution is not needed—you will just submit a summary on the names of possible predictive algorithms and justification for usage.

Option 2: Using Data Analytics in a Hospital Setting
Read the "Hospital" Portfolio Project assignment from the Week 8 Portfolio Project. Think through the problem and provide a one-page summary on what steps you may use in solving the hospital analytics problem, including the name(s) of the predictive algorithms that will be used. Also discuss your justification for the specific algorithms, how the specific predictive algorithms identified would attempt to solve the "Hospital" problem.

Note: As you learn more about the methodological approach commonly used, you may need to modify your final approach to this problem. Also in this assignment, a final solution is not needed— just submit a summary on the names of possible predictive algorithms and justification for usage.

Module 2
Readings
- Chapter 2 in *Applied Predictive Analytics: Principles and Techniques for the Professional Data Analyst*
- *Advanced Predictive Modeling Using SAS®Enterprise Miner™*
    - Improving Nominal Input Variable Selection pages 4-3 through 4-11
    - Review the demonstration steps pages 4-12 through 4-20
    - Review demonstration steps 4-25 through 4-35
- Chapter 3 in *Predictive Modeling with SAS Enterprise Miner: Practical Solutions for Business Applications*
- Khabaza, T. (2010) *Nine laws of data mining* [Seminal source.]

Discussion (25 points)

Critical Thinking (75 points)
Option 1: New Libraries, Datasets, Diagrams, Input Data, Replacement, Decision Trees—Learning Lessons
Watch these SAS videos:
Getting Started with SAS Enterprise Miner: Setting Up an Enterprise Miner Project

Getting Started with SAS Enterprise Miner: Exploring Input Data and Replacing Missing Values

Recreate in SAS Enterprise Miner OnDemand the data analysis project shown in these two videos. In your recreation, for the **Partition the Input DATA** step, enter 50.0 for Training, and enter 50.0 for Validation in the dataset allocation boxes. Your **Donor Data** has been loaded to the course for you to connect in your **New Library**. Use the path specified in the following instructions instead of the one shown in the video: **See the link here for Library Connections instructions, and in the module with the assignment.**

After recreating the diagram using the two SAS videos, you will submit screenshots in a Word document plus a one-page summary describing what you learned about SAS Enterprise Miner. The screenshots should include the finalized diagram and the results screen with the following:

Donation Diagram Workspace Contents should show:
1. Donor Diagram node and full property window displayed
2. StatExplore node and full property windows displayed
3. Data Partition node and full property window displayed
4. Replacement node and full property window displayed

Make sure your screen shots show the whole donation diagram workspace as shown in the last video. Then provide four individual screenshots with the property window showing fully each node in the diagram.

Requirements:
- Your paper should be two pages long, not counting the title page and reference page.
- Your paper must be formatted according to CSU-Global Guide to Writing & APA.
- If you need assistance with your writing style, start with the links under the Research Help and Writing Help tabs on the CSU-Global Library's homepage.

Review the **Module 2 Critical Thinking rubric** for full details on how you will be graded on this assignment.

Option 2: New Libraries, Datasets, Diagrams, Input Data, Replacement, Decision Trees—How Do I Use Them?
Watch these SAS videos:
Getting Started with SAS Enterprise Miner: Setting Up an Enterprise Miner Project

Getting Started with SAS Enterprise Miner: Exploring Input Data and Replacing Missing Values

Recreate in SAS Enterprise Miner OnDemand the data analysis project shown in these two videos. In your re-creation, for the **Partition the Input DATA** step, enter 65.0 for Training, and enter 35.0 for Validation in the dataset allocation boxes. Your **Donor Data** has been loaded to the course for you to connect in your **New Library**. Use the path specified in the following instructions instead of the one shown in the video.

See the link here for Library Connections instructions, and in the module with the assignment.

After recreating the diagram using the two SAS videos, you will submit screenshots in a Word document plus a one-page summary describing five ways how your organization could use the **SAS Enterprise Miner tool** to understand and prepare data before performing predictive analytics. Include a brief description of the dataset to be analyzed and what you hope to predict based on the data. The screenshots should include the finalized workspace with the data analytic diagram in SAS Enterprise Miner. Make sure your screenshot shows the whole diagram. The diagram should have all four nodes as shown in the last video.

