Course Syllabus

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MA223 Engineering Statistics I

Course Description:

We will introduce statistical concepts in the context of engineering, the physical, and the biological sciences. The course emphasizes statistical literacy (interpretation and clear communication of statistical methods, results, and concepts) and statistical reasoning (defining the need for data to address questions, modeling variability in a process, and choosing the appropriate methodology to address a question of interest). We describe approaches to collecting data, summarizing the information contained within the data, building a model to address a question of interest, using the data to estimate the unknowns in the model, assessing the model, and interpreting the results based on the model.

Learning Objectives:

Decisions need to be made in industry and science. This course discusses the collection and use of data for the purpose of decision making in the presence of variability. The course is built on the following five fundamental ideas:

I. A research question can often be framed in terms of a parameter which characterizes the population. Framing the question should then guide our analysis.

II. If data is to be useful for making conclusions about the population, a process referred to as drawing inference, proper data collection is crucial. Randomization can play an important role ensuring a sample is representative and that inferential conclusions are appropriate.

III. The use of data for decision making requires that the data be summarized and presented in ways that address the question of interest.

IV. Variability is inherent in any process, and as a result, our estimates are subject to sampling variability. However, these estimates often vary across samples in a predictable way; that is, they have a distribution that can be modeled.

V. With a model for the distribution of a statistic under a proposed model, we can quantify the the likelihood of an observed sample under that proposed model. This allows us to draw conclusions about the corresponding parameter, and therefore the population, of interest.

At the end of this course, students should be able to perform the following tasks:

(A) Given a problem description, **identify** the population and parameter(s) of interest as well as the statistic(s) from the sample appropriate for estimating the parameter(s). If appropriate, **formulate** an appropriate set of statistical hypotheses that address the research goal.

(B) **Describe** the importance of considering the data collection scheme when interpreting the results of a study, including potential confounding, replicability, and generalizability. Given a problem description, **identify** potential reasons for variability in the observed response and the limitations of the data collection scheme.

(C) **Construct** and **interpret** graphical and numerical summaries of data to address a given question of interest.

(D) **Describe** general techniques for modeling the sampling distribution of a statistic, and **discuss** the role of a sampling distribution in inference.

(E) Given a question of interest, **conduct** an appropriate statistical analysis (using either confidence intervals or p-values) in order to aid in decision making, and given a statistical analysis, **interpret** the results of the analysis in the context of the problem.

(F) **Comment** on the adequacy of a statistical method for addressing a given question of interest by **assessing** the conditions underlying the method.

(G) **Develop** a question of interest; then, **design** and **implement** a study to address the question.

(H) **Identify** the value of statistical methodology in the advancement of science as well as **recognize** its limitations.

(I) **Collaborate** with others to **conduct** data collection and a statistical analysis and **communicate** the results appropriately.

(J) **Support** a decision using graphical and/or numerical data.

As you progress through the course, objectives specific to each module will be given; accomplishing these module-level objectives will help you succeed in accomplishing the course-level objectives.

Overview of Course Topics

The following topics are included in the course.

- Study design, including random sampling schemes as well as a comparison of observational studies and controlled experiments.
- Graphical and numerical summaries for a single quantitative variable, the relationship between a quantitative and a categorical factor, and the relationship between two quantitative variables.
- Compare and contrast the distribution of the population, the sample, the sampling distribution, and the null distribution.
- Models for describing the sampling distribution of a statistic, including bootstrapping and parametric models.
- Confidence intervals for a single mean and parameters of a simple linear regression model.
- Hypothesis testing for a single mean, comparing multiple means across two or more groups, and the parameters of a simple linear regression model.

Course Prerequisites

MA111 (Calculus I) and RH131 (Rhetoric and Composition) are prerequisites for this course.

In particular, from calculus, students should be familiar with the concepts of differentiation (for determining an optimal solution) and integration (integrals provide the area under a curve). Similarly, students should be familiar with summation notation. This course will not require computational methods within these areas but will make use of these concepts.

Rhetoric and Composition is a prerequisite due to the amount of technical communication required in this course. Students should be able to distinguish between verb tenses and clearly communicate responses in paragraph form at the collegiate level.

Contact Information

Eric Reyes, Ph.D.
Statistician
Associate Professor | Department of Mathematics

Office: DL-110, D (inside Engineering Management Suite)
Phone: 812.877.8287
Email: reyesem@rose-hulman.edu

Contacting the Instructor:
I do not have regular office hours dedicated to this class. If you have questions, feel free to email or message me on Teams. I keep my Outlook calendar and Teams status up to date. Alternatively, you may always email me to schedule an appointment.

