

BUS250: Applied Mathematics in Business Spring 2020

This syllabus is subject to change as the term progresses.

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| Instructor: E-mail: | Dr. Nimesh Patel nimesh@hawaii.edu |
| Office: Office hours: | Please begin the Subject Line with: BUS250 Before sending an email, check to see if your question is answered in the syllabus! BusAd E601a Wednesday and Friday 12.00-1.00pm |
| Required: | (1) Laulima @ https://laulima.hawaii.edu/portal (2) Bowerman, <i>Business Statistics in Practice 9e</i> , 2018, New York: McGraw-Hill Education and access to McGraw-Hill (MH) Connect web-based course companion system. This is going to be part of the IDAP program so you will automatically buy an electronic version of the book and access to MH Connect as part of your course registration. You can then register for MH Connect on Laulima by selecting the “MH Campus” option. See the end of this syllabus for further details. The textbook and MH Connect will be used for readings and to provide homework and practice problems from week 6 onward. There is no textbook for weeks 1 to 5. |
| Suggested | (3) Microsoft Excel. |

CLASS TIME AND LOCATION

Due to classroom size constraints, please attend the class for your section only.

Section 1: Wednesday and Friday from 9.00am-10.15am in BUSAD D106

Section 2: Wednesday and Friday from 10.30am-11.45am in BUSAD D106

PREREQUISITES

Two years of high school algebra.

COURSE OBJECTIVES

1. Understand how to categorize a firm’s costs as variable and fixed, form its cost line, and, with its revenue line, model the firm’s breakeven point and target profit.
2. Develop expertise using the formalism of time value of money (TVM) to find the solution to problems involving present value, annuities, and “vanilla” bonds.

3. Understand and apply the formalism of elementary combinatorial techniques, permutations and combinations, and the binomial expansion formalism and develop and use key concepts in discrete probability.
4. Apply the binomial expansion formalism to the discrete binomial distribution and generalize it to the continuous Gaussian normal distribution and understand that its integral provides the cumulative probability.
5. Understand hypothesis testing, the sampling distribution, “the p -value,” and their role in statistics.
6. Develop the error function for data and understand how taking its derivative minimizes it and provides the coefficients for the best-fit line.

STRATEGIES FOR FULFILLING GOALS AND REACHING THE OBJECTIVES

Although the course is called “Applied Mathematics in Business”, there is a heavy statistics component to the course as well. It is my expectation that a large number of students will find this course difficult. There are no shortcuts and the only way to learn the material is to do the work. Students are EXPECTED to attend class (i.e. attending class is not a sufficient reason when arguing for a higher grade!) and do their homework in a timely manner. To be fair to all students in the class, extensions will not be given for missed deadlines. Students are also expected to read the relevant textbook sections as the material is covered in class. This is a good habit to get into since we cannot cover the material in as much detail as the textbook given time constraints.

STATEMENT OF FOUNDATIONS - SYMBOLIC REASONING (FS)

Courses fulfilling this requirement will expose students to the beauty and power of formal systems, as well as to their clarity and precision; courses will not focus solely on computational skills. Students should understand the concept of proof as a chain of inferences. They should be able to apply formal rules or algorithms. They should also be able to engage in hypothetical reasoning. In addition, the course should aim to develop the ability of students to use appropriate symbolic techniques in the context of problem solving, and in the presentation and critical evaluation of evidence.

http://www.hawaii.edu/gened/foundations_FS.htm

STATEMENT OF FOUNDATIONS - QUANTITATIVE REASONING (FQ)

Courses fulfilling this requirement will impart an appreciation for the relevance and usefulness of quantitative reasoning. We define quantitative reasoning as the ability to apply mathematical concepts to the interpretation and analysis of quantifiable information, expressed numerically or graphically, in order to solve a wide range of problems, from those arising in pure and applied research to everyday issues and questions. The primary goal of FQ courses is to teach mathematical reasoning and tools at the college level.

