

DSC 423: DATA ANALYSIS AND REGRESSION / DSC 323: DATA ANALYSIS & STATISTICAL SOFTWARE II

Winter 2019| *In-Class Sessions: Mondays 5:45pm – 9:00 pm @ the assigned classroom per campusconnect*

Monday Jan. 7 class rescheduled for Saturday Jan 12, at 9:00 AM in CDM 214

Instructor: Nandhini Gulasingam
Office Hours: Monday & Thursday 4:30 pm– 5:15 pm (Loop – CDM 703)
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Phone: (773) 325-4917
Course Website: <http://d2l.depaul.edu>
Drop Dates: <https://academics.depaul.edu/calendar/Pages/default.aspx>
Response Policy: within 24-hours between the course start and end dates per campusconnect

I. Course Summary

The course topics include: Inference for distributions, inference for a population mean, comparing two population means using paired or independent samples, checking normal assumptions. Multiple regression and correlation, analysis of residuals. Model selection methods. Logistic Regression models.

At the end of this course, students will be able:

- To perform data analyses using a statistical software and to interpret the output of their analysis;
- To apply modeling techniques to evaluate the association among variables and predict the values of a variable of interest to be informed and critical readers of quantitative arguments,
- To appreciate the role of statistics in empirical research and scientific study, and
- To gain flexible problem-solving skills applicable to unfamiliar statistical settings

II. Prerequisite(s)

IT 223 or IT 403 or consent of instructor. Students should be familiar with statistical inference methods, including sampling distributions, confidence intervals and hypothesis testing. A brief review of these topics will be covered in the first lecture of the course.

III. Textbooks and Resources

- A Second Course in Statistics: Regression Analysis, 7th ed., William Mendenhall, Terry L. Sincich, Prentice Hall, 2010 (ISBN: 9780321691699) – Or previous edition.
- Introductory notes on SAS will be posted on the course website.

VII. Assignments, Activities, and Grading

DSC 323 is taught in parallel to DSC 423. The structure of the class is identical. However, the undergrad section will have fewer requirements on homework assignments and project.

Homework and Programming Assignments (6)	50%
Group Project and Reports	50%

Grading Scale

A	93-100 points	C+	77-79.99 points
A-	90-92.99 points	C	73-76.99 points
B+	87-89.99 points	C-	70-72.99 points
B	83-86.99 points	D	50-69.99 points
B-	80-82.99 points	F	< 50

IV. IMPORTANT NOTICES

Homework and Programming Assignments (50%)

There will be five or six assignments. Assignments will be typically posted on Monday and will be due a week later by **Tuesday at 11.59 pm (there may be exceptions, so refer to the schedule)**. All assignments should be done **independently and cannot be discussed with anyone** other than your instructor. **No assignments or papers will be accepted past the due date** unless a documented medical or personal emergency arises.

Group Project and Report (50%)

The purpose of the final project is to demonstrate your ability to apply the knowledge and the techniques learned during this course. The final project for this class is more extensive analysis task, chosen by you from among the topics we discuss. Final projects will include a presentation to the rest of the class at the end of the quarter, in place of a final exam.

Whenever it is possible, it is recommended that the online students attend the final presentations to participate in the live discussions of the final projects and to complete critiques of the other projects. Alternate arrangements will be provided for online students to do their presentations or submit it as a video recording.

Deliverables for the Final Project:

- **Team List (Feb. 12)**: Team list to be posted on D2L under the discussion topic "Project Team List".
- **Proposal (Feb. 26)**: One page proposal that includes, project title, team mates, dataset, problem description, the proposed approach and methodology, and at least three references other than textbook or class notes.
- **Reports (Mar. 18)**: Reports will include a 1-2 page non-technical report, a 30-50 pages technical report. The electronic copy should be in a zip file format consisting all program source code, data and the reports.

News and Course information

You are expected to log in to the course website regularly, at least every other day, so you can keep up with announcements and course updates, and read the new posts on the discussion board. Participation to the discussion boards is important as it helps students share ideas and learn from each other. **Any questions regarding the course, assignments, project, etc. (other than that of personal nature) should be posted on the discussion forum at <http://d2l.depaul.edu>.**

Course announcements will be posted on the News page of the course D2L site. Some information will be sent by email (check your spam folder since your email application may filter the D2L emails as spam) and make sure that DePaul has your correct email. You also have the option (highly recommended!) to subscribe to the news page, and the discussion forum at <http://d2l.depaul.edu>.

Information for Online Students

Recordings of each lecture will be available a few hours after the "live" class, and can be found at the course website <http://d2l.depaul.edu/>. Online students are expected to watch the lectures and to keep up with the course information posted on the course website.

Statistical Software

We will be using SAS software in this course. Three or four lab sessions (recorded for online students) will be scheduled during the quarter.

SAS Software Access:

DePaul Labs: SAS 9.4 is available in the CDM labs and all DePaul labs.