While I try to be prompt with responses, I will respond to email within 1 business day. Note that this means that emails received after 5 PM (EST, Terre Haute time) will, in general, not be addressed until the following business day. I am, in general, not available of an evening or on weekends, as these times are reserved for my family.

Instructor Biography

After graduating from Rose-Hulman Institute of Technology in 2006 with a degree in Mathematics and Economics, I attended graduate school at North Carolina State University where I earned my Ph.D. in Statistics under the direction of Dr. Dennis Boos and Dr. Len Stefanski. My primary interest is biostatistics - the application of statistical methodology to medical research. As a former participant in the NHLBI Integrated Biostatistical Trainee Program for CVD Research, I spent five years as an intern at the Duke Clinical Research Institute serving as a statistical consultant under the direction of Karen Pieper.

My research interests include methods for variable selection (the process of discerning which variables are useful for predicting a response) and statistics education (how to teach my discipline in a way that gives the best student learning experience).

I was hired into the math department to teach primarily statistics. I teach Engineering Statistics each term (often multiple sections); I consistently work to improve the class because I love teaching it, and I believe it is important for every student on campus to be statistically literate. In addition to teaching statistics, I am the faculty adviser for the InterVarsity Christian Fellowship chapter on campus.

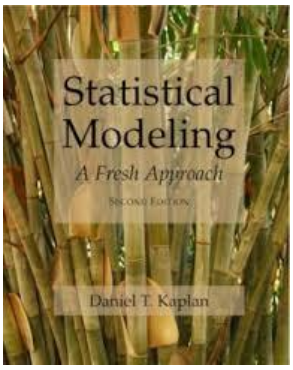
Textbook (Required)

- **Title:** Statistical Foundations for Engineers and Scientists

The textbook is **required**. This text is completely free and was written specifically for this course by the instructor. It provides coverage of the concepts assessed in the course. Regular reading will be assigned from this text. A link to the course text is available in the Key Resources section at the top of the course Moodle page. The text is completely electronic; for those that prefer a hard copy, you can download a PDF version from the textbook site.

Additional Textbook (Optional)

- **Title:** Statistical Modeling: A Fresh Approach
- **Author:** Daniel Kaplan
- **ISBN:** 978-0-9839658-7-9



The textbook is **optional**. This text was chosen because it provides an excellent reference for learning about statistics from a model-based perspective. For those that learn well from textbooks, this can be an excellent companion to the course. However, homework problems and reading assignments will not be made from the text. The text is freely available **online**.

Course Notes

Each module in the course includes reading assignments from the **course textbook** and video supplements. These are accompanied by a guided course note packet. There is one guided note packet per module. The guided notes highlight the key ideas from the readings and video supplements but are not meant to replace a textbook. The notes are simply a tool for organizing the course content.

Software

- **RStudio:** R is a freely available statistical computing language. **RStudio** provides a nice interface to the computing language. While you can obtain a copy from the website for your machine, Rose-Hulman faculty, staff, and students have access via a web interface; the link to this interface is provided under the Key Resources block at the top of the course page. No familiarity with R/**RStudio** is assumed.

Additional Technology Requirements

This course will be structured as a "hybrid classroom," which means that some of the content will be delivered online requiring additional technology. At a minimum, you should be able to perform the following tasks *prior* to beginning the course:

- Navigate Moodle and interact with activities posted in Moodle (such as discussion forums and quizzes).
- Have access to a high-speed internet connection for viewing instructional videos, downloading course note packets and data, and submitting course assignments.
- Be connected to the Rose-Hulman network either by being on campus or connecting to the **Rose-Hulman VPN**.

