

MATH325

STUDENT WARNING: This course syllabus is from a previous semester archive and serves only as a preparatory reference. Please use this syllabus as a reference only until the professor opens the classroom and you have access to the updated course syllabus. Please do NOT purchase any books or start any work based on this syllabus; this syllabus may NOT be the one that your individual instructor uses for a course that has not yet started. If you need to verify course textbooks, please refer to the online course description through your student portal. This syllabus is proprietary material of APUS.

Course Summary

Course : MATH325 **Title :** Linear Regression I

Length of Course : 8

Prerequisites : MATH220, MATH302 **Credit Hours :** 3

Description

Course Description: Linear regression models are widely used in business administration, economics, engineering, and the social, health, and biological sciences. Successful applications of these models require a sound understanding of both the underlying theory and the practical problems that are encountered in using the models in real-life situations. In this first course in linear regression students will be exposed to some of the fundamental tools of linear regression. The emphasis will be on using and interpreting linear models. In addition to analyzing given linear models, students will analyze data and create linear regression models as a means to assess and evaluate the extent to which individual or sets of predictor variables influence a particular response. Furthermore, students will use models to forecast outcomes associated with various response variables. Applications from a number of different areas will be examined. (Prerequisites: MATH220 and MATH302)

Course Scope:

This first course in linear regression will focus on using regression models to assess the nature of the relationship that exists between sets of predictor variables and a particular response variable of interest. Estimation, confidence interval building, testing of hypotheses, and the prediction of new observations will be emphasized. The use of indicator variables as a means to include categorical variables into regression models will also be discussed. Matrix algebra will be utilized, along with Excel and Minitab, to construct, interpret, and validate linear models from a number of different application areas.

Students must have access to Excel 2007 or later and Minitab 17 or later. This software is not provided by the course material grant and must be purchased/provided by the student. Prerequisites: MATH220 and MATH302.

Objectives

After completing the course, the student should be able to:

CO1. Analyze linear regression models to determine the nature of the relationship between sets of predictor variables and a particular response variable.

CO2. Evaluate and quantify the manner in which sets of predictor variables influence a particular

response variable.

CO3. Apply linear regression models to forecast new observations and predict the outcome associated with a particular response variable.

CO4. Conduct test of hypotheses to evaluate the significance and applicability of linear regression models.

CO5. Create linear regression models to be used to forecast new observations associated with a particular response variable.

CO6. Examine the appropriateness of a linear regression model.

CO7. Apply remedial measures, as required, to ensure that the conditions associated with a regression model are satisfied.

Outline

Week 1: Getting Started & Linear Regression with One Predictor Variable

Course Objective(s)

CO1, CO2

Reading(s)

Read and study Appendix A

Read and study Chapter 1

Complete the Week 1 Lesson

Assignment(s)

First required contact. Introduce yourself on the Week 1 Introduction Forum and get to know your classmates

Review Problems: 1.2, 1.4, 1.6, 1.7, 1.8, 1.9, 1.11, 1.17, 1.21, 1.22, 1.25

Post questions or comments on the Q&A Forum.

Week 2: Inferences in Regression & Correlation Analysis

Course Objective(s)

CO3, CO4

Reading(s)

Read and study Sections 2.1 – 2.10

Complete the Week 2 Lesson

Assignment(s)

Submit Project #1 by 11:55 PM Eastern Time on Sunday.

Access Project 1_MATH325 in the Assignments section of our classroom.

Make a post to the Week 2 Discussion Forum by 11:55PM Wednesday

Review Problems: 2.2, 2.4, 2.6, 2.7ab, 2.13abc, 2.16abcd, 2.17, 2.23, 2.26cd, 2.32

Post questions or comments on the Q&A Forum.

Week 3: Diagnostics and Remedial Measures

Course Objective(s)

CO6, CO7

Reading(s)

Read and study Sections 3.1 through 3.3 and 3.8, and 3.9

Complete the Week 3 Lesson

Assignment(s)

Complete Exam #1 (chapters 1, 2 and 3) by 11:55 PM Eastern Time on Sunday.

Access Exam1_MATH325 in the Assignments section of our classroom.

Make a post to the Week 3 Discussion Forum by 11:55PM Wednesday

Review Problems: 3.2, 3.4(except part g), and 3.18

Post questions or comments on the Q&A Forum.

Week 4: Matrix Approach to Simple Linear Regression

Course Objective(s)

CO1, CO2, CO3, CO5

Reading(s)

Read and study Chapter 5

Complete the Week 4 Lesson

Assignment(s)

Make a post to the Week 4 Discussion Forum by 11:55PM Wednesday

Review Problems: 5.7, 5.13, and 5.26

Post questions or comments on the Q&A Forum.

