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Class times Both sections meet MWF in Roop 129. §8 at 1010-1100 and §10 at 1115-1205.

Office Hours M 125–215, W 230-300, F 905-955, or by appointment.

Cellphones

There is to be no use of cellphones in the classroom. Please turn off your cellphones *before* entering the room, even if it is before the start of class time. You will be asked to leave the class for the class's remainder for using your cellphone, even if class has not started.

The Big Picture

Math 220 is officially titled "Elementary Statistics." It is fundamentally about how and when to make decisions based on data. Unless you don't have data in which case you need to figure out how to gather it in an unbiased way. Unbiased is a key term in so far as your analysis for a given time ought to be replicable with some level of confidence.

One very novel aspect of this class that will differ greatly from your previous encounters with mathematics in that interpretation is difficult and considerable ambiguity is present in the topics. As illustrative examples, first consider if you were to compare average consumption of ice cream with incidence of exposure to the flu on a monthly basis. It is tempting to conclude that ice cream cures the common cold! I know that you know that this is silly reasoning but think about a second example where the flaw is not so obvious. If I have a data set that tracks people's wellness according to whether or not they took a physical health classes in college and if the data indicated that these folks who took such a class are generally more healthy, should we conclude that it is good policy to make everyone take a physical health class in college? I claim that the answer is "I don't know" and that I need to know more.

In each of the two examples, a facile interpretation needs to be refuted and in the second example it is not clear that the data supports the position even if it is "common sense" that a wellness class can only boost health. Generally speaking, often times it is not so much that there is a "right answer" to questions but rather a need to ask more questions to really understand how data should shape our decisions. Differing from previous mathematics class, we will not speak in terms of "certainty" and "truth" but rather "likeliness" and "confidence."

This art of how to gather data (experimental design), when enough data has been gathered (sampling), and when meaningful inferences can be drawn from the data (modeling and hypothesis testing) is a basic summary of what we mean when we speak of the discipline of statistics. Our flu and health courses examples above were drawn from the area of public health but I'm sure you know of very similar questions arising in the spheres of psychology, public policy, epidemiology, predicting elections, etc.. So while the tools of this class are nominally mathematical, the reach and applications of the class are far and wide. This course is effectively about applying mathematical tools to almost everything you care to understand.

Course Schedule and use of class time

(1) The required course-pack is available from the bookstore ($33) and contains a copy of the slides used in the readings and each of the in-class activities. These materials were developed by my colleague, Professor Sam Prins. There is a special course pack exclusively for our sections.
(2) The required text & software is: Navidi Monks Essential Statistics and access code to ConnectMath. The access code comes bundled with each of the book formats (hardcover, softcover & e-book) for sale at the bookstore:
    - ISBN: 9781259348822 $122 is the all-digital option with e-book + ConnectMath access code

- ISBN: 9781259348815 $145 is the loose-leaf version + ConnectMath access code
- ISBN: 9781259348174 $161 is the hardcover version + ConnectMath access code

I recommend that you get the all-digital option with e-book + ConnectMath access code. This is based on the vast majority of students in past 220 classes stating that the e-book was useful but they rarely opened the hardcopy of the book.

If you purchase a used or new book from an online retailer, it will very likely not come with a valid ConnectMath access code. In that case, you will need to purchase the e-book+ConnectMath access code directly from the publisher ($104). Ill leave it up to you whether this is a better option than purchasing one of the JMU bookstore options.

(3) You must have a TI84-plus or TI83-plus calculator. You will be permitted to use your calculator in all assessments. Instructions for use of a TI84-plus are in the textbook. If you already have a TI83-plus then you don't need to buy another calculator as most of the instructions are the same and you can ask me if you can't figure out how to use it. If you have a non-TI calculator e.g. Casio, then it is up to you to figure out how to use it. Use of the calculator will give us more time for understanding concepts rather than doing arithmetic. Super helpful in class and for homework!

(4) SPSS will be used to analyze datasets of more realistic size than a calculator can handle. Instructions on the use of SPSS will be provided. SPSS is available in labs on campus. See the current list of lab locations at https://remedy.jmu.edu/labs/onesoft.asp?softname=SPSS.

(5) To connect to the online homework/practice/ebook for the first time:
- Go to http://www.connectmath.com
- Enter the coursecode: **D3WML-P69QJ**
- Select continue on the "Confirm Enrollment Information" page.
- On the "Enter your access code" page:
  - Enter the ConnectMath access code from the card you purchased at the bookstore or
  - Use the financial aid access code: **EBAF5-80C24-36595-E1595**, or
  - Buy an access code online using the "purchase an access code online" option. (Cost is $104 and this includes the e-book). The financial aid access code will expire 2 weeks after its first use - you will need to purchase your own code from the bookstore or the "buy online" option to continue using ConnectMath after that.
- Complete the rest of the registration information and click "Submit".

(6) We will also use WebWork for some homeworks where ConnectMath is sub-optimal. WebWork is free and no code or special login is needed.

(7) I will post additional materials on the course's Canvas site that will assist you in reading the text and/orwill supplement the text.

Schedule, Reading and Class Time

A course schedule is attached (and can be seen on the class's canvas page. Included in the schedule are the dates and times of three tests, three projects, and the final exam. Also included in the schedule are the topics for each class and the due dates of different homework assignments.