You will need dependable internet access (on-campus wireless internet will be sufficient) to successfully complete this course. **If you plan to be in a location during the course that does not have reliable internet access or restricts access to Google products (such as Google Chrome), you may be unable to successfully complete aspects of the course.**

Grading Procedures

Statistics is a unique discipline in that it exists solely to aid decision-makers in other fields. This course seeks to improve your statistical literacy and reasoning such that you could successfully collaborate on a small research study. This course can also serve to launch you into further statistics coursework to eventually contribute to the analysis of a study. In order to assess your progress toward the course goals, several types of assignments are given throughout the course. Each type of assignment assesses a different aspect of the course; some things are best learned in groups while others should be mastered at the individual level. As a result, the grading scheme uses a mix of components as well. In order to help you achieve the objectives of the course, I will be implementing a variation on "specifications grading." That is, instead of taking a weighted average of points earned on a series of assignments throughout the term, you will earn grades based on establishing competency (across the course) in four areas (Statistical Literacy, Statistical Reasoning, Statistical Design, and Statistical Analysis). Your grade in the course is determined according to the following table:

Grade **Requirements**
A • Successfully complete 9 *Module Exams* • Successfully complete 3 *Forum Discussions* • Successfully complete at least 32 *Portfolio Problems* • Successfully complete 9 *Homework Assignments*
B • Successfully complete 8 *Module Exams* • Successfully complete 2 *Forum Discussions* • Successfully complete at least 28 *Portfolio Problems* • Successfully complete 9 *Homework Assignments*
C • Successfully complete 7 *Module Exams* • Successfully complete 1 *Forum Discussions* • Successfully complete at least 24 *Portfolio Problems* • Successfully complete 9 *Homework Assignments*
D • Successfully complete 6 *Module Exams* • Successfully complete at least 20 *Portfolio Problems* • Successfully complete 9 *Homework Assignments*

Plus grades will be earned if the criteria for the grade is met (as described in the table above) *and* at least two of the *Module Exams* completed earned a perfect score.

This Preliminary Course Grade is further impacted by performance on the *Lab Assignments*:

- Failure to successfully complete a *Lab Assignment* will result in the course grade being reduced by a half letter grade (A to B+, C+ to C, etc.).

Note: all assignments are graded as Satisfactory/Unsatisfactory. No partial credit is awarded. The definition of "satisfactory" depends on the type of assignment, as described below. In order to help you submit satisfactory work, very clear expectations will be provided for each assignment. Be aware that while "satisfactory" does not equate to "perfection," in many cases (particularly *Module Exams* and *Lab Assignments*), the requirements for satisfactory work will demand your work meet high standards.

Description of Course Assignments

The course is broken into nine modules. Each module will consist of an opportunity to demonstrate progress toward the course learning objectives. Some types of assignments accompany every module, while other assignments occur only periodically throughout the course. The assignments are described below.

Homework

One homework assignment will be given for each module (for a total of 9 assignments). The due date for each assignment is listed on the calendar for the course. **Each homework is due by 7:00 PM on its due date**. Homework is to be completed in the course software (**RStudio**) and submitted electronically using the corresponding Moodle dropbox on the course page. Late homework will not be accepted for any reason. **Each assignment is to be completed in your Homework/Lab Group**. Only one submission is required from each group. Each assignment will consist of a mix of questions. In order to successfully complete an assignment, the following criteria must be met:

- Every problem on the assignment must be attempted with a good faith effort. This means that every problem is attempted and the solution, even if incorrect, attempts to address the problem using the material discussed in class.

Homework will be written using the course software. Homework is a chance to demonstrate what you know; it should be well communicated (anyone who has taken this course should be able to pick up your assignment and understand what you mean by your answer). Note: while you are completing the work as a team, every individual is responsible for the entirety of the work submitted.

Portfolio Problems

Each module will contain 4 questions (for a total of 36 questions) that assess key concepts or computational tasks related to the course learning objectives corresponding to that module. Across all modules, this provides an opportunity to demonstrate your progress toward meeting the course objectives stated in the syllabus. You may consult any resource available to you on Moodle as well as other students in the completion of your portfolio, **but each student must submit their own responses**. You have as many opportunities to complete the portfolio problems as needed prior to their due date (**11:59 PM on the same day as the corresponding homework assignment**).

Module Exams

Every module will include an exam (for a total of 9 exams). **Your grade in the course is primarily determined through your performance on these exams** as they are the mechanism by which you demonstrate competency in each of the areas. **All exams are *individual* assignments; you should *not* communicate with anyone other than the instructor regarding any portion of the assignment.** The due date for each exam is listed on the calendar for the course. **Each exam is due by 11:59 PM on its due date**. There are four components to each exam (one for each of the competency areas). Each component is to be submitted electronically. The four components are described here:

- Statistical Literacy: there will be 5 multiple choice questions focusing on definitions of key terms and interpretations of key components of the class (including graphics).
  - This will be administered through a Moodle Quiz.
  - Successful completion of the literacy component requires you correctly answer 4 of the 5 questions correctly.
  - You will have 2 attempts to successfully complete the literacy component.
- Statistical Reasoning: there will be a single short essay question focusing on the conceptual foundations of the class.
  - This will be administered through an Assignment text box.
  - Successful completion of the reasoning component is defined by the **Rubric for Class Questions**.
- Statistical Design: there will be a single short essay question focusing on critiquing a study design or the conclusion of a study and making recommendations.
  - This will be administered through an Assignment text box.
  - Successful completion of the design component is defined by the **Rubric for Class Questions**.
- Statistical Analysis: there will be a single prompt asking you to address a research question of interest using the provided data.
  - This will be completed using the course software (**RStudio**) and submitted in an Assignment dropbox.
  - Successful completion of the analysis component is defined by the **Rubric for Class Questions**.

Successful completion of a *Module Exam* requires the following:

- Successful completion of 3 out of the 4 above components.

Forum Discussions

There will be three forum discussions during the term. Forum discussions are designed to facilitate conversation among the class of course concepts in an applied setting. The due date for each forum discussion is listed on the calendar for the course. **Each forum discussion post is due by 11:59 PM on its due date.** Late assignments will not be accepted. In order to successfully complete a forum discussion, the following criteria must be met:

- An initial response to the prompt must be made.
- The response must address the prompt using the material discussed in class.

Lab Reports

There will be two *Lab Reports* assigned during the term. Labs are an opportunity to apply the concepts in the course to answer research questions and engage in the research process from start to finish in a collaborative environment. The due date for each lab report is listed on the calendar for the course. **Each lab is due by 11:59 PM on its due date**. Labs are to be completed in the course software (**RStudio**) and submitted electronically using the corresponding Moodle dropbox on the course page. Late assignments will not be accepted. If there is an issue with completing the lab on time, be sure to contact the instructor in advance to discuss options. **Lab assignments are to be completed in your Homework/Lab Groups**. Only one report is required per group. Each lab report will consist of a set of 10 short answer questions. Successful completion of the lab report requires the following criteria be met:

- Successful completion of 9 of the 10 questions.
- Each question will be assessed using the **Rubric for Class Questions**.

Final Exam

The Final Exam is comprehensive and is coordinated with other sections of the course, if applicable. There are two parts to the Final Exam. Part 1 of the exam is a "by-hand" individual portion. This portion consists of a series of multiple-choice and short answer questions. Every 4 questions successfully completed will earn credit towards the successful completion of a module exam (it will replace a failed module exam). However, **a student can use the Final Exam to earn at most 2 module exams**. Individual questions will be assessed using the **Rubric for Class Questions**.

The second part is a "computer-assisted" group portion which assesses both study design and analysis as well as communication. This portion allows the use of course software (**RStudio**, StatKey, Maple, etc.), as well as any resource posted on the Moodle site and personal notes. **This portion is to be completed in your Lab/Homework Group**. However, you may not collaborate with any individuals outside of your group or the instructor during the exam. Successful completion of this portion requires:

- 9 of the 10 questions be answered correctly.

The questions will be assessed using the **Rubric for Class Questions**. Successfully completing this portion of the exam counts toward successful completion of a *Lab Report*.

To be clear, the Final Exam cannot lower your course grade. It can only be used to replace existing assignments that you did not successfully complete during the term. The final exam policy is mandated by the Department of Mathematics; the full policy is available at the following two sites:

- **https://rosehulman.sharepoint.com/sites/Math/SitePages/Finals.aspx**
- https://moodle.rose-hulman.edu/pluginfile.php/148458/mod_folder/content/0/2019-20/Syllabus2019-20-MA223Public.pdf?forcedownload=1

Outliers

Life happens. We all have different priorities, and at times those priorities may not align with the timing of class assignments. The best way to ensure your work is satisfactory is to begin assignments early, refer to the Rubric for Class Questions frequently, and engage with the material regularly. As an alternative, you may make use of an "outlier."

Each "outlier" provides a second chance on an assessment - you may revise and resubmit an assessment that you did not successfully complete the first time or that you were unable to submit by the deadline. Revisions must be submitted within 1 week of receiving the initial feedback on the assignment.

Note: each "outlier" is valid for use on *one* component of a *Module Exam* that was unsuccessful. It is possible to use both outliers within a single module.

