PURDUE UNIVERSITY NORTHWEST

Department of Mathematics, Statistics and Computer Science
2200 169th Street
Hammond, IN 46323
(219) 989-2273
https://academics.pnw.edu/math-stats-computer-science

STAT 40001-002/MA 59800-004 Statistical Computing Fall 2017

Instructor: Gokarna Aryal, Ph.D.

Classroom and Time: CLO 363, TR 2:00 PM- 3:15 PM.

Office: Classroom Office Building, CLO 380

Office Hours: MW 11:00 AM- 2:00 PM, TR 4:00 PM- 5:00 PM and other times by appointment

Contact: Phone: (219) 989 2701
E-mail: aryalg@ pnw.edu

Prerequisites: STAT 30100 or STAT 34500

Textbook: **None Required** Lecture note will be provided
Other Resources: The following books are recommended as references:

- A first course in Statistical Programming With R, by W. John Braun and Duncan J. Murdoch
- Art of R Programming by Norman Matloff
- Statistical Computing with R by Maria Rizzo
- Probability and Statistics with R by Maria D. Ugarte, Ana F. Militino and Alan T. Arnholt

Course Description:
STAT 40001 is a 3 credit hours undergraduate level course in statistical computing. The purpose of this course is to teach fundamental computing skills required by practicing statisticians. Students will use statistical software for analysis and model building of real world data. Topics include descriptive statistics, inferential statistics, model building, designing and performing simulation experiments, writing codes to perform common statistical tasks.

General Course Objectives:
STAT 40001 meets the following standards of an experiential learning course:

- ✓Intention
- ✓Preparedness and Planning
- ✓Authenticity
- ✓Reflection
- ✓Orientation and Training
- ✓Monitoring and Continuous Improvement
- ✓Assessment and Evaluation
- ✓Acknowledgment

Specific Course Objectives:

- Import, manage, and clean data from a wide variety of data sources.
- Use regular expressions for data management.
- Produce and interpret graphics for exploratory data analysis and report presentations.
- Write efficient and well documented code for descriptive and inferential statistics.
- Generate and evaluate random numbers from different probability models.
- Analyze data through model building.
- Design and analysis of simulation experiments.

Course Content:

- Data, Session Management and Descriptive Statistics
- R Essentials and Graphics
- Probability Distributions
- Basic Inference Methods
- Linear Models
- Nonparametric Statistics
- Optimization and Simulation Experiments

Note: If you are enrolled in MA 59800-004 course you will have additional reading material and assignments related to the resampling methods, including, but not limited to, Bootstrap, Jackknifing, EM algorithms, for estimation and testing.

Course Grade: Your final grade will be based on your performance on the homework, lab assignments, projects and the exams described below.

Homework : Homework will be assigned every other week and you will also be given lab assignments in each class meeting. **20%** of your grade will be based on homework and **5%** based on lab assignments.

Project: You are expected to complete one individual project and one group project. Details about the nature of the projects will be discussed in the class. Individual project worth **5%** and the group project worth **10%** of your grade.

Examinations: Two midterm exams and a final exam will be given during the semester. Each midterm test worth **15%** and final worth **30%** of your grade. A tentative schedule of the tests is as below

Midterm Exam 1: Thursday, October 7, 2017
Midterm Exam 2: Thursday, November 16, 2017
Final Exam: Tuesday, December 12, 2017 (2:45 PM- 4:45 PM)

Grade: Based on total points accumulated if your overall percentage of total points falls into the following range, you will receive the corresponding grade:

$\mathbf{97-100 \to A+,}$	$\mathbf{93-96 \to A,}$	$\mathbf{90-92 \to A-,}$
$\mathbf{87-89 \to B+,}$	$\mathbf{83-86 \to B,}$	$\mathbf{80-82 \to B-,}$
$\mathbf{77-79 \to C+,}$	$\mathbf{73-76 \to C,}$	$\mathbf{70-72 \to C-,}$
$\mathbf{67-69 \to D+,}$	$\mathbf{63-66 \to D,}$	$\mathbf{60-62 \to D-,}$
	Below **59%** $\to$ F.	