Week 5: Multiple Regression I

Course Objective(s)

CO1, CO2, CO3, CO4, CO5

Reading(s)

Read and study Chapter 6

Complete the Week 5 Lesson

Assignment(s)

Submit Project #2 by 11:55 PM Eastern Time on Sunday.

Access Project2_MATH325 in the Assignments section of our classroom.

Make a post to the Week 5 Discussion Forum by 11:55PM Wednesday

Review Problems: 6.3, 6.5a-d, 6.6, 6.8, 6.16, 6.17

Post questions or comments on the Q&A Forum.

Week 6: Multiple Regression II

Course Objective(s)

CO4, CO5, CO6

Reading(s)

Read and study Chapter 7

Complete the Week 6 Lesson

Assignment(s)

Complete Exam #2 (chapters 3, 5, and 6) by 11:55 PM Eastern Time on Sunday.

Access Exam2_MATH325 in the Assignments section of our classroom.

Make a post to the Week 6 Discussion Forum by 11:55PM Wednesday

Review Problems: 7.1, 7.3, 7.4, 7.16, 7.24, 7.26

Post questions or comments on the Q&A Forum.

Week 7: Qualitative Predictors, Indicator Variables, and Model Building Procedures

Course Objective(s)

CO1, CO2, CO4, CO5

Reading(s)

Read and study Sections 8.3 and 8.4 and 9.1 through 9.5

Complete the Week 7 Lesson

Assignment(s)

Commence Project #3.

Access Project 3_MATH325 in the Assignments section of our classroom.

Make a post to the Week 7 Discussion Forum by 11:55PM Wednesday

Review Problems: 8.12, 8.15, 8.26, 8.28, 8.34; 9.10c, 9.11, 9.18, and 9.22

Post questions or comments on the Q&A Forum.

Week 8: Project #3, Exam #3

Reading(s)

Submit the Final Project and complete the Final Exam

Complete the Week 8 Lesson

Assignment(s)

Submit Project #3 by 11:55 PM Eastern Time on Wednesday.

Access Project3_MATH325 in the Assignments section of our classroom.

Make a post to the Week 8 Discussion Forum by 11:55PM Wednesday

Complete Exam #3 (chapters 7, 8, and 9) by 11:55 PM Eastern Time on Sunday.

Access Exam #3 in the Assignments section of our classroom.

Post questions or comments on the Q&A Forum.

Evaluation

Staying on task and adhering to the published schedule are typically among the most challenging aspects of completing an academic course successfully. This is especially true for online and part-time non-resident programs. To avoid the pitfall of falling behind, students in this course should complete the assigned reading and complete all Lessons in a timely manner. Students should also complete the suggested Review Problem Sets as set forth in the schedule provided in the Course Outline of this syllabus. Review Problem Sets will not be graded, but their solutions will be available via the link in the Lessons section of our online classroom. Students should refer to these solutions as a means to confirm their understanding of the topics covered in the Review Problem Sets.

I urge you to utilize the Q&A Forum as a means to interact with your classmates. If while working through examples or problems from our textbook you have a question or a comment, please post the question or comment on the Q&A Forum. Naturally, I hope that the Q&A Forum will facilitate interactions among the members of our class. If you have an insight that you wish to share or a question you wish to have answered please use the Q&A Forum to exchange such information.

Forums: Naturally, I value punctuality, familiarity with the required readings, and classroom questions or comments that are relevant and insightful. Whether helping someone understand a point, seeking clarification of a concept you may not completely understand, or contributing to the positive flow of the class discussion based on your experience, it is important for you to realize that learning is an action process—and sharing is a key ingredient in undertaking that process successfully. Therefore, I urge you to participate actively in an effort to build a positive and effective learning environment—for yourself and others.

Your first required Forum post is the week 1 Introduction Forum. This must be completed by 11:55PM Eastern Time on Sunday during the first week of our course. I will evaluate your responses to the Forums using a 10 point scale, and your contribution to each of the Forums will count as 1.25 percent of the overall course grade, for a total of 10 percent. My evaluation of your participation in our forums will be based on the extent to which you participated and fostered a positive and effective learning environment—for yourself and others. Participating and sharing are the keys. I will post my wrap-up comments for each of our weekly Forums after their due dates. At that time the Forum will be locked and no additional posts will be permitted. Naturally, I urge you to read my wrap-up post, the posts of your classmates, and any summary feedback I provide. If you wish to continue to discuss a topic posed in a Forum that has been locked, you can certainly do so by using the Message tool or the Q&A Forum to interact with the other members of our course.