Academic Misconduct Penalty

Expectations for upholding academic integrity, and the importance of academic integrity within the institution, as well as the departmental policy on academic integrity, can be located in the last chapter of the course syllabus (Institute Policies). In this section, we simply outline the penalty for academic misconduct. If a student commits academic misconduct on an assignment, the following action will be taken by the instructor:

- A letter will be sent to the student, the Head of the Department of Mathematics, and the Dean of Students outlining the incident and the penalty applied.
- If the misconduct occurs on a Homework Assignment, the student forfeits the right to successfully complete the assignment, which results in the automatic failure of the course, by definition.
- If the misconduct occurs on an exam, the student forfeits the right to successfully complete any portion of the exam; and, the components of this exam are not available for using an "outlier;" the final course grade will be further reduced by 1 letter grade (A to a B, C+ to a D+, etc.).
- If the misconduct occurs on the Final Exam, the student will receive a 0 on the entire exam; the final course grade will be further reduced by 1 letter grade (A to a B, C+ to a D+, etc.)

This policy is consistent with the **Mathematics Department's Academic Integrity Policy**. To ensure you are not found in violation of the standards of academic integrity, you are encouraged to read the **Student Handbook**.

Attendance Policy

The success (or failure) of Rose-Hulman's coronavirus-containment measures depends on each one of us. As part of this effort, your grade in the course is not directly linked to your attendance in class. I encourage you to shift from thinking of "being in class" as your goal and instead "engaging with course content." Short version: if you are experiencing any symptoms, believe you were exposed to COVID-19, or have been asked to quarantine or isolate, do not come to class. In-class activities are meant to help explain course content; but, no new information is shared during those times. The other class meeting is primarily for group work; as a group, you could always engage with one another remotely via Teams/Slack/Discord/Zoom (etc.).

Here are a few additional things to keep in mind regarding your attendance in class.

- Be vigilant and closely monitor your health; be honest about any worrying symptoms.
- Even if you or others will be inconvenienced, even if you worry about what you'll miss in class, *stay home* and contact your professors *via email* if you have any symptoms.
- It is more important than ever to start assignments early; don't allow yourself to fall behind.
- Let go of perfectionist expectations of yourself and others; be open-minded about course delivery, virtual office hours, remote gatherings with classmates, etc.

While in class, you are expected to adhere to all guidelines stated in the Rose Ready document. Any violations in these guidelines will be brought to the attention of the student. If a student displays a pattern of disregard for these guidelines, the following action will be taken by the instructor:

- A letter will be sent to the Head of the Department of Mathematics outlining the incident.
- The student's final course grade will be reduced by 1 letter grade (A to a B, C+ to a D+, etc.)

Expectations for Professionalism within a Group

Whether working in industry or academia, engineers and scientists will primarily make use of statistical ideas in a collaborative setting. Further, we believe learning some of the abstract ideas in this course is best done within a group setting. As a result, some portions of this course require collaborative work. I expect each student to act professionally within their group. Group members will have different levels of mastery of the course content and different skill sets. As a result, a healthy group does not necessarily mean "equal participation" of group members. However, every group member is responsible for the work submitted by the group; therefore, every group member is expected to act professionally - which includes active participation in meetings and aiding in the construction of final documents. At a minimum, professionalism includes:

- No one is done until everyone is done.
- You have the right to ask anyone in your group for help.
- You have the duty to assist anyone in your group who asks for help to the best of your abilities.
  - Helping peers means explaining thinking; it does not mean giving answers or doing the work for them.
  - Provide justification when you make a statement to another member of the group.
- If the group has a question, it is appropriate to ask the instructor.
  - The group has a question when everyone shares the question.
  - The group has a question when an individual is uncertain after consulting with other members of the group and receiving their responses.

You are expected to resolve typical issues of group dynamics; the instructor can help with this as needed. If you feel a member of your group is not acting in a professional manner to the extent that you do not feel comfortable with that individual's name attached to the work submitted, please contact the instructor in writing (via email) immediately. If, after investigating, the instructor determines that a student has a pattern of unprofessionalism (negligence) within a group, the following action will be taken by the instructor:

- A letter will be sent to the Head of the Department of Mathematics outlining the incident.
- The student's final course grade will be reduced by 1 letter grade (A to a B, C+ to a D+, etc.).

