JOHN JAY COLLEGE OF CRIMINAL JUSTICE
The City University of New York
524 West 59th Street, New York, NY, 10019

Syllabus for:

MAT 301-**04** Probability and Statistics I
MAT 301-**02** Hybrid Probability and Statistics I
MAT 301-**03** Hybrid Probability and Statistics I

Professor's name: Nicholas Petraco
E-mail address: npetraco@gmail.com

Contact hours:

MAT 301-**04** Tuesday/Thursday 4:30-5:45 and anytime over email
MAT 301-**02** Tuesday Hybrid 3:05-4:20 and anytime over email
MAT 301-**03** Thursday Hybrid 3:05-4:20 and anytime over email

Course Format:

MAT 301-**04** In-person twice a week
MAT 301-**02** Hybrid once a week
MAT 301-**03** Hybrid once a week

Course website: https://npetraco.github.io/MAT301/

Course Description:

The purpose of this course is to acquaint undergraduate science students with statistical methods that are applicable to data they will encounter in their scientific careers, as well as issues and pitfalls to be aware of when applying these methods.

It is not adequate to simply learn the "theory" behind the methodology encountered in this course. It must be applied on real data of practical interest to the sciences. As such this course will build expertise in the general scientific/statistical computing environment R (http://www.r-project.org/). The course assumes minimal knowledge of computers and statistical procedures. It is designed to build the student's skill set and confidence in both of these areas. Topics covered will include basic data descriptive tools, graphing, probability theory, discrete/continuous distributions, estimation and hypothesis testing.

Course lecture materials will be posted on the following website:

https://npetraco.github.io/MAT301/

Occasional announcements and important reminders will be emailed to you. As such **you must give me an email address that you check on a regular basis**.

Most lectures posted to the course website will be accompanied by short videos which will be posted to YouTube. A link to the videos will be sent to you in email when it is posted. **Homework and Exams will be given through WebAssign**. See below for details.

Learning outcomes:

By the end of the course students will be able to:

1. Choose an appropriate probability or statistical model for a particular problem.
2. Know what conditions are typically required for the use of particular probability and statistical models; and be able to assess whether those conditions are reasonably met.
3. Interpret calculated solutions of particular statistical models.
4. Make appropriate inferences using the chosen statistical models.
5. Use the R software system to handle datasets, display datasets graphically, and do probability computations, statistical analyses, and computer simulation.

Requirements / course policies

Unethical/unprofessional conduct which includes cheating will result in a failing grade and referral for additional action. These include copying others work and sharing work when explicitly forbidden.

No make up exams will be given. Failure to take a scheduled examination without a valid and independently supported official documentation from a medical provider at least 48 hours in advance (unless the emergency is induced by force majeure, subsequent to the 48 hour cutoff, where in a valid and independently supported official documentation from a medical provider is still required) will result in a zero grade for that examination.

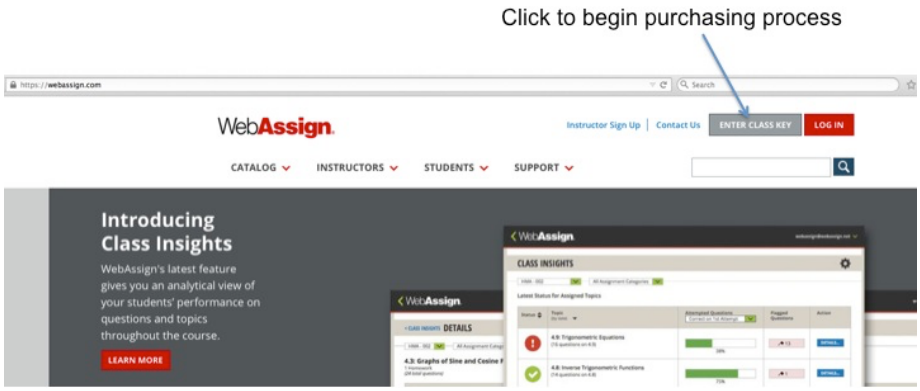
Required Electronic Text and Resources:

Probability and Statistics for Engineering and the Sciences - 9e
J. L. Devore

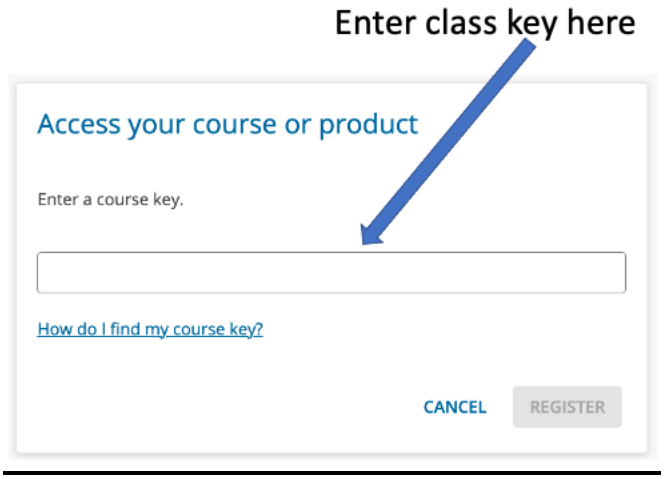
- The Assignments/Electronic Text can be purchased at:

  https://www.webassign.net/

- In order to purchase click on “Enter Class Key”:



- The WebAssign website will probably prompt you to log into your account. If you don't have an account, create one.
- When you log in, you should see a place to enter the class key:



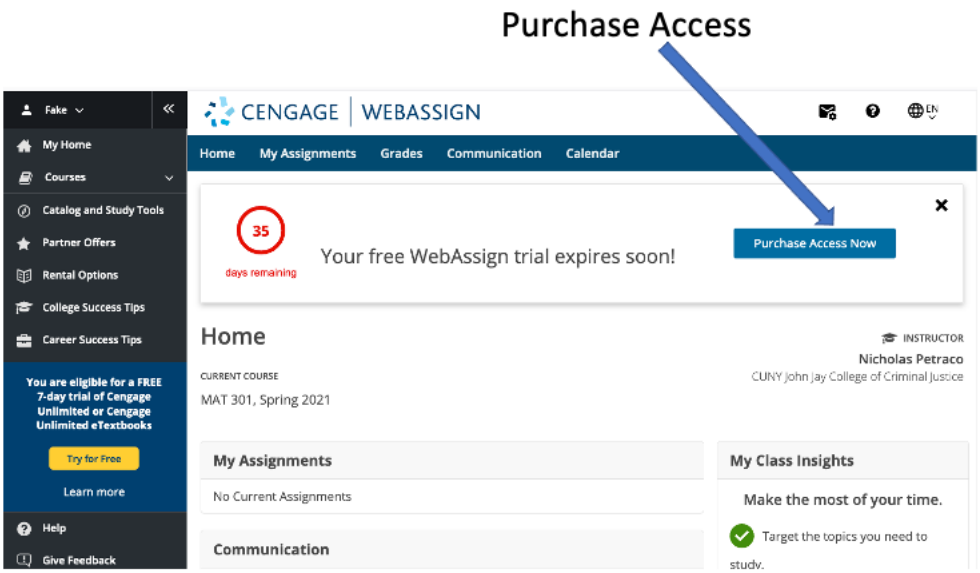
CAREFUL: NOTE YOUR SECTION!!!!!!

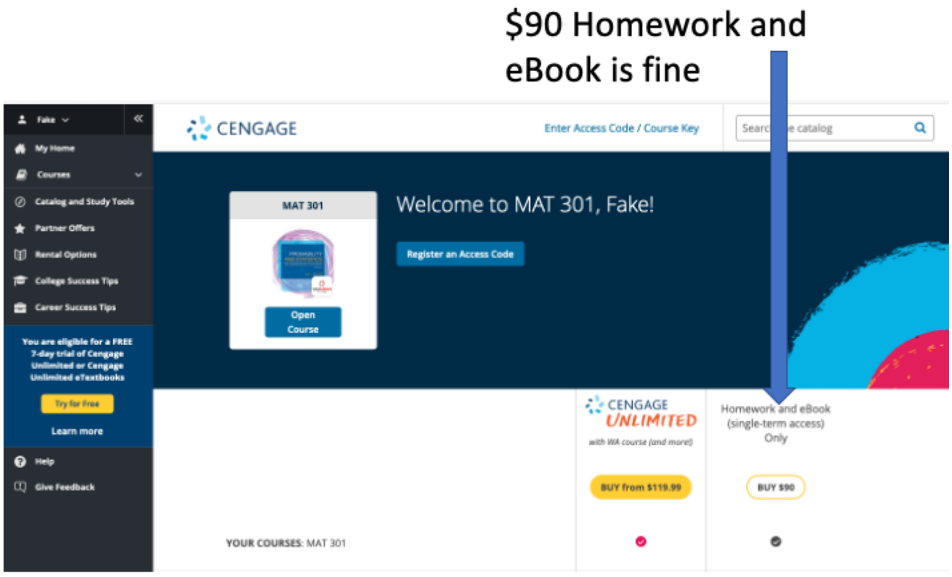
- Students Registered for Petraco **MAT 301-04** Probability and Statistics Section-04 (**Tuesday/Thursday Meet**):
  - Class Key: **jjay.cuny 0120 0110**

- Students Registered for Petraco, **MAT 301-02** Probability and Statistics Section-02 (**Tuesday Meet Only**):
  - Class Key: **jjay.cuny 4341 7667**

- Students Registered for Petraco, **MAT 301-03** Probability and Statistics Section-03 (**Thursday Meet Only**):
  - Class Key: **jjay.cuny 6236 5920**

- After logging in/creating-account, eventually the website will prompt you to purchase the materials for the class:





- Purchase "Probability and Statistics for Engineering and the Sciences – 9/e by Devore, Homework and eBook (single term access only)", which should be ~$90.00:

Suggest supplementary text (NOT REQUIRED):
Statistics: An introduction using R, 2nd ed.
Crawley
ISBN-10: 1118941098

Grading:

The grades for this course are based on homework (25%), two exams (50%) and a final (25%).

