



Course Syllabus: Applied Statistics and Data Analysis - AMCS 210

Division	Computer, Electrical and Mathematical Sciences & Engineering
Course Number	AMCS 210
Course Title	Applied Statistics and Data Analysis
Academic Semester	Spring
Academic Year	2016/2017
Semester Start Date	01/22/2017
Semester End Date	05/18/2017
Class Schedule (Days & Time)	02:30 PM - 04:00 PM Sun Wed

Instructor(s)

Name	Email	Phone	Office Location	Office Hours
Ying Sun	ying.sun@kaust.edu.sa	+966128080644	4116, 1, Al-Khawarizmi (bldg. 1)	

Teaching Assistant(s)

Name	Email
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Course Information

Comprehensive Course Description	For students outside AMCS wishing to obtain an introduction to statistical method. This course is AMCS 110 for AMCS students. Provides fundamentals of probability and statistics for data analysis in research. Topics include data collection, exploratory data analysis, random variables, common discrete and continuous distributions, sampling distributions, estimation, confidence intervals, hypothesis tests, elementary simulation and bootstrapping, distribution-free techniques, linear regression, analysis of variance, two-way tables, and data analysis using statistical software.
Course Description from Program Guide	Provides fundamentals of probability and statistics for data analysis in research. Topics include data collection, exploratory data analysis, random variables, common discrete and continuous distributions, sampling distributions, estimation, confidence intervals, hypothesis tests, linear regression, analysis of variance, two (2)-way tables, and data analysis using statistical software. No degree credits for AMCS majors.
Goals and Objectives	For students outside AMCS wishing to obtain an introduction to statistical method. This course is AMCS 110 for AMCS students. Provides fundamentals of probability and statistics for data analysis in research. Topics include data collection, exploratory data analysis, random variables, common discrete and continuous distributions, sampling distributions, estimation, confidence intervals, hypothesis tests, elementary simulation and bootstrapping, distribution-free techniques, linear regression, analysis of variance, two-way tables, and data analysis using statistical software.
Required Knowledge	The required computer package for this class is R. Example code and datasets will be posted on the class webpage. You are welcome to use other packages, such as Matlab or Mathematica, but R has many built in functions that other more general packages lack. If you choose to use another software package, you are on your own, and be aware that many tasks may become more time-consuming.

Reference Texts	<p>-Tamhane, A. C. and Dunlop, D. D. (2000) Statistics and Data Analysis: From Elementary to Intermediate. Prentice Hall: Upper Saddle River, NJ. ISBN: 0-1374-4426-5 (Required)</p> <p>-Hayter, A. J. (2012) Probability and Statistics for Engineers and Scientists, 4th edition, ISBN: 1111827044. (Optional)</p> <p>-Dalgaard, P. (2008) Introductory Statistics with R. Springer Science and Business Media. ISBN: 978-0-387-79053-4. (Optional)</p>
Method of evaluation	<p>25.00% - Course Project(s) 20.00% - Problem sets 35.00% - Midterm exam 20.00% - Homework /Assignments</p>
Nature of the assignments	<p>Homework will complement the work in class, generally due every other Wednesday. No late homeworks accepted unless prior arrangements have been made. Staple the pages together (we are not responsible for lost pages). Submit the problems in order, making sure that the computer output and discussion is placed together. Do not put the computer output at the end of home- work; raw output is not acceptable. Make it clear what parts of the output are relevant and show how they answer the questions posed. You are encouraged to work together on the homework, but collaboration with classmates is strictly limited to discussing problems, not writing them up or sharing R code. ?</p>
Course Policies	<p>Grades will be posted on the course website. Students who miss homeworks or exams should expect a grade of zero on that assignment. Your grade on any homework or exam may be disputed only within 48 hours of receiving the graded exam. If you are unable to take an exam or complete an assign- ment on time due to circumstances beyond your control, please e-mail me within 24 hours for appropriate arrangements. If you know ahead of time that you will have a university excused absence, homework assignments are due before you leave, and exams will be made up after you return.</p>
Additional Information	<p>The materials used in this course are copyrighted. By materials, I mean all materials generated for this class including syllabi, exams, course notes, computer code, and examples. You do not have the right to copy the handouts or distribute them, unless I expressly grant permission.</p> <p>This syllabus should be taken as a fairly reliable guide for the course content. However, you cannot claim any rights from it and in particular I reserve the right to change due dates or the methods of assessment. Ocial announcements will ALWAYS be those made in class.</p>

Tentative Course Schedule

(Time, topic/emphasis & resources)

Week	Lectures	Topic
1	Sun 01/22/2017 Wed 01/25/2017	Introduction
2	Sun 01/29/2017 Wed 02/01/2017	R programming
3	Sun 02/05/2017 Wed 02/08/2017	Data collection
4	Sun 02/12/2017 Wed 02/15/2017	Descriptive statistics
5	Sun 02/19/2017 Wed 02/22/2017	Probability theory
6	Sun 02/26/2017 Wed 03/01/2017	Probability theory
7	Sun 03/05/2017 Wed 03/08/2017	Sampling distribution
8	Sun 03/12/2017 Wed 03/15/2017	Sampling distribution
9	Sun 03/19/2017 Wed 03/22/2017	Estimation
10	Sun 03/26/2017 Wed 03/29/2017	Estimation
11	Sun 04/02/2017 Wed 04/05/2017	Confidence interval
12	Sun 04/09/2017 Wed 04/12/2017	Confidence interval
13	Sun 04/16/2017 Wed 04/19/2017	Hypothesis test
14	Sun 04/23/2017 Wed 04/26/2017	Hypothesis test
15	Sun 04/30/2017 Wed 05/03/2017	Linear regression
16	Sun 05/07/2017 Wed 05/10/2017	Linear regression
17	Sun 05/14/2017 Wed 05/17/2017	ANOVA
18		ANOVA

Note

The instructor reserves the right to make changes to this syllabus as necessary.