In a remote learning environment, the key to success is regular engagement with course material, and that is accomplished through remaining disciplined with your schedule. Here are the biggest lies you can tell yourself about this course:

1. *I can get everything done over the weekend*. The truth is that you might get the work done, but you most likely will not retain it well enough to perform adequately on module exams. If you try to take shortcuts to learning (starting with homework and only looking at worked examples instead of doing the reading and mastering the deeper concepts), you will most likely find yourself saying "I understand it on the homework but miss points on the exam." Mastery of the content requires regular engagement throughout the week through the various activities in the course.
2. *The best way to study is to "look over" my notes*. Learning requires an active component, which is one of the reasons for the note packet; filling in notes is more active than simply reading the text. The more active role you take in your education, the more you will retain. "Looking over" notes or homework solutions is generally a poor study technique. It is better to create a cheat sheet (even if the exam is open notes or the cheat sheet is not allowed). If the cheat sheet is not allowed, it produces a good study tool. If the exam is open notes, use the cheat sheet to highlight the key ideas as well as where you should look in the notes and text for more information quickly. The cheat sheet is more than definitions, it is a place to draw connections between topics.
3. *I just need examples*. This is not a math class; this is more like a humanities course. You will spend more time explaining your logic and discovering the subtleties in others' logic than making computations. You will not survive the course using pattern recognition. That is, you cannot learn the material by seeing several examples and mimicking that approach. Success requires you to spend time outside of the homework thinking about the concepts - drawing connections, being able to explain them in different ways, and recognizing them in the description of a study design. Think of it like preparing for an exam over a book you read; you want to know the plot, how the characters connect, what the story is trying to illustrate, and even how it relates to your personal narrative. Success in a statistics course is similar. If you only pay attention to the "examples," things will not go well.

At a minimum, you will be expected, *each week*, to put 3 hours into notes/lectures, an additional hour on learning activities, 1-2 hours on homework assignments, and an additional 1-2 hours preparing for major assessments. This includes the time spent in class. Each student has different commitments during the term. Most of you have a full course load; some are working; others are involved in groups across campus; some may be caring for family members. And, let's face it, this term looks a bit different than the Rose-Hulman you remember or expected, and we may experience some significant disruptions! Therefore, the schedule that works best for you will vary, but I can offer you some advice.

Below is a rough schedule of the course activities and due dates.

	Monday	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Weekend**
Week 1	Introduction to the Course	Introduction to RStudio		Begin Content	Activity Day: Forum Discussion	
Week 2	Individual Flex	Remote HW Day	Module Exam	Begin Content	Activity Day: Self-Guided Lecture	
Week 3	Individual Flex	Remote HW Day	Module Exam	Begin Content	Activity Day: Self-Guided Lecture	
Week 4	Individual Flex	Remote HW Day	Module Exam	Begin Content	Activity Day: Forum Discussion	
Week 5	Individual Flex	In-Class HW Day	Module Exam	Begin Content	Activity Day: Group Lecture	
Week 6	Individual Flex	In-Class HW Day	Module Exam	Begin Content	Activity Day: Group Lecture	
Week 7	Individual Flex	In-Class HW Day	Module Exam / **Lab Due**	Begin Content	Activity Day: Forum Discussion	
Week 8	Individual Flex	In-Class HW Day	Module Exam	Begin Content	Activity Day: Group Lecture	
Week 9	Individual Flex	In-Class HW Day	Module Exam	Begin Content	Activity Day: Group Lecture	
Week 10	Individual Flex	In-Class HW Day	Module Exam / **Lab Due**	Begin Content	Final Q&A	

Based on this, here are my recommendations:

- On the days marked "Begin Content," begin working through the note packet for the module using the corresponding reading assignments and videos.
  - You should be able to complete the note packet with 2-3 evenings' worth of light work (an hour or less each evening).
  - Ideally, you would complete the note packet on the evening of the "Activity Day."
- Use the "Individual Flex" day to do the following:
  - If not complete, finish the note packet for the module.
  - Work on the homework assignment individually (expect 1 hour of individual work).
  - Complete the portfolio problems for the module.
- Use the "Remote HW" or "In-Class HW" days to complete the homework assignment as a group.
  - The instructor is available during the class period to answer questions.
  - This period is for the group to complete the write up together (expect 1 hour of collaborative work).
- "Module Exam" days indicate the day the module exam becomes available (you will be given approximately 48 hours to complete the exam).
  - Use this time to study by making a cheat sheet filled with key ideas and where to find them in the notes/text.
  - Read each of the exam questions through once, but do not try to answer them yet; instead, use your cheat sheet to note the key ideas.
  - Complete the Statistical Literacy portion of the exam first; then, complete the remaining portions (expect 1 hour to complete the exam).
  - You can use the "Begin Content" day to ask questions about the exam that remain before submitting it.