The Week 1 Introduction Forum: During the first week of class each student must make a post to the Week 1 Introduction Forum. You are to use this Forum to introduce yourself and state your goals and objectives as they relate to our course. You are required to make a post to the Week 1 Introduction Forum in order to complete your enrollment in the course. Your post must be **at least 250 words**, and you must complete it by the end of the first week. This is a university requirement.

Projects: Three projects, designed to give you an opportunity to apply the concepts we discuss in our course, will be utilized to evaluate your performance in the course. Each project will account for 10% of your overall grade. Projects will be assigned as indicated on the course schedule and students are expected to complete them on time. No late submissions will be accepted.

Specific instructions will be provided for each project in the Lessons section of our classroom. Each project is to be completed on an individual basis. Of course, in completing the projects you may consult appropriate reference materials—and should use proper citations when doing so. However, the projects are to represent your individual effort. Therefore, **no collaboration is permitted on the projects.**

Project assignments will be posted in the Assignments section of our classroom. When you are prepared to commence a project go to the Assignments section of our classroom and access the project write-up. It's important for you to understand that your projects must be submitted by the 11:55PM EASTERN time deadline, as indicated in the syllabus. I will not accept late submissions. Please don't wait until the last minute to submit your projects. Once you submit a project it will be graded; your score will be recorded in the Gradebook; and the project will be returned to you along with any feedback deemed appropriate.

Examinations: Three examinations will be utilized to evaluate your performance in the course. Each exam will account for 20% of your overall grade. Generally, the exams will contain problems similar to those discussed in the suggested homework problems and reflect the material presented in our textbook. However, you should expect to be challenged by the examinations. Exams will be conducted as indicated on the course schedule and students are expected to complete them on time. No late submissions will be accepted.

Specific instructions will be provided for each examination in the Lessons section of our classroom at the outset of the week in which the exams are due. Each of these graded exercises is to be completed on an individual basis. You may consult published textbooks, articles, and other printed materials. However, **no collaboration is permitted on the examinations.** You are not to discuss, orally, in print, or online—in any manner—any aspect of the examinations with anyone other than your instructor. Clearly, student-teacher relationships are built on trust. This is especially true in the case of an online course. For example, students must trust that teachers have made appropriate decisions about the structure and content of the courses they teach, and teachers must trust that students complete assignments as directed. Acts that violate this trust undermine the educational process and compromise the integrity of the perpetrator. Don't cheat. Don't compromise your integrity. To do so invalidates the very purpose which likely motivated you to undertake this course—to learn, to become a better decision maker, to broaden your perspective, and to increase your skill set.

At the beginning of the week in which they are due, exams will be posted in the Assignments section of our classroom. When you are prepared to take an examination go to the Assignments section of our classroom and access the exam. It is important for you to understand that you will be able to submit your answers to an assessment only once. Your answers must be submitted by the 11:55PM EASTERN time deadline, as indicated in the syllabus and the course calendar. I will not accept late submissions. So, please don't wait until the last minute to submit your answers to an exam. Once you submit your answers your exam will be graded, and your score will be recorded in the Gradebook. After all students have completed an exam and they have been graded, the exam will be returned to you for your review. Naturally, if you answer any of the questions on an assessment incorrectly I urge you to review the feedback and reconcile any errors you may have made on the exam.

The notations used in statistical work aren't found in many word processing programs, making it difficult to produce many of the symbols used in our course. You may wish to use the Symbol font in Microsoft Word and the Insert/Object/Microsoft Equation feature in Word when preparing documents related to our course. Insert/Symbol is also sometimes useful. Of course, you will also want to familiarize yourself with the Insert/Edit Equation feature (the fx icon) contained in the Rich Text Editor that is available in our classroom. Additionally, since many of the computations and analyses required in our course can be easily carried out using Microsoft Excel, you may wish to familiarize yourself with the process whereby Excel outputs can be copied and pasted into a Word or pdf file. And, of course, you will want to ensure that you know how to scan and transmit your completed exams and projects to your instructor.

Students' final grades will be posted within 7 days of the end of the semester. Students should not telephone

the university looking for grades until at least 30 days after the end of the semester. Please see the [Student Handbook](#) to reference the University's [grading scale](#).

