C O U R S E S Y L L A B U S

Statistical Consulting – STAT488-001 (2 credit capstone course)
Fall Semester, 2013: Tuesdays and Thursdays 1.00 – 2.15pm in Dumbach Hall, Room 004
Prerequisites: Restricted to Applied Statistics MS students with at least one semester in the A/S program completed; some experience in analyzing real datasets using regression, design, and/or CDA techniques
Text: Cabrera, J. & McDougall, A. (2002), *Statistical Consulting*, Springer-Verlag, ISBN: 0-387-98863-7

Instructor: Professor Timothy E. O'Brien, Ph.D. Email: tobrie1@luc.edu
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Office Hours: Tuesdays and Thursdays 11.30am – 12.30pm & by appointment
(no Thursday office hours on 10/10 and 11/07 due to GPD meetings those days)
Course Web Page: **http://webpages.math.luc.edu/~tobrien/courses/consult/course-homepage.html**

Course Overview

Students enrolled in this course will be introduced to statistical consulting techniques useful for work with researchers and decision-makers in university, medical, financial and industrial settings. So as to better appreciate the practical nuances and subtleties of consulting, enrolled students will engage in actual hands-on statistical consulting with administrators, researchers, or students at one of Loyola's lakeside campuses (via the Course Practicum) or remotely. Ethical issues related to the use and misuse of statistical methods, surveys, and studies will also be thoroughly discussed. Students will summarize their consulting activities in class discussions and reports, give class presentations, take quizzes, and write a final course paper.

Since statistical consulting requires the integration/synthesis and use of course material across the full statistics curriculum spectrum, this course clearly and emphatically serves as a "capstone course" for the MS program in Applied Statistics. As such, this course also provides an excellent opportunity to assess the quality of our program by measuring key student outcomes.

Presentations, Homework and Quizzes

Four quizzes will be given during the semester (see schedule below) on the material from the presentations and text. Students are divided into groups of three students, and each group will work with a given client or clients; reports to the larger class by each group will then be given in the form of a 10-minute presentation on each of four instances during the semester (see schedule below). Since this course stresses communication in addition to statistical know-how, clear expression is very important on quizzes and in all presentations.

Grading Scheme

Participation	5%
Presentations and handout materials	40%
Quiz Average	40%
Individual Final Paper	15%

Final course (letter) grades will be awarded according to the following grading scheme:

	[92.5 , 100] = A	[90.0 , 92.5) = A-
[87.5 , 90.0) = B+	[82.5 , 87.5) = B	[80.0 , 82.5) = B-
[77.5 , 80.0) = C+	[72.5 , 77.5) = C	[70.0 , 72.5) = C-
[67.5 , 70.0) = D+	[60.0 , 67.5) = D	[0.0 , 60.0) = F

Statistical Software

Students should make every effort to become fluent in statistical/programming packages such as SPSS, Stata, SAS, Minitab and R. Although previous knowledge of these packages is not assumed, students may be tested on any software programs and output discussed in the textbook and/or in class.

Make-up Quizzes and Group Work

A make-up for any quiz will be given only in case of an illness verified by a note from a physician or a death in your family. The lowest quiz score will be dropped, so the quiz average will be based on the highest three quiz scores. Also, all students must participate fully in group work such as in the preparation of group presentations: those not participating fully will be penalized.

Academic Honesty

It is presumed and required that students do their own work on the in-class quizzes and course paper. Submitting work as your own which is copied or paraphrased from someone else is not permitted. Cheating includes, but is not limited to, illegal collaboration, copying, and assisting others in their course papers. Anyone found cheating will not be permitted to withdraw and will receive an "F" grade for the course. Your academic dean will be informed and a statement will be placed in your permanent file.

Tentative Semester Schedule (Text Sections) – this schedule is subject to change (check website)