Requirements:
- Your paper should be two pages long, not counting the title page and reference page.
- Your paper must be formatted according to CSU-Global Guide to Writing & APA Requirements.
- If you need assistance with your writing style, start with the links under the Research Help and Writing Help tabs on the CSU-Global Library's homepage.

Review the **Module 2 Critical Thinking rubric** for full details on how you will be graded on this assignment.

Module 3

Readings
- Chapter 3 & 4 in *Applied Predictive Analytics: Principles and Techniques for the Professional Data Analyst*
- Chapter 1.4 & 1.6 in *SAS Institute. Advanced Predictive Modeling Using SAS® Enterprise Miner™*
- Chapter 2 in *Predictive Modeling with SAS Enterprise Miner: Practical Solutions for Business Applications*
    - Stat Explore Node
    - MultiPlot Node

- o Graph Explore Node
- o Variable Clustering Node
- o Cluster Node
- o Variable Selection Node
- Molina-Solana, M., Birch, D., & Guo, Y. (2017). Improving data exploration in graphs with fuzzy logic and large-scale visualization. *Applied Soft Computing, 53*, 227-235.
- Stein, B. (2018). Data driven modeling & optimization of industrial processes. [Doctoral Thesis]. *Leiden University*.

Discussion (25 points)

Critical Thinking (100 points)
Option 1: Decision Trees—Learning Lessons
Using the three SAS videos, add to your CT assignment project from last week by recreating in SAS Enterprise Miner OnDemand the Decision Tree model creation shown. Your **Donor Data** has been loaded to the course for you to connect in your **New Library**. Use the path specified in the Library Connections instructions instead of the one shown in the video. Use the path specified in the Library Connection instructions.

Watch these SAS videos:
Getting Started With SAS Enterprise Miner: Setting Up an Enterprise Miner Project

Getting Started With SAS Enterprise Miner: Exploring Input Data and Replacing Missing Values

Getting Started With SAS Enterprise Miner: Building Decision Trees

After recreating the diagram using these three videos, submit screenshots and a one-page summary in a Word document describing what you learned about SAS Enterprise Miner from this exercise. The screenshots should be of the finalized diagram and the results screen of the decision tree model in SAS Enterprise Miner. Make sure your screen shot shows the whole diagram. The diagram should have the decision tree model as shown in the last video. **DO NOT** submit generic screenshots taken from the internet or other documents. It must be screenshots of your own computer screen. The date must be visible in the screen shots to confirm that the software is current and running on your system.

Requirements:
- Your paper should be two pages long, not counting the title page.
- Your paper must be formatted according to CSU-Global Guide to Writing & APA.
- If you need assistance with your writing style, start with the links under the Research Help and Writing Help tabs on the CSU-Global Library's homepage.

Review the **Module 3 Critical Thinking rubric** for full details on how you will be graded on this assignment.

Option 2: Decision Trees—How Do I Use Them?
Using the three SAS Videos below, add to your CT assignment project from last week by recreating in SAS Enterprise Miner OnDemand the decision tree model creation shown. Your **Donor Data** has been loaded to the course for you to connect in your **New Library**. Use the path specified in the Library Connections instructions instead of the one shown in the video. Use the path specified in the Library Connection instructions.

Watch these SAS videos:
Getting Started With SAS Enterprise Miner: Setting Up an Enterprise Miner Project

Getting Started With SAS Enterprise Miner: Exploring Input Data and Replacing Missing Values

Getting Started With SAS Enterprise Miner: Building Decision Trees

After recreating the diagram using these three videos, submit screenshots and a one-page summary in a Word document describing how your organization could use this tool to analyze data. Include a brief description of the dataset to be analyzed and what you hope to predict based on the data. The screenshots should be of the finalized diagram and the results screen of the decision tree model in SAS Enterprise Miner. Make sure your screenshot shows the whole diagram. The diagram should have the decision tree model as shown in the last video. **DO NOT** submit generic screenshots taken from the internet or other documents. It must be screenshots of your own computer screen. The date must be visible in the screen shots to confirm that the software is current and running on your system.

Requirements:
- Your paper should be two pages long, not counting the title page and reference page.
- Your paper must be formatted according to CSU-Global Guide to Writing & APA.

