



Course Syllabus: Nonparametric Statistics - STAT 260

Division	Computer, Electrical and Mathematical Sciences & Engineering
Course Number	STAT 260
Course Title	Nonparametric Statistics
Academic Semester	Spring
Academic Year	2017/2018
Semester Start Date	01/28/2018
Semester End Date	05/24/2018
Class Schedule (Days & Time)	09:00 AM - 10:30 AM Mon Tue

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	This course is an introduction to nonparametric function estimation. Topics include kernels, local polynomials, Fourier series, spline methods, wavelets, automated smoothing methods, cross-validation, large sample distributional properties of estimators, lack-of-fit tests, semiparametric models, recent advances in function estimation.
Course Description from Program Guide	This course is an introduction to nonparametric function estimation. Topics include kernels, local polynomials, Fourier series, spline methods, wavelets, automated smoothing methods, cross-validation, large sample distributional properties of estimators, lack-of-fit tests, semiparametric models, recent advances in function estimation.
Goals and Objectives	This course will introduce students to the basics of nonparametric function estimation. The emphasis will be on regression, although many of the ideas to be discussed apply to other areas (e.g., density estimation) as well. A mix of theory and applications will be presented. Students will also be given access to some R software for computing smoothers and determining data-driven smoothing parameters.
Required Knowledge	Statistical inference, calculus, linear algebra
Reference Texts	Hart, J. Nonparametric Smoothing and Lack-of-Fit Tests, Springer Series in Statistics, 1997
Method of evaluation	50.00% - Course Project(s) 50.00% - Homework /Assignments

Nature of the assignments	Homework will complement the work in class, generally due every other week. The required computer package for this class is R. Example code and datasets will be posted on the class webpage.
Course Policies	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.
Additional Information	

Tentative Course Schedule

(Time, topic/emphasis & resources)

Week	Lectures	Topic
1	Mon 01/29/2018 Tue 01/30/2018	Introducciton to smoothing
2	Mon 02/05/2018 Tue 02/06/2018	Nonparametric density estimation: kernel methods
3	Mon 02/12/2018 Tue 02/13/2018	Nonparametric density estimation: statistical properties
4	Mon 02/19/2018 Tue 02/20/2018	Nonparametric regression: kernel estimators, local polynomials
5	Mon 02/26/2018 Tue 02/27/2018	Nonparametric regression: smoothing splines
6	Mon 03/05/2018 Tue 03/06/2018	Nonparametric regression: Fourier series, wavelets
7	Mon 03/12/2018 Tue 03/13/2018	Choice of smoothing parameters
8	Mon 03/19/2018 Tue 03/20/2018	Multiple regression: extension of ideas from single regression
9	Mon 03/26/2018 Tue 03/27/2018	Multiple regression: single index models
10	Mon 04/02/2018 Tue 04/03/2018	Spring break
11	Mon 04/09/2018 Tue 04/10/2018	Multiple regression: additive models
12	Mon 04/16/2018 Tue 04/17/2018	Multiple regression: varying coefficient models
13	Mon 04/23/2018 Tue 04/24/2018	Local likelihood
14	Mon 04/30/2018 Tue 05/01/2018	Spectral estimation
15	Mon 05/07/2018 Tue 05/08/2018	Topics on robust statistical methods
16	Mon 05/14/2018 Tue 05/15/2018	Topics on rank-based methods
17	Mon 05/21/2018 Tue 05/22/2018	Project due
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Note

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