<https://www.hawaii.edu/gened/foundations.htm>

ADMINISTRATION

Registration: Students who have issues with or questions about registration should contact the Office of Student Academic Services (OSAS) in BusAd B101. For more information, please visit the page:

<http://www.shidler.hawaii.edu/current-students/contact>

Communication: Email is the preferred communication method in emergency. Students should check the course Laulima website regularly for announcements.

Examinations: There will be a midterm and a final exam. The midterm will be in-class during the Wednesday lecture of the 8th week of class (March 4, 2020). The final exam date and time will be announced on Laulima during the semester. All exams will be closed-book. Cell phones or tablets “just as calculators” may not be used during exams. Though Excel skills will be developed throughout the course, the midterm and final exam will not require Excel and computers will not be allowed. The midterm and final will consist of both multiple-choice and short answer questions.

Make-up exams may be given only under *very rare* circumstances, and the instructor reserves the right to deduct points as deemed appropriate. If an exam must be missed, the student must request approval from the instructor **prior** to the absence. **No make-up exam will be given without prior approval** and will be considered only in legitimate, unavoidable circumstances (serious illness, family emergency, etc). **Proper documentation for the absence must be presented.** If allowed, make-up exams will be scheduled at the discretion of the instructor. Make-up quizzes or exams may be more rigorous and graded to a higher standard than the original. If students believe that there is an error in the grading of an exam, they should call it to the instructor’s attention **within a week after the results are posted on Laulima**. If a student believes a question has been ungraded unfairly, the policy is to re-grade the entire homework/exam.

Honor Pledge at Each Examination: On the first page of each exam booklet, students will be asked to sign the following Honor Pledge:

On my honor as a student taking this course at the Shidler College of Business at University of Hawai‘i at Mānoa, I pledge that I have neither given nor received aid on this exam. I also pledge that I have read the Syllabus and am in compliance with the policies stated therein.

Therefore, students should read this entire Syllabus carefully *before* the first exam, and review it periodically, so that they can follow it and meaningfully sign the Honor Pledge at each exam

Homeworks: There will be 10 homeworks. The first four will be posted on Laulima and must be completed in groups of two to four students. The last six homeworks will be administered on MH Connect and each must be completed individually. Pay close attention to the due date in MH Connect. Once the deadline for a homework has passed you will not be able to complete it for credit even though the “deadline” will be extended to allow for students to complete the problems as practice. Before the due date you may attempt the homework **as many times as you wish**.

Extra-credit: To be fair to all students, opportunities for extra credit will **not** be offered to individual students based on poor performance. Instead, an extra credit question may offered to **all** students on the final exam. This is to ensure equal opportunities to all students throughout the semester.

Grading: Each student’s grade for the course will be based on scores in the following areas using the following weights:

| Description | Percent |
|--------------------|----------------|
| Participation | 10 |
| Homework | 30 |
| Midterm Exam | 30 |
| Final Exam | 30 |
| Total | 100 |

Participation: Place a **tri-folded placard** with your name during class to help facilitate discussion and grading. Attendance may periodically be taken during the semester and will factor into your participation score.

In-class problem solving: In-class problem solving sessions will involve students solving questions in groups. Each group must have their work checked before leaving class. Solutions will **not** be provided outside of having your work checked in class.

COURSE SCHEDULE

The schedule is subject to change as the semester progresses. We have a lot of topics to cover, each deserving of their own course. Due to the limited amount of time we have some of the topics will be covered at a broad level. Textbook references (9th edition) are in parentheses.