The final grade in the course will be based on three examinations, three projects, and eight forums, as indicated below. Grades will be assigned based on the following scores:

Grading:

Name	Grade %
Forums	10.00 %
Week 1 Forum	1.25 %
Week 2 Forum	1.25 %
Week 3 Forum	1.25 %
Week 4 Forum	1.25 %
Week 5 Forum	1.25 %
Week 6 Forum	1.25 %
Week 7 Forum	1.25 %
Week 8 Forum	1.25 %
Projects	30.00 %
Project #1	10.00 %
Project #2	10.00 %
Project #3	10.00 %
Exams	60.00 %
Examination #1	20.00 %
Examination #2	20.00 %
Examination #3	20.00 %
APUS Honor Code	1.00 %
APUS Honor Code and Pledge	1.00 %

Materials

Book Title: Applied Linear Regression Models, 4th ed. - The VitalSource e-book is provided via the APUS Bookstore

Author: Kutner

Publication Info: McGraw-Hill

ISBN: 9781308043524

Book Title: You must validate your cart to get access to your VitalSource e-book(s). If needed, instructions are available here - <http://apus.libguides.com/bookstore/undergraduate>

Author: N/A

Publication Info: N/A

ISBN: N/A

Microsoft Excel and Minitab will be used for many of the computations and analyses required in the course. Students must have access to these software packages.

Students who do not already have access to Minitab can procure a free 30 day trial version or rent it at a greatly reduced student discount. Details can be found at the following URL:

http://e5.onthehub.com/WebStore/ProductsByMajorVersionList.aspx?cmi_mnuMain_child=2a1143f0-74c7-e011-ae14-f04da23e67f6&cmi_mnuMain=2ff73789-74c7-e011-ae14-f04da23e67f6&ws=49c547ba-f56d-dd11-bb6c-0030485a6b08

In addition to the required course textbook, public domain Websites might also prove to be useful. Please abide by the university's academic honesty policy when using Internet sources.

Course Guidelines

Citation and Reference Style

- Attention Please: Students will follow the APA Format as the sole citation and reference style used in written work submitted as part of coursework to the University. Assignments completed in a narrative essay or composition format must follow the citation style cited in the APA Format.

Tutoring

- [Tutor.com](http://www.tutor.com) offers online homework help and learning resources by connecting students to certified tutors for one-on-one help. AMU and APU students are eligible for 10 free hours* of tutoring provided by APUS. Tutors are available 24/7 unless otherwise noted. Tutor.com also has a SkillCenter Resource Library offering educational resources, worksheets, videos, websites and career help. Accessing these resources does not count against tutoring hours and is also available 24/7. Please visit the APUS Library and search for 'Tutor' to create an account.

Late Assignments

- Students are expected to submit classroom assignments by the posted due date and to complete the course according to the published class schedule. The due date for each assignment is listed under each Assignment.
- Generally speaking, late work may result in a deduction up to 15% of the grade for each day late, not to exceed 5 days.
- As a working adult I know your time is limited and often out of your control. Faculty may be more flexible if they know ahead of time of any potential late assignments.

Turn It In

- Faculty may require assignments be submitted to Turnitin.com. Turnitin.com will analyze a paper and report instances of potential plagiarism for the student to edit before submitting it for a grade. In some cases professors may require students to use Turnitin.com. This is automatically processed through the Assignments area of the course.

Academic Dishonesty

- Academic Dishonesty incorporates more than plagiarism, which is using the work of others without citation. Academic dishonesty includes any use of content purchased or retrieved from web services such as CourseHero.com. Additionally, allowing your work to be placed on such web services is academic dishonesty, as it is enabling the dishonesty of others. The copy and pasting of content from any web page, without citation as a direct quote, is academic dishonesty. When in doubt, do not copy/paste, and always cite.

Submission Guidelines

- Some assignments may have very specific requirements for formatting (such as font, margins, etc) and submission file type (such as .docx, .pdf, etc) See the assignment instructions for details. In general,

standard file types such as those associated with Microsoft Office are preferred, unless otherwise specified.

Disclaimer Statement

- Course content may vary from the outline to meet the needs of this particular group.

Communicating on the Forum

- Forums are the heart of the interaction in this course. The more engaged and lively the exchanges, the more interesting and fun the course will be. Only substantive comments will receive credit. Although there is a final posting time after which the instructor will grade comments, it is not sufficient to wait until the last day to contribute your comments/questions on the forum. The purpose of the forums is to actively participate in an on-going discussion about the assigned content.
- “Substantive” means comments that contribute something new and hopefully important to the discussion. Thus a message that simply says “I agree” is not substantive. A substantive comment contributes a new idea or perspective, a good follow-up question to a point made, offers a response to a question, provides an example or illustration of a key point, points out an inconsistency in an argument, etc.
- As a class, if we run into conflicting view points, we must respect each individual's own opinion. Hateful and hurtful comments towards other individuals, students, groups, peoples, and/or societies will not be tolerated.

University Policies

[Student Handbook](#)

- [Drop/Withdrawal policy](#)
- [Extension Requests](#)
- [Academic Probation](#)
- [Appeals](#)
- [Disability Accommodations](#)

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