Course lecture posting calendar:

Week	Lecture Topics	Sub Topics	HW and Exam Dates
Jan 31-Feb 4	Introduction	Introduction Important Definitions Basic Graphing	
Feb 7-11	Introduction and Tutorial for R		Feb 15: HW Set 1 Due
Feb 14-18	Summarizing Data 1-3	Mean, Median, Mode Variance and Standard Deviation Range and Quantiles	Feb 22: HW Set 2 Due
Feb 21-25	Probability 1-2	Definitions Axions and Theorems	Feb 29: HW Set 3 Due
Feb 28-Mar 4	Probability 3-4 Review (Sect 02, 03)	Conditional Probability and Bayes' Theoren Example Problems	Mar 8: HW Set 4 Due
March 7-11	Review and Exam I		**Mar 8 (Sect 02), Mar 10 (Sect 03, 04): Exam 1**
March 14-18	Important Distributions 1-3	Permutations and Combinations Discrete Probability Mass Discrete Moments	Mar 22: HW Set 5 Due
March 21-25	Important Distributions 4-5	Discrete Distributions Continuous Distributions	Mar 29: HW Set 6 Due
Mar 28-Apr 1	Point Estimation 1-4	Maximum Likelihood Estimators Sampling Distributions Unbiased Estimators Example Problems	Apr 5: HW Set 7 Due
April 4-8	Point Estimation 5-6 Review (Sect 02, 03)	Bootstrap Estimation Bootstrap Fails	Apr 12: HW Set 8 Due
April 11-15	Review and Exam II		**Apr 12 (Sect 02), Apr 14 (Sect 03, 04): Exam 2**
May 2-6	Interval Estimation 1-4	Definitions and Theory Computing Confidence Intervals Reference Formulas Bootstrap Confidence Intervals	May 10: HW Set 9 Due
May 9-13	Hypothesis Testing 1-3	Definitions and Theory One Sample Hypothesis Tests Two Sample Hypothesis Tests	May 17: HW Set 10 Due
	Analysis of Variance 1-3	Definitions and Theory Example Problems Post Hoc Testing	
May 16-20	Regression 1-3	Definitions and Theory Workflow Example Problems	May 18: HW Set 11 Due **Sec 02 Tu Hybrid: May 24, 3:30pm: Exam 3 (Final)** **Sec 03 Th Hybrid: May 19, 1:00pm: Exam 3 (Final)** **Sec 04 Tu/Th: May 19, 3:30pm: Exam 3 (Final)**

College wide policies for undergraduate courses *(*see the *Undergraduate Bulletin*, Chapter IV Academic Standards)

A. **Incomplete Grade Policy**

B. **Extra Work During the Semester**

C. **Americans with Disabilities Act (ADA) Policies**

"Qualified students with disabilities will be provided reasonable academic accommodations if determined eligible by the Office of Accessibility Services (OAS). Prior to granting disability accommodations in this course, the instructor must receive written verification of a student's eligibility from the OAS which is located at L66 in the

new building (212-237-8031). It is the student's responsibility to initiate contact with the office and to follow the established procedures for having the accommodation notice sent to the instructor."

> Source: *Reasonable Accommodations: A Faculty Guide to Teaching College Students with Disabilities*, 4th ed., City University of New York, p.3. (http://www.jjay.cuny.edu/studentlife/Reasonable_Accommodations.pdf)

Statement of the College Policy on Plagiarism

Plagiarism is the presentation of someone else's ideas, words, or artistic, scientific, or technical work as one's own creation. Using the ideas or work of another is permissible only when the original author is identified. Paraphrasing and summarizing, as well as direct quotations require citations to the original source.

Plagiarism may be intentional or unintentional. Lack of dishonest intent does not necessarily absolve a student of responsibility for plagiarism.

It is the student's responsibility to recognize the difference between statements that are common knowledge (which do not require documentation) and restatements of the ideas of others. Paraphrase, summary, and direct quotation are acceptable forms of restatement, as long as the source is cited.

Students who are unsure how and when to provide documentation are advised to consult with their instructors. The Library has free guides designed to help students with problems of documentation. *(John Jay College of Criminal Justice Undergraduate Bulletin,* http://www.jjay.cuny.edu/academics/654.php, see Chapter IV Academic Standards)