Attendance Policy : Doing exercises and attending classes regularly are integral parts of the learning process. **Attendance in every lecture is mandatory and will be checked regularly.**

Technology: We will be using statistical software R (RStudio) to do statistical computation. In order to get access to this software please visit *http://www.r-project.org.*

Important Dates:

- Thursday, October 7, 2017– Test 1
- Tuesday, October 10, 2017 – (October) Fall Break
- Friday November 10, 2017 – Last day to drop Fall 2017 classes
- Thursday, November 16, 2017 – Test 2
- Thursday, November 23, 2017 – Thanksgiving Day
- Tuesday, December 12, 2017 – Final Exam

Miscellaneous Policies:

- Students are expected to comply with University regulations regarding civility, attendance, and appropriate classroom behavior. For Classroom Civility Policies and Academic Dishonesty Policy please visit the following websites
  `www.pnw.edu/dean-of-students/toward-a-model-of-community-civility-student-guide-12006/`
  `www.pnw.edu/dean-of-students/purdue-university-northwest-academic-integrity-policy/`

- Honor Code
  The following is an Honor Code and an Honor Pledge to which all Purdue University Calumet Students must adhere: "I understand that academic dishonesty will not be tolerated at Purdue University Northwest. I am here to learn. Through learning, I will strive to become a better person and a more valuable contributor to society. I understand that dishonesty in the classroom, through cheating, plagiarism or other dishonest acts, defeats this purpose and disgraces the mission and quality of a Purdue University Northwest education. Therefore, I make the following pledge: In accordance with the honor code, I will not engage in dishonesty in my academic activities, and I will not tolerate such dishonesty by other students.

- Students with Disabilities:
  Students who may need accommodations to address barriers caused by documented disabilities under the Americans with Disabilities Act or Section 504 of the Rehabilitation Act need to register with the Disability Access Center (DAC) to receive accommodations. To request and receive accommodations, students schedule an appointment with the DAC to initiate review and approval of supporting documentation showing their disability, the barriers it causes, and the recommended accommodations. If documentation is approved, the DAC will email a letter to the student's current semester faculty members outlining the accommodations needed to ensure accessibility. Accommodations will be provided from the date the letter originates from the DAC. It is important to register as soon as possible as accommodations are not retroactive. The DAC is located at the Hammond campus in the Student Union & Library Building (SUL) 341 and Westville in the Technology Building (TECH) 101. The DAC can be reached at (219) 989-2455 or emailing: dac@pnw.edu. Please visit `www.pnw.edu/dac`.

- Non-Discrimination:
  Purdue University Northwest prohibits discrimination against any member of the University community on the basis of race, religion, color, sex, age, national origin or ancestry, genetic information, marital status, parental status, sexual orientation, gender identity and expression, disability, or status as a veteran. Any student who believes they have witnessed or experienced discrimination are encouraged to report the incident to the Office of Equity, Diversity & Inclusion in Lawshe 231, Hammond or call (219) 989-2337 or in Schwarz 25, Westville or call (219) 785-5545. Additional information can be found on the Diversity website `http://www.pnw.edu/diversity`.

- Student Mental Health and Wellbeing:
  Purdue University Northwest is committed to supporting and advancing the mental health and well-being of our PNW students. During the course of their academic careers, students often experience personal challenges that contribute to barriers in learning, such as drug/alcohol problems, strained relationships, chronic worrying, persistent sadness or loss of interest in enjoyable activities, family conflict, grief and loss, domestic violence, difficulty concentrating, problems with organization, procrastination and/or lack of motivation. Students also sometimes come to college with a history of learning difficulties (e.g., any form of special education), experience difficulties succeeding in a particular subject (e.g., math, reading), or have experienced some form of trauma be it emotional or physical (e.g., head injury). These mental health concerns can lead to diminished academic performance and can interfere with daily life activities. If you or someone you know has a history of mental health concerns or if you are unsure and would like a consultation, a variety of confidential services are available. The Counseling Center is located in Gyte 05 in Hammond and TECH 157 in Westville. You can also reach us at (219) 989-2366 or on the Counseling website `www.pnw.edu/counseling/`. National Suicide Prevention Hotline at (800) 273-TALK or on the web at `suicidepreventionlifeline.org`.

- Emergency Preparedness:
  An information sheet, with instructions for various types of possible emergencies, is posted in each room on campus. These emergencies include criminal activity, severe weather, fire, medical emergencies, and noises sounding like gunshots. Students are strongly encouraged to review this instruction sheet carefully and acquaint themselves with these important guidelines. PNW will hold annual drills to prepare for emergencies such as severe weather, active shooter and fire. It is strongly encouraged that all students participate in these drills in an effort to strengthen our emergency preparedness efforts.