# SYLLABUS FOR COMPUTATIONAL STATISTICS WITH APPLICATIONS

## MAT 4672 - Section D676, Spring 2016

**Lecture**: TTh 4:05 PM to 5:45 PM. Room N 723.

**Instructor**: Dr. Hüseyin Yüce
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Office Hours: TTh 3:00PM - 4:00PM or by appointment.

**Class Webpage:** http://websupport1.citytech.cuny.edu/faculty/hyuce/Yuce/MAT_4672.html

**Prerequisites:** MAT 3672 with a grade of D or better is pre-requisite for the course.

**Text:** *SAS and R: Data Management, Statistical Analysis, and Graphics* by K. Kleinman and N. J. Horton.
*Applied Statistics and SAS Programming Language*, 5th Ed. by R. P. Cody and J. F Smith.
Documentation and manuals of R in http://www.r-project.org/.

**Course Objectives:** Topics include computer algorithms for evaluation, simulation, and visualization of data; sampling from prescribed distributions; robustness and error analysis of procedures used by statistical packages; graphics for data display; computation of probabilities and percentiles.

**Technology:** All of the coursework will be done using SAS and R programming languages. SAS is commercial software (http://www.sas.com/) and R is free software (http://www.r-project.org/) environments for statistical computing.

**Evaluation**: There will be one in class exam (a midterm) worth 100 points and a 100-point comprehensive final exam. In addition to the exams, there will be three class projects worth 25 points each (total of 75) and a lab grade of 5 points in each lecture (total of 125). So there are 400 total points in this course. The grading scale will be no worse than what is shown in the table below and the grades will NOT be curved. To find your final class grade at the end of the semester, add all your points and divide by 400 and then find the corresponding percentage table below.

| | | | |
|---|---|---|---|
| 93–100% | A | 77–79% | C+ |
| 90–92% | A- | 70–76% | C |
| 87–89% | B+ | 60–69% | D |
| 83–86% | B | 0–59% | F |
| 80–82% | B- | | |

**Writing Component**: This is a *writing intensive course*. The course consists of 25 labs/lectures and each of these labs will have a short writing component. You need to be able to express your findings/solutions to non-experts in formal writing. Your three projects will be in the form of technical report (see the attached guidelines). Your writing and organizational skills will be also evaluated as part of the course grade (see writing rubrics).

**Attendance**: You are expected to attend all class meetings and are responsible for all the material covered. Attendance will be taken. Lateness and students leaving before the end of the class period will be recorded. If these become excessive, the student may be asked to withdraw from the course. Any changes in this syllabus or in the scheduling of exams, assignments etc. will be announced during class meetings. Students who miss a class meeting should obtain all the information for that meeting. *Active participation in class will be also taken into consideration while computing the final grade*.

**Make-up Exam Policy:** There will be **no 'make–up'** exams. *Unless a valid excuse* (medical or family emergencies, College related travel such as athletic or academic competitions) *is presented in advance, a missed exam will receive the score 0.* Students must look at this syllabus carefully and plan well ahead: *personal travel is NOT a valid excuse.* If a student misses an exam for a valid reason and provides a written verification from an appropriate authority (not a family member), that

percentage of the grade may be made up on the final. No extra time will be given for students who arrive late. No student will be allowed to take the final exam early.

**Available Help**: You are encouraged to come to my office hours or make an appointment for help.

**Academic Misconduct**: includes (but is not limited to) giving or receiving assistance on a test, quiz, or homework assignment for which such assistance is not permitted, falsifying a document to obtain an excusal from a test, using sources without proper citation in written assignments, and using unauthorized notes on a test or quiz. A more complete definition of Academic Misconduct, see the Student Handbook.

**Important Dates**:

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|---|---|
| Monday, February 1st | Late registration/Change of program ends. |
| Tuesday, February 2nd | Last day to drop classes with 75% tuition refund. |
| Tuesday, February 9th | Last day to drop classes with 50% tuition refund. |
| Wednesday, February 17th | Last day to drop classes with 25% tuition refund. |
| Monday, April 11th | Last day to withdraw with "W" grade. |

**Homework:** The homework will not be collected. It is the responsibility of the student to complete these assignments. If you have any questions concerning HW problems, you are encouraged to come to the office hours.

**Tentative Schedule:**

| Date | Session | Date | Session |
|---|---|---|---|
| 2/2 | Lab 1: Simple graphing | 3/29 | Lab 15: Robust regression |
| 2/4 | Lab 2: Random samples | 3/31 | Lab 16: Estimation of location |
| 2/11 | Lab 3: Illustrating CLT | 4/5 | Lab 17: Estimation of location |
| 2/16 | Lab 4: Simulation of CI coverage Prob. | 4/7 | Lab 18: Bootstrap method |
| 2/18 | Lab 5: Exact CI coverage Prob. – *Intro of proj 1 is due.* | 4/12 | Lab 19: Studentized and wild bootstrap methods (end R) |
| 2/23 | Lab 6: Macros & File I/O | 4/14 | Lab 20: ANOVA-one way |
| 2/25 | Lab 7: Least square curve fitting. – *Analysis of proj 1 is due.* | 4/19 | Lab 21: Application on lead absorption, **Project 2 due** |
| 3/1 | Lab 8: Least square spline fitting | 4/21 | Lab 22: ANOVA-two way |
| 3/3 | Lab 9: 3D Graphics. – *Results/conclusion of proj 1 is due.* | 5/3 | Lab 23: One way ANOVA data reading |
| 3/8 | Lab 10: Regression and 3D graphics | 5/5 | Lab 24: Repeated measures and accuracy in blood glucose data. |
| 3/10 | Lab 11: Response surface regression (rsreg), **Project 1 due** | 5/10 | Lab 25: Comprehensive lab – a case study |
| 3/15 | Lab 12: DOW Chemical Co. application on rsreg | 5/12 | Project Workshop |
| 3/17 | Lab 13: Missing data / review | 5/17 | Project Pres. / **Project 3 due** |
| 3/22 | **MIDTERM** | 5/19 | Review |
| 3/24 | Lab 14: Writing R_functions and exploring R (begin R) | 5/24 | **FINAL** |

**Note**: This schedule, the choice of problems/sections and the grading scale are tentative and may change. Any changes will be announced during regular class meetings.