

Syllabus for ISyE 4031 – Regression and Forecasting

1. **Class Time and Location:** Day #2 & #4, 8:00 – 9:55 am at GTE Assigned Classroom
2. **Instructor:** Dr. Jye-Chyi (JC) Lu
3. **Email:** JCLU@isye.gatech.edu (main communication method)
4. **Office & Office Hours:** GTL Room (TBA); Day #2 and #4, 12:20 – 1:20 pm
5. **Course Description posted in GT Catalog:** Regression analysis: multiple linear regression, diagnostics, and variable selection. Forecasting: exponential smoothing techniques and autoregressive moving average models.
6. **Co-Requisite or Pre-Requisite:** ISyE 2027, ISyE 3030 (students can take ISyE 3030 and this class ISyE 4031 together in the GTE (many students did very well in the past)).
7. **Texts:** I will use notes posted on Canvas. The book below will serve as our main reference. Bowerman, O'Connell and Koehler (2005), *Forecasting, Time Series, and Regression*, fourth edition, Brooks/Cole, ISBN-13: 978-0-534-40977-7.
8. **Course Contents:** The course will be instructed under the following three components.
 - 1) Simple and Multiple Regressions, Variable Selection and Model Diagnostics,
 - 2) Exponential Smoothing, Time-Series ARMA Models, Seasonal ARIMAs
 - 3) Advanced Regressions, Time-Series Regressions, Advanced Forecasting Methods
9. **Software:** Free statistical software package R will be used. It can be downloaded at <http://cran.r-project.org/> This software is important for ISyE 4031 and ISyE 4034 courses and popular in many real-world applications.
10. **Grade Distribution (might be adjusted):** Exam #1(a) (20%), Exam #1(b) (12%), Exam #2 (15%), Exam #3(a) (20%), Exam #3(b) (10%), Two Computer Projects (in place of the Final Exam) (15%), Two Enrichment Projects (5%), Attendance (2% - GTE requires attendance check for every lecture – students are allowed to miss up to three attendances), Instructional Survey (1%). **Note that there are past reports and R-codes for take-home exams, and computer and enrichment projects. Past in-class exams (with solutions) will also be available for students.**
11. **Final Grades:** Unless we made exams too difficult (or too easy), we will use the following letter grade assignments: A for [90 and above) semester scores, B for [80, 89.999), C for [70, 79.999), D for [60, 69.999), and F for (59.999 or below).
12. **Georgia Tech Honor Codes:** **Students are required to follow the Georgia tech honor code which may be found at:** <http://osi.gatech.edu/content/honor-code>
Please pay attention to the following guidelines provided by Georgia Tech.

- 1) What is not plagiarism? *Plagiarizing is defined by Webster's as "to steal and pass off (the ideas or words of another) as one's own : use (another's production) without crediting the source."* If caught plagiarizing, you will be dealt with according to the GT Academic Honor Code.
- 2) What is authorized collaboration and what is unauthorized collaboration? Regardless whether an exam is an in-class or take-home exam, **solving exam problems together is an unauthorized collaboration**. If an exam is a take-home exam and it is required to write computer codes to employ software packages to perform certain computation or data analysis, the following are **authorized collaboration** with fellow students:
 - (a) installing software systems onto your PC,
 - (b) downloading data into software systems,
 - (c) calling codes into your PC's software systems, and
 - (d) getting computer printouts from computer screens or downloadable files,

All other activities such as discussion of how to solve a problem, which software function to use, how to write codes or find sample codes to do computation or analyze data, and discussion of how to write solution reports to interpret computer printouts are **unauthorized collaborations**.

Course outcome \ Program Outcomes	1. identify, formulate solve engg prob by engg, sci & Math	2. produce solutions consider public health, safety, welfare, global, cultural, social, environ & economic	3 communicate with a range of audience	4 recognize ethical & professional responsibilities, make informed judgement consider resolutions in global, economic, environ and societal context.	5. effective on a team provide leadership, collaborative and inclusive environ, plan tasks & meet objectives	6. develop and conduct experiment, analyze and interpret data & use engineering judgement to draw conclusions.	7. acquire and apply new knowledge using appropriate learning strategies
1. Formulate real life problems using regression and forecasting models	H						
2. Collect appropriate data to estimate the models and understand which data are useful in solving the problem						H	
3. Use statistical software to estimate the models from real data							
4. Draw conclusions from estimated models to solve real life problems	H						

Evaluation of the important outcomes

The outcome 1, 2 and 4 will be assessed by the project