If you need assistance with your writing style, start with the links under the Research Help and Writing Help tabs on the CSU-Global Library's homepage.

Review the **Module 3 Critical Thinking rubric** for full details on how you will be graded on this assignment.

Module 4
Readings
- Chapters 5, 6 & 7 in *Applied Predictive Analytics: Principles and Techniques for the Professional Data Analyst*
- Chapter 2 in *Advanced Predictive Modeling Using SAS®Enterprise Miner™*
  - Principal Component Analysis pages 2-8 through 2-18
  - Review demonstration steps pages 2-18 through 2-29
  - Variable Clustering pages 2-30 through 2-44 and review demonstration steps 2-45 through 2-52
- Chapter 3 in *Advanced Predictive Modeling Using SAS®Enterprise Miner™*
  - Partial Least Squares Regression pages 3-3 through 3-10
  - Read pages 3-18 through 3-26
  - Review the demonstration pages 3-27 through 3-33
- Agyapong, K. B., Hayfron-Acquah, J. B., & Asante, M. (2016). An overview of data mining models. *International Journal of Software & Hardware Research in Engineering, 4*(5), 53-60.
- Forzani, L., Arancibia, R., Llop, P., & Tomassi, D. (2018). Supervised dimension reduction for ordinal predictors. *Computational Statistics and Data Analysis, 125*, 136-155.

Discussion (25 points)

Portfolio Milestone (25 points)
Option 1: Using Predictive Analytics to Solve Industrial Challenges
During Week 1, you identified an industry on which your final Portfolio Project will be based. Now, create a well-developed outline for the final Portfolio Project and complete the executive summary. You must include in your outline all sections required for the final Portfolio Project assignment (see Week 8 for the full assignment). Also, include the 10 scholarly references you plan to use, in addition to your textbook. Remember six of these articles must come from academic journals. The CSU-Global Library is a great place to find resources.

Option 2: Using Data Analytics in a Hospital Setting
During Week 1, you developed a one-page summary on predictive algorithms you would use to solve the "Hospital" problem. Now create a well-developed outline for the final Portfolio Project and complete the executive summary. You must include all sections required for the final Portfolio Project assignment (see Week 8 for the full assignment). Also, include the 10 scholarly references you plan to use in addition to your textbook. Remember, six of these articles must come from academic journals. The CSU-Global Library is a great place to find resources.

Module 5

Readings

- Chapter 8 (pages 213-253) in *Applied Predictive Analytics: Principles and Techniques for the Professional Data Analyst*
- Regression Models and review setup pages 1-34 through 1-39 in *Advanced Predictive Modeling Using SAS®Enterprise Miner™*
- Chapters 4 & 5 in *Predictive Modeling with SAS Enterprise Miner: Practical Solutions for Business Applications*
- Ajiboye, A., Abdullah-Arshah, R., Qin, H., & Abdul-Hadi, J. (2016). Comparing the performance of predictive models constructed using the techniques of feed-forward and generalized regression neural networks. *International Journal of Software Engineering and Computer Systems, 2*(1), 66-73.
- Fernandes, E., Holanda, M., Victorino, M., Borges, V., Carvalho, R., & Van Erven, G. (2019). Educational data mining: Predictive analysis of academic performance of public school students in the capital of Brazil. *Journal of Business Research, 94*, 335-343.
- Jahani, M., & Mahdavi, M. (2016). Comparison of predictive models for the early diagnosis of diabetes. *Healthcare Informatics Research, 22*(2), 95–100.

Discussion (25 points)

Critical Thinking (100 points)
Option 1: Comparing Models—Learning Lessons
Using the four SAS videos**,** add to your CT assignment project from Module 3 by recreating in SAS Enterprise Miner OnDemand then comparing the models diagram shown. Your **Donor Data** has been loaded to the course for you to connect in your **New Library**. Use the path specified in the Library Connection instructions.