| Week | Date | Topic |
|-------------|-------------|--|
| 1 | 1/15 | Introduction, algebra review |
| | 1/17 | Algebra review, cost-volume-profit analysis, break even points |
| 2 | 1/22 | Calculus review, HW1 given |
| | 1/24 | Calculus review, profit maximization |
| 3 | 1/29 | In-class problem solving, HW2 given |
| | 1/31 | Excel skills review |
| 4 | 2/5 | Time value of money, interest rates, compounding, HW3 given |
| | 2/7 | Annuities & perpetuities |
| 5 | 2/12 | Mortgages and other loans, HW4 given |
| | 2/14 | In-class problem solving |
| 6 | 2/19 | Probability, events, union & intersection (4.1-4.3) , HW5 given |
| | 2/21 | Conditional probability, independence (4.4-4.5) |
| 7 | 2/26 | Combinations and permutations (4.6) |
| | 2/28 | Midterm Review |
| 8 | 3/4 | <u>In-class Midterm</u> |
| | 3/6 | Two types of random variables, moments (6.1) |
| 9 | 3/11 | Discrete distributions (6.2-6.4) , HW6 given |
| | 3/13 | Discrete distributions (6.2-6.4) |
| 10 | 3/25 | In-class problem solving, HW7 given |
| | 3/27 | Continuous distributions (7.1-7.3, 7.5) |
| 11 | 4/1 | Continuous distributions (7.1-7.3, 7.5), definite integral, HW8 given |
| | 4/3 | Normal distribution, standard normal (7.3) |
| 12 | 4/8 | Samples, sample statistics (8.1, 8.3) , HW9 given |
| | 4/10 | Central limit theorem (8.1) |
| 13 | 4/15 | In-class problem solving, HW10 given |

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| | 4/17 | Hypothesis testing, type I and type II errors (10.1-10.3) |
| 14 | 4/22 | Hypothesis testing continued (10.1-10.3) |
| | 4/24 | Hypothesis testing continued (10.1-10.3) |
| 15 | 4/29 | Final review |
| | 5/1 | Final review |

COURSE COMPLIANCE WITH VARIOUS CAMPUS POLICIES:

All rules and policies of the University of Hawai‘i at Mānoa and the Shidler College of Business will be followed in the course.

Students with Disabilities: Any student who has a documented disability and requires accommodations is strongly encouraged to contact me or the KOKUA Program located in Room 13 on the first floor of the Student Services Center (also KOKUA Program Director at 956-7511 or visit their webpage: <http://www.hawaii.edu/kokua/>).

Academic Honesty: Cheating and Plagiarism will not be tolerated. All incidents will be handled in accordance with the UH *Student Code of Conduct*. The UH Student Code of Conduct, is available at: <http://www.hawaii.edu/student/conduct>. The most relevant portions are included below for your convenience.

Because UHM is an academic community with high professional standards, its teaching, research, and service purposes are seriously disrupted and subverted by academic dishonesty. Such dishonesty includes cheating and plagiarism as defined below. Ignorance of these definitions will not provide an excuse for acts of academic dishonesty.

IMPORTANT Definitions for Plagiarism and Cheating.

Cheating includes but is not limited to giving or receiving unauthorized assistance during an examination; obtaining unauthorized information about an examination before it is given; submitting another’s work as one’s own; using prohibited sources of information during an examination; fabricating or falsifying data in experiments and other research; altering the record of any grade; altering answers after an examination has been submitted; falsifying any official University record; or misrepresenting of facts in order to obtain exemptions from course requirements.

Plagiarism includes but is not limited to submitting, in fulfillment of an academic requirement, any work that has been copied in whole or in part from another individual’s work without attributing that borrowed portion to the individual; neglecting to identify as a quotation another’s idea and particular phrasing that was not assimilated into the student’s language and style or paraphrasing a passage so that the reader is misled as to the source; submitting the same written or oral or artistic material in more than one course without obtaining authorization from the instructors involved; or “drylabbing,” which includes obtaining and using experimental data and laboratory write-ups from other sections of a course or from previous terms.

How to Access Your Course Materials for McGraw-Hill Connect

This is going to be part of the IDAP program so you will automatically buy an electronic version of the textbook and access to MH Connect as part of your course registration at a heavily discounted price. You can then register for MH Connect on Lualima by selecting the “MH Campus” option. Follow the steps to access your course materials. Not that you should NOT be required to enter any payment details through any of this process.

A discounted OPTIONAL loose-leaf version of the textbook is also available at the bookstore.