There is definitely a rhythm to the course (albeit the Winter Break messes with that a bit). It helps to develop a consistent routine during the first module and continue that throughout the term.

Students with Accessibility Needs

Rose-Hulman is committed to working with students who have special needs or disabilities. Such students may be eligible to receive accommodations that provide equal access to learning, the living and learning environment, and college activities. Visit the **Accessibility Services website** for more information. Requests for academic accommodations must be documented with and approved by the Accessibility Services office before they can be implemented in this course.

Emergency Information

To receive email or text messages regarding emergency situations that may impact campus and, possibly, the delivery of classes, register for RAVE alerts and/or follow @Rose-HulmanAlert on Twitter. Any announcements about the Institute's ability to offer classes will be shared on Rose-Hulman's website.

Student Handbook

This course adheres to all policies described in the **Student Handbook**. A few key sections are briefly outlined below. In brief, Rose-Hulman expects its students to be responsible adults and to behave at all times with honor and integrity. All students are expected to abide by this code and to aid in its enforcement by reporting violations of it.<\p>

Dropping the Course

You are responsible for understanding the university's policies and procedures regarding withdrawing from courses found in the current catalog. You should be aware of the current deadlines according to the **Rose-Hulman Academic Calendar.** More information for Drops and Adds can be found on the **Registrar's site here**.

Academic Integrity

Academic integrity is an integral part of the Rose-Hulman community. It is important that all members of our community learn to properly acknowledge the important contributions of others in our respective fields, both within Rose-Hulman and external to Rose-Hulman. Understanding how to work in collaboration with others and how to incorporate their work into your own, and then appropriately acknowledging them, demonstrates your intellectual maturity and a high degree of professionalism. Academic integrity refers to maintaining a high standard of honesty in academic conduct. All students and faculty are encouraged and required to show academic integrity at all times. On the other hand, academic misconduct is a failure of academic integrity. Specifically, academic misconduct is cheating, plagiarism, or interfering with the academic progress of other students.

The **Academic Rules and Procedures document** provides extensive rules and procedures for academic and other misconduct. The Mathematics Department **follows these rules seriously**. The minimum penalty for such misconduct is for the instructor to award zero credit for whatever test, exam, project or quiz on which the misconduct occurs, even if it results in a lowered or failing grade. A report of the misconduct will be sent to the Dean of Students and the Mathematics Department Head. Faculty members may exact a higher penalty, up to and including failure in the course if they feel the misconduct warrants such action. Students may appeal the sanctions to the rules and discipline committee, per the cited web page.

Plagiarism is a serious offense, and students are expected to adhere to the Rose-Hulman policy on plagiarism and cheating. Some individuals might say that they did not understand what plagiarism was when they took credit for someone else's ideas, but ignorance is not an excuse for lack of academic integrity. It is each student's responsibility to know the Rose-Hulman policy on academic honesty, including plagiarism, cheating, dishonest conduct, and collusion. This not only includes misrepresenting others' work as your own, but also summarizing, paraphrasing, use of any other material in your work, and incorrect or incomplete citations and references. Using the same work for multiple courses is also dishonest. If you have any questions concerning rules, procedures, or about academic honesty, plagiarism, cheating, dishonest conduct or collusion, please speak with your instructor.

Course Information Copyrights

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For further information please refer to **Rose-Hulman Library information on Copyright**.

Diversity Statement

Rose-Hulman is commited to being an **inclusive community** in which the multiplicty of values, beliefs, intellectual viewpoints, and cultural perspectives enrich learning and inform scholarship.

Online Access Requirements

Rose-Hulman welcomes students from around the world and encourages faculty, staff, and students to travel around the world. However, geopolitical conditions and compliance with export law and regulations prevent us from delivering certain kinds of educational experiences and/or using certain kinds of Institute technologies in some locations. For example, students in locations with limited access to the internet in general, or with restricted access to portions of the internet, or which are embargoed by the U.S. Directorate of Defense Trade, may not be able to successfully complete Rose-Hulman courses.

Disclaimer

The instructor reserves the right to modify the course content, schedule, topics, policies, etc. outlined in this syllabus.