

STAT 7250

CRN: 24814

Advanced Topics in Statistics 2: Functional Data Analysis

Description This class is an introduction to Functional Data Analysis (FDA). FDA considers data that may be curves or smooth functions varying over a continuum. Emphasis will be on the theoretical and computational aspects of FDA. We will discuss visualization and data exploration, nonparametric smoothing, functional linear models, functional principle components analysis, analysis involving derivatives, registration, nonlinear smoothing, and asymptotic theory. Course work will involve in class participation, assignments, presentations, and a final project. Familiarity with basic probability, matrix theory and theoretical statistics is required for the course.

Time Tu/Th, 11:30 a.m. – 12:45 p.m.

Location 330 Allen

Web Page <http://home.cc.umanitoba.ca/~koulist/stat7250>

Instructor Theodoro Koulis
320 Machray Hall
Telephone: (204) 474-8205
Email: theo.koulis@ad.umanitoba.ca

Office Hours T.B.A.
(AND by appointment. Drop in and ask me any statistics related problem.)

Marks Participation : 10%
Assignments (3): 25%
Presentation (1): 25%
Final Project (1): 40%

Students are expected to work individually on assignments. However, discussion of the final project may be undertaken in small groups. Extensions for assignments and projects will not be given. **Note:** Extensions will be granted if additional work is required.

References J. O. Ramsay and B. W. Silverman, *Functional Data Analysis*. New York: Springer, second ed., 2005. [Electronic Resource. Click here.](#)

J. O. Ramsay, G. Hooker, and S. Graves, *Functional Data Analysis with R and MATLAB*. Use R!, Springer, 2009. [Electronic Resource. Click here.](#)

J. O. Ramsay and B. W. Silverman, *Applied Functional Data Analysis: Methods and Case Studies*. Springer, 2002. [Electronic Resource. Click here.](#)

Note: Electronic resources are available through the University of Manitoba Libraries proxy server.

Software We will be using Matlab and the fdaM package found at <http://www.functionaldata.org>. The Functional Data Analysis package is also available for R. It is found at <http://cran.r-project.org/web/packages/fda/index.html>. Knowledge of Matlab is not a prerequisite, but some programming experience will be helpful. Matlab is installed on all graduate computers in the Department of Statistics.

Note It is important that you understand what constitutes academic dishonesty and that you are familiar with the very serious consequences. Links to resources that describe academic dishonesty (including plagiarism, cheating, inappropriate collaboration and examination impersonation) can be found at:

<http://umanitoba.ca/faculties/science/undergrad/resources/webdisciplinedocuments.html>

or through the Faculty of Science home page at:

<http://www.umanitoba.ca/faculties/science>.

Typical penalties imposed within the Faculty of Science for academic dishonesty are also described.