Watch these SAS videos:
Getting Started With SAS Enterprise Miner: Setting Up an Enterprise Miner Project

Getting Started With SAS Enterprise Miner: Exploring Input Data and Replacing Missing Values

Getting Started With SAS Enterprise Miner: Building Decision Trees

Getting Started With SAS Enterprise Miner: Impute, Transform, Regression & Neural Models

After recreating the diagram with the videos, submit screenshots and a one-page summary in a Word document describing what you learned about SAS Enterprise Miner from this exercise. The screenshots will be of the finalized diagram and the results screen of the Regression and Neural Models in SAS Enterprise Miner. Make sure your screenshot shows the whole diagram. The diagram should have the Regression and Neural Models as shown in the last video. **DO NOT** submit generic screenshots taken from the internet or other documents. It must be screenshots of your own computer screen. The date must be visible in the screen shots to confirm that the software is current and running on your system.

Requirements:
- Your paper should be two pages long, not counting the title page and reference page.
- Your paper must be formatted according to CSU-Global Guide to Writing & APA.
- If you need assistance with your writing style, start with the links under the Research Help and Writing Help tabs on the CSU-Global Library's homepage.

Review the Module 5 Critical Thinking rubric for full details on how you will be graded on this assignment.

Option 2: Comparing Models—How Can I Use
Using the five SAS videos**,** add to your CT assignment project from Module 3 by recreating in SAS Enterprise Miner OnDemand the comparing models diagram shown. Your **Donor Data** has been loaded to the course for you to connect in your **New Library**. Use the path specified in the Library Connection instructions.

Watch these SAS videos:
Getting Started with SAS Enterprise Miner: Setting Up an Enterprise Miner Project

Getting Started with SAS Enterprise Miner: Exploring Input Data and Replacing Missing Values

Getting Started with SAS Enterprise Miner: Building Decision Trees

Getting Started with SAS Enterprise Miner: Impute, Transform, Regression & Neural Models

Getting Started with SAS Enterprise Miner: Comparing Models

After recreating the diagram with these five videos, submit screenshots and a one-page summary in a Word document describing how your organization could use this tool to analyze data. Include a brief description of the dataset to be analyzed and what you hope to predict based on the data. The screenshots will be of the finalized diagram and the results screen of the Regression and Neural Models in SAS Enterprise Miner. Make sure your screenshot shows the whole diagram. The diagram should have the Regression and Neural Models as shown in the last video.

Requirements:
- Your paper should be two pages long, not counting the title page and reference page.
- Your paper must be formatted according to CSU-Global Guide to Writing & APA.
- If you need assistance with your writing style, start with the links under the Research Help and Writing Help tabs on the CSU-Global Library's homepage.

Review the **Module 5 Critical Thinking rubric** for full details on how you will be graded on this assignment.

Module 6

Readings
- *Professional Data Analyst*
- Read Regression Models and review setup pages 1-34 through 1-39 in *Advanced Predictive Modeling Using SAS®Enterprise Miner™*
- Chapter 6 in *Predictive Modeling with SAS Enterprise Miner: Practical Solutions for Business Applications*

Discussion (25 points)

Critical Thinking (150 points)
Option 1: Create a Predictive Model—Claims

For this CT Assignment, using SAS Enterprise Miner you will use a dataset named **Claims** to create a new project with one of the predictive analytic models **covered in this course**. The Claims dataset is available in your library once you create a **New Library** linking to the course data.

See the link here for Library Connection instructions.

After creating the diagram, submit screenshots and a one-page summary in a Word document describing how you created this model to analyze this dataset. Describe the steps taken and the property changes necessary. The screenshots will be of the finalized diagram and the results screen of the model in SAS Enterprise Miner. Make sure your screenshot shows the whole diagram.

Requirements:
- Your paper should be two pages long, not counting the title page and reference page.
- Your paper must be formatted according to CSU-Global Guide to Writing & APA.

If you need assistance with your writing style, start with the links under the Research Help and Writing Help tabs on the CSU-Global Library's homepage.

Review the **Module 6 Critical Thinking rubric** for full details on how you will be graded on this assignment.

Option 2: Create a Predictive Model—Retail
For this CT Assignment, using SAS Enterprise Miner you will use a dataset named **DMRETAIL** to create a new project with one of the predictive analytic models covered in this course. The DMRETAIL dataset is available in your library once you create a **New Library** linking to the course data.

See the link here for Library Connection instructions.