Tuesday	Thursday
08/27 – Intro to Stat. Consulting (Ch.1)	08/29 – Intro to Stat. Consulting (Ch.1)
09/03 – Communication (Ch.2)	09/05 – Communication (Ch.2)
09/10 – Statistical Methodology Review (Ch.3)	09/12 – Statistical Methodology Review (Ch.3)
09/17 – **Group Presentations I**	**09/19 – Quiz 1**
09/24 – A Consulting Project from A to Z (Ch.4)	09/26 – A Consulting Project from A to Z (Ch.4)
10/01 – Job Promotion Discrimination (§6.1)	10/03 – The Case of Lost Mail (§6.2)
10/08 – **Fall Break**	10/10 – **Group Presentations II**
10/15 – Quiz 2	10/17 – Device to Reduce Engine Emissions (§6.3)
10/22 – Reverse Psychology (§6.4)	10/24 – The Flick Tail Study (§7.1)
10/29 – Does it Have Good Taste? (§7.2)	10/31 – Expenditures in NY Municipalities (§7.3)
11/05 – **Group Presentations III**	**11/07 – Quiz 3**
11/12 – Measuring Quality Time (§7.4)	11/14 – A Tale of Two Thieves (§8.1)
11/19 – Guest Speaker?	11/21 – Plastic Explosives Detection (§8.2)
11/26 – A Market Research Study (§8.3)	11/28 – **Thanksgiving Break**
12/03 – **Group Presentations IV**	**12/05 – Quiz 4**

Note: The last day that a student may withdraw without a penalty grade of "WF" is Friday, November 1st

Student Groups and Contact Information (Clients and themes are subject to change during the semester)

Group Number/client	Student Name (Last, First)		Names in Alphabetical Order (group) and presentation date
1 – Hunter College group	Drenovac, Nancy		Beck, Andy (2) – 09/10
	Ficek, Joseph		Drenovac, Nancy (1) – 09/12
	Syzdek, Brian		Ficek, Joseph (1) – 09/24
2 – Questionnaires and Assessment	Beck, Andy		Jagger, Matt (3) – 09/26
	Ong, Ta Zhi		Liu, Yang (4) – 10/01
	Wu, Linlin		Ma, Xianggyu/Oliver (5) – 10/03
3 – Predictive/Medical Modelling	Jagger, Matt		McCauley, Anne (5) – 10/17
	Wilkins, Patrick		Ong, Ta Zhi (2) – 10/22
	Xiong, Yuling (Alice)		Syzdek, Brian (1) – 10/24
4 – Environmental/GIS	Liu, Yang		Urdov, Kiril (5) – 10/29
	Üsen, Fatih		Üsen, Fatih (4) – 10/31
	Velasquez, Loren		Velasquez, Loren (4) – 11/12
5 – Big Data/Data Mining	Ma, Xianggyu (Oliver)		Wilkins, Patrick (3) – 11/14
	McCauley, Anne		Wu, Linlin (2) – 11/21
	Urdov, Kiril		Xiong, Yuling/Alice (3) – 11/26

Additional Reading List

Books

- Derr, *Statistical Consulting: A Guide to Effective Communication*, 2000, Duxbury.
- Hahn & Doganaksoy, *A Career in Statistics: Beyond the Numbers*, 2011, Wiley.
- Peck, Haugh & Goodman, *Statistical Case Studies: A Collaboration between Academe and Industry*, 1998, SIAM/ASA Publication.

Articles

- Arndt & Woolson, Establishing a biostatistical core unit in a clinical research center, *Amer. Stat.*, 1991.
- Berger, Training statisticians to be alert to the dangers of misapplying statistical methods, *J. Modern Applied Stat. Methods*, 2005.
- Clancy, Letters to the editor, *Amer. J. Sports Medicine,* 2000.
- D'Agostino Sr., Massaro & Sullivan, Non-inferiority trials: Design concepts and issues – the encounters of academic consultants in statistics, *Stat. in Medicine*, 2003.
- Deutsch, "What sample size do I need?" Or, a biostatistical consultant's role as an educator, *JSM/Section on Teaching Statistics in Health Sciences Proceedings*, 2002.
- Hewett et al, The effect of neuromuscular training on the incidence of knee injury in female athletes, *Amer. J. Sports Medicine*, 1999.
- Kirk, Statistical consulting in a university: Dealing with people and other challenges, *Amer. Stat.*, 1991.
- Marquardt, Statistical consulting in industry, *Amer. Stat.*, 1979.
- Moses & Louis, Statistical consulting in clinical research: The two-way street, *Stat. in Medicine*, 1984.
- Pfannkuch & Wild, Statistical thinking and statistical practice: Themes gleaned from professional statisticians, *Statistical Science*, 2000.
- Stegman, Statistical consulting in the university: A faculty member's perspective, *J. Educ. Stat.*, 1985.
- Vardeman & Morris, Statistics and ethics: Some advice for young statisticians, *Amer. Stat.*, 2003.
- Zahn & Isenberg, Nonstatistical aspects of statistical consulting, *Amer. Stat.*, 1983.