PHA6935 – Pharmaceutical Data Analysis in HEOR Settings I:

Pharmaceutical Data Management   3 Semester Credit Hours

(1) Course Purpose:

The purpose of this course is an introduction to analyzing medical and pharmacy data using programming techniques in SAS and SQL. This course will explore the features and complexities of medical and pharmacy data and will focus on all the corresponding aspects of the introductory/preparatory phases of the data life cycle in health economics and outcomes research, including importing and cleansing data, manipulating and creating new variables, merging data, and subsequently preparing a final analytic data set to address specific clinical questions related to a patient population to achieve the objectives of a research study. This course will also provide introductory exposure to generating descriptive statistics using SAS and SQL.

Course Faculty and Office Hours

Varies

Office Hours

By Appointment

Place and Time of Class Sessions: Saturday evenings (All times Eastern) and recorded lectures to be viewed during the week when feasible for the student.

Course Objectives

Upon completion of this course, the student will:

- Articulate the differences between data and knowledge as they apply in the patient care and medication use process
- Describe the prominent issues and resolutions used when working with pharmacy claims data.
- Describe the rationale and impact of analytics in the pharmaceutical, pharmacy and medical services, and insurance markets.
- Discuss legal and regulatory issues related to pharmaceutical data analysis.

- Describe career options for a pharmacist in the information technology and data analytics field.

Pre-Requisite Knowledge and Skills - PHA6283: Commercial Applications of Pharmacoeconomic Principles

(2)   Course Structure & Outline

Course Structure. Live online video and recorded class sessions, homework assignments, pharmacy application papers, and other self-directed learning activities are required (e.g. videos, readings, web-based learning, etc.).

Course Outline/Activities. Refer to Appendix A for the tentative class schedule.

Required Software SAS Enterprise Guide – provided to student

Recommended Textbooks Course materials are provided to student

See Appendix B for a complete list of reading assignments.

Student Evaluation & Grading

Evaluation Methods

- ☐ Midterm Exam 25%
- ☐ Final Exam 25%
- ☐ Pharmacy Application Papers 30%
- ☐ SAS/SQL Homework 15%
- ☐ Class Participation 5%

Pharmacy Application Papers

You are expected to apply material by submitting a topic paper and completing homework assignments in SAS and participating in the group discussion during the workshops.

Weekly topic paper should be single-spaced with one-inch margins and at most one page long using Times New Roman 12 point font. The paper should be well-organized and written in a professional tone. It should be concise and relate the topic to the class material. (ONLY 3 PAPERS ARE REQUIRED THIS SEMESTER)

SAS/SQL Homework

3 homework assignments using data sets provided to you are assigned throughout the semester and you will answer the questions using SAS/SQL.

(3)   Exams

The exam will consist of completing a series of questions using the data set of a patient population provided to the student. The exam will cover the concepts from class lectures and the assigned textbooks.

Grading Scale

A =	95-100
A- =	90-94
B+ =	86-89
B =	83-85
B- =	80-82
C+ =	76-79
C =	73-75
C- =	70-72
D+ =	66-69
D =	63-65
D- =	60-62
E =	<60

Class Attendance Policy

Attendance to live sessions is required. Class participation grades will be reduced for not attending.

Make-up Quiz/Exam Policy

Make-up exams for the exams will be given only if the student has written official documentation of a valid excuse.

Policy on Old Quizzes and Assignments

No old quizzes or assignments are provided.

Assignment Deadlines

Late assignments will not be accepted.

General College of Pharmacy Course Policies

The College of Pharmacy has a website that lists course policies that are common to all courses. This website covers the following:

1. University Grading Policies

2. Academic Integrity Policy

3. How to request learning accommodations

4. Faculty and course evaluations

5. Student expectations in class

6. Discussion board policy

7. Email communications

8. Religious holidays

9. Counseling & student health

10. How to access services for student success

Please see the following URL for this information:

http://www.cop.ufl.edu/wp-content/uploads/dept/studaff/policies/General%20COP%20Course%20Policies.pdf

(4)   Complaints

Should you have any complaints with your experience in this course please visit:

http://www.distancelearning.ufl.edu/student-complaints to submit a complaint.