After creating the final diagram, submit screenshots of complete diagrams, including property panes, and a one-page summary in a Word document describing how you created this model to analyze this dataset. Describe the steps taken and the property changes necessary. The screenshots should be of the finalized diagram and the results screen of the model in SAS Enterprise Miner. Make sure your screenshot shows the whole diagram.

Requirements:
- Your paper should be two pages long, not counting the title page and reference page.
- Your paper must be formatted according to CSU-Global Guide to Writing & APA.

If you need assistance with your writing style, start with the links under the Research Help and Writing Help tabs on the CSU-Global Library's homepage.

Review the **Module 6 Critical Thinking rubric** for full details on how you will be graded on this assignment.

Module 7

Readings
- Chapter 9, 10, & 12 in *Applied Predictive Analytics: Principles and Techniques for the Professional Data Analyst*
- Chapter 7 in *Predictive Modeling with SAS Enterprise Miner: Practical Solutions for Business Applications*

- Pejović, M., Nikolić, M., Heuvelink, G., Hengl, T., Kilibarda, M., & Bajat, B. (2018). Sparse regression interaction models for spatial prediction of soil properties in 3D. *Computers & Geosciences, 118*, 1-13.
- SAS Institute (2017). SAS Enterprise Miner 14.2: High-performance procedures.

Discussion (25 points)

Module 8

Readings
- Chapter 13 in *Applied Predictive Analytics: Principles and Techniques for the Professional Data Analyst*
- Chapter 6 in *Advanced Predictive Modeling Using SAS® Enterprise Miner™*
  - Appraising Model Performance (Reading pages 6-3 through 6-4 and Review demonstration steps pages 6-4)
  - Generalized Profit Matrices (Reading pages 6-11 through 6-18 and Review demonstration steps pages 6-19 through 6-27)
  - Basic Two-Stage Models (Reading pages 6-37 through 6-39 and Review demonstration steps pages 6-40 through 6-47
- Chapter 7 in *Advanced Predictive Modeling Using SAS® Enterprise Miner™*
  - Open Source Integration Node pages 7-3 through 7-7 and
  - Review demonstration pages 7-8 through 7-14
  - Reusing Metadata pages 7-15 through 7-17
  - Review demonstration pages 7-18 through 7-23
- Tan, T. K., & Darken, C. J. (2015). Learning and prediction of relational time series. *Computational and Mathematical Organization Theory, 21*(2), 210-241.

Discussion (25 points)

Portfolio Project (300 points)
Option 1: Using Predictive Analytics to Solve Industrial Challenges
Pick an industry (e.g., airlines, insurance, banking) and identify a data problem that can be solved using advanced predictive analytics. For the problem you identified, describe all the CRISP-DM phases that will be followed, from the setting up, defining, and identification phases thru the deployment phase.

Your final project should, at the minimum, contain the following:
- Introduction to the industry domain
- Definition of the data problem
- Solution using the predictive analytics
- Data CRISP-DM life cycle phases
- Logical architecture diagram as applicable
- Answers to the following: How would the SAS Enterprise miner's predictive analytical functions explored in this course be used (where applicable) to help you with the analysis? If it is not SAS Enterprise Miner, what other tool would you recommend? Why?
- Summary and conclusion

Requirements:
- Your written paper should be 10-12 pages long, not counting the title and reference pages, which you must include.
- Integrate concepts, terms, and theories from the readings and module content.
- You need to cite at least 10 sources for this assignment, outside of the textbook. Six of these sources must come from academic journals. The CSU-Global Library is a great place to find resources.

- Your paper must be formatted according to CSU-Global Guide to Writing & APA.

If you need assistance with your writing style, start with the links under the Research Help and Writing Help tabs on the CSU-Global Library's homepage.

Option 2: Using Data Analytics in a Hospital Setting
A hospital is suddenly experiencing incoming patients with a common virus problem around the fall period of every year. It does not have any system in place to determine how much medicine it should keep ready for the next fall. What is the data problem that can be solved for this hospital using advanced predictive analytics? Describe all the CRISP-DM phases that will be followed, from the setting up, defining and identification phases thru the deployment phase.