Virtual Labs

You can also use DePaul's virtual lab to access the SAS 9.4 windows and Mac versions. To access the virtual labs, see instructions posted under SAS Resources section of D2L. If you run into any issues accessing the virtual lab or the software, contact the help-desk at 312-362-8765.

Optional text for SAS: Applied Statistics and the SAS Programming Language, 5th edition, by Cody, R.P. and Smith. J.S. Prentice Hall (2005), ISBN: 0131465325.

Information for all Students

Any questions regarding the course, assignments, project, etc. (other than that of personal nature) should be posted on the discussion forum at <http://d2l.depaul.edu>. Only questions of personal nature should be emailed.

All students are expected:

- To read this document in full.
- To attend all classes (online students are expected to watch each lecture). If you miss a class, it is your responsibility to watch the lecture recording and to get copies of the notes or documents handed out in class. All lecture materials and recordings are available at <http://d2l.depaul.edu/> under your course home page.
- To participate actively to class discussions and activities and to work on the in-class problems and exercises that are designed to improve students' understanding of the class topics.
- To be familiar with all the course documents and notes posted at the course website.
- To read all the sections in the textbook and additional readings relevant to the lecture before coming to class. The reading assignments are listed in the schedule included in this syllabus. Lecture notes are meant to complement the course textbook not to replace it.
- Attitude: A professional and academic attitude is expected throughout this course. Measurable examples of non-academic or unprofessional attitude include but are not limited to: talking to others when the instructor is speaking, mocking another's opinion, cell phones ringing, emailing, texting or using the internet whether on a phone or computer. If any issues arise a student may be asked to leave the classroom. The professor will work with the Dean of Students Office to navigate such student issues.
- Civil Discourse: DePaul University is a community that thrives on open discourse that challenges students, both intellectually and personally, to be [Socially Responsible Leaders](#). It is the expectation that all dialogue in this course is civil and respectful of the dignity of each student. Any instances of disrespect or hostility can jeopardize a student's ability to be successful in the course. The professor will partner with the Dean of Students Office to assist in managing such issues.
- Cell Phones/On Call: If you bring a cell phone to class, it must be off or set to a silent mode. Should you need to answer a call during class, students must leave the room in an undistruptive manner. Out of respect

to fellow students and the professor, texting is never allowable in class. If you are required to be on call as part of your job, please advise me at the start of the course.

- **To strictly adhere to the University Academic Integrity Policy:** This course will be subject to the university's academic integrity policy. More information can be found at <https://resources.depaul.edu/teaching-commons/teaching/academic-integrity/Pages/default.aspx>.

Submitting work that is not yours is grounds for an automatic 'F' for the entire course – this includes taking content and ideas from others or consulting others to complete your deliverables other than your instructor. The only exception to this rule is discussing the project with your teammates – see project instructions for exceptions.

Changes to Syllabus

This syllabus is subject to change as necessary during the quarter. If a change occurs, it will be thoroughly addressed during class, posted under Announcements in D2L and sent via email.

Online Course Evaluations

Evaluations are a way for students to provide valuable feedback regarding their instructor and the course. Detailed feedback will enable the instructor to continuously tailor teaching methods and course content to meet the learning goals of the course and the academic needs of the students. They are a requirement of the course and are key to continue to provide you with the highest quality of teaching. The evaluations are anonymous; the instructor and administration do not track who entered what responses. A program is used to check if the student completed the evaluations, but the evaluation is completely separate from the student's identity. Since 100% participation is our goal, students are sent periodic reminders over three weeks. Students do not receive reminders once they complete the evaluation. Please see <https://resources.depaul.edu/teaching-commons/teaching/Pages/online-teaching-evaluations.aspx> for additional information.

Accommodations (Students with Disabilities)

Students seeking disability-related accommodations are required to register with DePaul's Center for Students with Disabilities (CSD) enabling them to access accommodations and support services to assist with their success. There are two office locations:

- Loop Campus – Lewis Center #1420 – (312) 362-8002
- Lincoln Park Campus – Student Center #370 – (773) 325-1677

Students who register with the Center for Students with Disabilities are also invited to contact Dr. Gergory Moorhead, Director of the Center, privately to discuss how he may assist in facilitating the accommodations to be used in a course. This is best done early in the term. The conversation will remain confidential to the extent possible.

Please see <https://offices.depaul.edu/student-affairs/about/departments/Pages/csd.aspx> for Services and Contact Information.