Appendix A: Class Schedule

PHA6935 - Pharmaceutical Data Analysis in HEOR Settings I		
Class Schedule - Spring 2019 Semester		
Week	**Topics**	**Reading**
1a	Overview and Welcome Introductions Installing SAS software; troubleshooting access to SAS libraries and UF Data The Evolving Healthcare Landscape	SAS Programming 1: Essentials - Ch. 2: Getting Started with SAS
1b	SAS processing options for system performance: - Fullstimer option - Compress option - Sortsize option - Cpucount option - Obs option - Understanding the SAS Log Loading data into SAS: - Lib name statement - GUI import function Introduction to the DATA step and PROC step: - Sort - Freq - Contents - Print - Univariate Miscellaneous: - Missing Values - Inserting Comments - Why Your SAS Program Will Not Run	SAS Programming 1: Essentials - Ch. 4: Getting Familiar with SAS Data Sets SAS Programming 1: Essentials - Ch. 5: Reading SAS Data Sets SAS Programming 1: Essentials - Ch. 6: Reading Excel Worksheets SAS Programming 1: Essentials - Ch. 7: Reading Delimited Raw Data Files SAS SUGI Paper Resources
2a	Troubleshooting Workshop	Weekly Application Paper Topic 1: What is pharmacy informatics and data analysis in an HEOR context and how is it applicable to the contemporary pharmaceutical goods and services market? Provide examples from industry (PBM, health insurance, manufacturer, etc.)
2b	Cleaning and Manipulating Data in SAS 1 - Character vs. String variable - WHERE/IF THEN OR AND/KEEP/DROP/SORT/NODUPKEY IN/NOT	SAS Programming 1: Essentials - Ch. 8: Validating and Cleaning Data SAS Programming 1: Essentials - Ch. 9: Manipulating Data SAS Programming 2: Data Manipulation Techniques -

	IN/INTNX/INTCK/CONCATENATE/SUBSTR/TRANPOSE - SAS operations - equal, not equal, less than, greater than, etc.	Ch. 8: Restructuring a Data Set SAS SUGI Paper Resources Weekly Application Paper 1 Due 4/1 at 11:59pm EST
3a	Troubleshooting Workshop	
3b	Cleaning and Manipulating Data in SAS 2 - Character vs. String variable - WHERE/IF THEN OR AND/KEEP/DROP/SORT/NODUPKEY IN/NOT IN/INTNX/INTCK/CONCATENATE/SUBSTR/TRANSPOSE - SAS operations - equal, not equal, less than, greater than, etc.	SAS Programming 1: Essentials - Ch. 8: Validating and Cleaning Data SAS Programming 1: Essentials - Ch. 9: Manipulating Data SAS Programming 2: Data Manipulation Techniques - Ch. 8: Restructuring a Data Set SAS SUGI Paper Resources SAS Homework 1 Due 4/15 at 11:59pm EST
4a	Troubleshooting Workshop	Weekly Application Paper Topic 2: "Big Data" is a buzzword skyrocketing in popularity. In an HEOR context, define "big data" and outline where it can sometimes be difficult for organizations to make sense of too much information. Discuss what "Big Data" is and how data reduction and data cleaning techniques in SAS aid the researcher. What techniques are available for cleaning and reducing high volumes of information? Why is this important?
4b	Introduction to working with HEOR data: - ICD-9/CPT/HCPCS/NDC/LOINC/J codes, cost data, etc.	Introduction to Common Data Elements in Healthcare Analytics and Issues with Claims Databases
Midterm Exam		
5a		

5b	Introduction to PROC SQL in SAS:
	- Data Manipulation Functions:
	  - Count, Distinct, Max, Min, Sum, Average, Variance, Missing
	Standard Deviation, Standard Error
	  - Subsetting records
	- Creating an Index
	- Full Joins, InnerJoins, Left Joins, Right Joins
		SAS Programming 1: Essentials - Ch. 10: Combining SAS Data Sets
		SAS Programming 2: Data Manipulation Techniques - Ch. 10: Other SAS Languages
		SAS SUGI Paper Resources
		Weekly Application Paper 2
		SAS Homework 2

6a	Troubleshooting Workshop	
		Weekly Application Paper Topic 3: What career opportunities are available in pharmacy informatics and data analysis in HEOR? Identify how technology has changed the occupational landscape and provide examples. How can students prepare for a career in pharmacy informatics and data analysis in an HEOR context?
6b	Arrays in SAS	SAS Programming 3: Advanced Techniques and Efficiencies - Ch. 5: Using DATA Step Arrays SAS SUGI Paper Resources Weekly Application Paper 3 Due SAS Homework 3 Due
6b2	Hash Objects and Macros in SAS	SAS Programming 2: Data Manipulation Techniques - Ch. 10: Other SAS Languages SAS Programming 3: Advanced Techniques and Efficiencies - Ch. 6: Using DATA Step Hash and Hiter Objects SAS SUGI Paper Resources
7	Course Review and Discussion	Course Review and Discussion (Optional)

Appendix B: Reading Assignments

Vary by semester, includes contemporary empirical literature on pharmacy informatics and health economics and outcomes research that are informative and applicable to the student to integrate into course material. Please refer to the documentation that has been posted in the corresponding folders by subject matter in Canvas. SUGI (SAS Users Group International) papers have been posted in Canvas for your use to provide supplemental materials to aid understanding the course concepts. Additional learning materials as provided by the SAS Institute will also be posted in Canvas.