Your final project should, at the minimum, contain the following:
- Introduction to the problem hospital is facing
- Definition of the data problem
- Solution using the predictive analytics
- Data CRISP-DM life cycle phases
- Logical architecture diagram as applicable
- Answers to the following: How would the SAS Enterprise miner's predictive analytical functions explored in this course be used (where applicable) to help you with the analysis. If it is not SAS Enterprise Miner, what other tool would you recommend? Why?
- Summary and conclusion

Requirements:
- Your written paper should be 10-12 pages long, not counting the title and reference pages, which you must include.
- Integrate concepts, terms, and theories from the readings and module content.
- You need to cite at least 10 sources for this assignment, outside of the textbook. Six of these sources must come from academic journals. The CSU-Global Library is a great place to find resources.
- Your paper must be formatted according to CSU-Global Guide to Writing & APA.

If you need assistance with your writing style, start with the links under the Research Help and Writing Help tabs on the CSU-Global Library's homepage.

COURSE POLICIES

Course Grading

20% Discussion Participation
45% Critical Thinking Assignments
35% Final Portfolio Project

Grading Scale	
A	95.0 – 100
A-	90.0 – 94.9
B+	86.7 – 89.9
B	83.3 – 86.6
B-	80.0 – 83.2
C+	75.0 – 79.9
C	70.0 – 74.9
D	60.0 – 69.9
F	59.9 or below

IN-CLASSROOM POLICIES

For information on late work and incomplete grade policies, please refer to our **In-Classroom Student Policies and Guidelines** or the Academic Catalog for comprehensive documentation of CSU-Global institutional policies.

Academic Integrity
Students must assume responsibility for maintaining honesty in all work submitted for credit and in any other work designated by the instructor of the course. Academic dishonesty includes cheating, fabrication, facilitating academic dishonesty, plagiarism, reusing /repurposing your own work (see CSU-Global Guide to Writing & APA for percentage of repurposed work that can be used in an assignment), unauthorized possession of academic materials, and unauthorized collaboration. The CSU-Global Library provides information on how students can avoid plagiarism by understanding what it is and how to use the Library and internet resources.

Citing Sources with APA Style
All students are expected to follow the CSU-Global Guide to Writing & APA when citing in APA (based on the most recent APA style manual) for all assignments. A link to this guide should also be provided within most assignment descriptions in your course.

Disability Services Statement
CSU-Global is committed to providing reasonable accommodations for all persons with disabilities. Any student with a documented disability requesting academic accommodations should contact the Disability Resource Coordinator at 720-279-0650 and/or email ada@CSUGlobal.edu for additional information to coordinate reasonable accommodations for students with documented disabilities.

Netiquette
Respect the diversity of opinions among the instructor and classmates and engage with them in a courteous, respectful, and professional manner. All posts and classroom communication must be conducted in accordance with the student code of conduct. Think before you push the Send button. Did you say just what you meant? How will the person on the other end read the words?

Maintain an environment free of harassment, stalking, threats, abuse, insults, or humiliation toward the instructor and classmates. This includes, but is not limited to, demeaning written or oral comments of an ethnic, religious, age, disability, sexist (or sexual orientation), or racist nature; and the unwanted sexual advances or intimidations by email, or on discussion boards and other postings within or connected to the online classroom. If you have concerns about something that has been said, please let your instructor know.

SAS RESOURCES AND INFORMATION ON CERTIFICATION

Information about SAS Certification

Taking SAS certification exams help you validate your skills and increase your value to an employer. You can choose SAS certifications across many subjects, including programming, data management, and analytics, to name a few. For more information on SAS certification go here: https://www.sas.com/en_us/certification.html. All students, teachers, professors or staff associated with an academic institution qualify for 50% discount on all SAS certification exams. Please contact certification@sas.com to receive the discount code that will reduce the exam fee by 50% during the registration process.

Resources for Learning SAS

SAS Certification Prep Guides: https://www.sas.com/store/books/categories/certification-guide/cBooks-cbooks_categories-cbooks_categories_12-p1.html
Visit SAS Communities Visit our online sites to share and connect with other SAS users and build your SAS skills. Don't miss key communities including: SAS Certification, SAS Training, SAS Academy for Data Science, SAS Programming, New SAS User, SAS Analytics U and SAS Viya for Learners. https://communities.sas.com/t5/Learn-SAS/ct-p/learn