Incomplete Grades

An incomplete grade is a special, temporary grade that may be assigned by an instructor when unforeseeable circumstances prevent a student from completing course requirements by the end of the term and when

otherwise the student had a record of satisfactory progress in the course. All incomplete requests must be approved by the instructor of the course and a CDM Associate Dean. Only exceptions cases will receive such approval. Information about the Incomplete Grades policy can be found at <http://www.cdm.depaul.edu/Current%20Students/Pages/Grading-Policies.aspx>

Academic Policies

All students are required to manage their class schedules each term in accordance with the deadlines for enrolling and withdrawing as indicated in the [University Academic Calendar](#). Information on enrollment, withdrawal, grading and incompletes can be found at:

<http://www.cdm.depaul.edu/Current%20Students/Pages/PoliciesandProcedures.aspx>

V. Use of Class Material (to everyone who has access to the D2L Class)

Course material is to be used only by the students in this class for this class purpose only, and cannot be used or redistributed in paper form or be distributed on the internet electronically or via websites. This includes course lecture slides, course videos, example codes, in-class activities and answers, lab exercises and data files, assignment questions and data files, assignment answers, reading materials, project documents and any articles presented in class or for homework.

VI. Schedule

*Please note that this schedule is subject to change. The days you have a lab, you will also have a lecture in the assigned classroom at the assigned time per campusconnect, **except Jan. 12, 9:00 AM class will be in CDM 214.***

Lecture	Topics	Reading	What's Due
Jan. 7	Class Rescheduled to Jan. 12 @ 9 am in CDM 214		
Lecture 1 Jan. 12 Saturday 9:00-12:30 PM @ CDM 214)	A review of basic concepts relevant to our course, students should have already covered much of this material elsewhere. Inference for the mean of a population. Introduction to SAS. Lab session (10:30 AM - 12:15 PM) @ Daley 505	Chapter 1: 1.1 - 1.9	
Lecture 2 Jan. 14	Statistical inference and introduction to linear regression models. Multiple linear regression, Parameter estimation, Least square estimates.	Chapter 2 Chapter 3 Chapter 4: 4.1 - 4.9 Chapter 7: 7.5	
No Lecture Jan. 21	Martin Luther King Day - University officially closed Work to complete on your own on MLK Day (A) Reading (a) Interpreting Boxplots <ul style="list-style-type: none"> https://www.wellbeingatschool.org.nz/information-sheet/understanding-and-interpreting-box-plots http://web.pdx.edu/~stipakb/download/PA551/boxplot.html http://www.dummies.com/education/math/statistics/interpreting-box-plots/ (b) Histograms <ul style="list-style-type: none"> http://qualityamerica.com/LSS-Knowledge- 		➤ Assignment 1 due Tu. Jan. 22 at 11.59pm

	Center/qualityimprovementtools/interpreting_histograms.php <ul style="list-style-type: none">• https://www.ck12.org/book/CK-12-Probability-and-Statistics-Concepts/section/4.6/• http://www.dummies.com/education/math/statistics/how-to-interpret-the-shape-of-statistical-data-in-a-histogram/• https://quizizz.com/admin/quiz/5717a91ab226ead95e743f21 <p><u>(B) Work on Assignment 1 & 2</u></p>		
Lecture 3 Jan. 28	Multiple linear regression: model diagnostics. Residual Analysis and Categorical variables. Transformations.	Chapter 4: 4.1 - 4.8, 4.12, 4.14 Chapter 5: 5.7 – 5.9 Chapter 7: 7.6 Chapter 8: 8.1 - 8.6	➤ Assignment 2 due Tu. Jan. 29 at 11.59pm
Lecture 4 Feb. 4	Multiple linear regression: Computing predictions and prediction errors. Multicollinearity and influential observations.	Chapter 3: 3.9 Chapter 4: 4.9, 4.11 Chapter 7: 7.4 Chapters 8: 8.6	➤ Assignment 3 due Tu. Feb. 5 at 11.59pm
Lecture 5 Feb. 11	Multiple linear regression: Model building and variable selection methods. Lab session (7:30 PM - 9:00 PM) @ CDM 658	Chapter 6	➤ Assignment 4 due Tu. Feb. 12 at 11.59pm ➤ Project Team List to be posted on D2L due Tu. Feb. 12 at 11.59pm
Lecture 6 Feb. 18	Multiple linear regression: Model validation methods. Discussion of project.	Chapter 4: 4.10-4.14 Chapter 5	➤ Assignment 5 due Tu. Feb. 19 at 11.59pm
Lecture 7 Feb. 25	Logistic regression: Exploratory analysis, model selection, diagnostics, and predictions. Lab session (7:30 PM - 9:00 PM) @ CDM 658	Chapter 9: sections 9.5,9.6	➤ Project Proposal due Tu. Feb. 26 at 11.59pm
Lecture 8 Mar. 4	Logistic regression: Model validation. Lab session (7:30 PM - 9:00 PM) @ CDM 658	Chapter 9: sections 9.5, 9.6. Chapter 12	➤ Assignment 6 due Tu. Mar. 5 at 11.59pm
Lecture 9 Mar. 11	Building more complex models: non-linear regression, polynomial regression.	Chapter 4: 4.10-4.14 Chapter 5	
Lecture 10 Mar. 18	Final Project Reports + Code + Data Team Evaluations		➤ Final Project Reports and Team Evaluations due Mon. Nov. 18 at 11.59 pm