Your singular most important responsibility is to come to class prepared. This means you must complete the reading assignment. Along with materials to read from the text I will provide audio files to accompany your reading of the slides and the text. To test your preparation you must take the `iRAT`[1] on canvas before coming to class. Each iRAT is open book and unlimited time but, again, mut be taken before class for credit. Your two lowest iRAT scores will be dropped. There are no make-up iRATS.

There will be time at the start of class to ask questions on the trickiest parts of the reading. I will speak for at most 10 minutes on these.

After the opening that may include the "trickiest part" mini-lecture, our class time will be spent working in teams and, as a team, you will first complete a 10 minute `tRAT`[2] Your lowest tRAT will be dropped. There are

[1] `individual Readiness Assurance Tests.`

[2] `team Readiness Assurance Tests.`

no make-up tRATS.
Teams can appeal a tRAT questions by completing a form that can be printed off from canvas and submitting it for appeal. In the event of a successful appeal, you must have completed the iRAT to receive the tRAT appeal credit.
The remainder and bulk of class time will be used to work on guided activities/worksheets that require you and your team to apply course concepts. These activities/worksheets focus on your judgment and the ability to apply your knowledge rather than simply recalling facts.

Peer Evaluation

At the end of the course you will have the opportunity to anonymously evaluate your team-mates. This Peer Evaluation will consider how well your team-mates prepared for the tRATs and their overall contribution to the in-class activities and team projects. More on this later.

Attendance and Late Arrivals

You are expected to attend all classes. Penalties for coming to class late, leaving early or being absent will be incurred through the tRAT scores and the end-of-semester peer evaluation score. Tardiness will likely result in your missing the tRAT and as previously mentioned you must be present to receive credit for your teams score on a tRAT. In addition, your team may choose to penalize your tardiness or absenteeism in the end-of-semester peer evaluation. See the absence policy for the definition of excused absences and the documentation required.

Online Homework

The purpose of homework is to provide practice at applying the concepts and to identify areas where you are having difficulty. As such, you will be allowed to attempt each homework problem an unlimited number of times before the deadline. Just in case this isnt clear: you can keep trying and trying until you get the questions 100% correct.
<u>More details</u> Problems will be assigned online. A list of the homework sets along with tentative deadlines for completion are on the last 2 pages. I highly recommend that you start the homework sets early and seek help from your teammates, myself or the Science and Math Learning Center if you are having difficulty. Some of these homework problems may be incorporated into the class activities/worksheets. You are encouraged to work on the homework with your team. As long as you meet the deadlines, you should (if you put the time in) get 100% for every homework set.

Team Projects

These projects will use SPSS to apply the concepts covered in readings and class to more realistic examples than those encountered in the homework or in-class problems. Almost all disciplines participate in the collection and analysis of data; these projects will introduce you to the computing skills needed for basic data analysis. 3 team projects will be assigned and graded. Each project will be equally weighted. Each team will hand in only one report. Tentative dates for the in-class work on the projects are listed in the schedule. The reports will be due in class approximately 7 days later. No late projects will be accepted. Please be aware that the Science and Math Learning Center will not help you with the projects. Instead, please ask me for help on any aspect of the projects.

Tests

There will be 3 in-class closed book and closed note individual tests tentatively scheduled for **Monday October 3**, **Wednesday October 26**, and **Wednesday December 7**. The tests will be equally weighted. I will provide a formula sheet for you to use in these tests. Further details will be given later. Tentative dates are in the attached schedule. You will be permitted to use your TI-84 plus calculator in these tests but please note that I may give you SPSS output to use and you are responsible for knowing how to read and interpret this output. If your lowest test score is at least 25% and it is to your benefit, I will replace this lowest test score with your score in the final exam. This policy allows you to have a bad test day and also reflects the fact that learning takes place over the course of the semester; what you may not understand at the beginning of the semester may

be clearer at the end. Note that this will only apply to at most one of your tests. A missed test will be counted as zero. See the absence policy for the only exceptions to this rule.

Final Exam

There will be a final exam during the official university exam time of:

- Section 8 (meets MWF 10:10AM): Friday December 16 8:00AM-10:00AM.
- Section 12 (meets MWF 11:15AM): Wednesday December 14 10:30AM-12:30PM.

I cannot allow students in one section to take their final with the other section. Please keep this time in mind when scheduling your travel plans.

The final will be comprehensive, closed book and closed notes and will be taken individually. I will provide a formula sheet for you to use in the exam. Further details will be given later. You will be permitted to use your TI-84 plus calculator in the final but please note that I may give you SPSS output to use and you are responsible for knowing how to read and interpret this output. A missed exam will be counted as zero. See the absence policy for the only exceptions to this rule.

Assessment and Grades

Your grade has two components: individual work and team work. Out of a total of 1000 points your individual work is worth 800 points, your team work worth 200 points. Of the individual work, 25% is for iRATS, 15% for online homework, 40% for tests, and 20% for the final exam. Of the team work, 40% is for tRATS and 60% is for team projects.

Grades will be posted on Canvas at regular intervals. Please check these for accuracy and let me know ASAP if you believe there is an error. If you are concerned about your letter grade at any point in the semester please talk to me.

Adjustment of Team Performance Grades by Anonymous Peer Evaluation

Sometimes individuals do not participate adequately in their team or are habitually late or absent. To help prevent this behavior, each student must evaluate his or her teammates anonymously using a numerical scale at the end of the course. The average of these peer evaluations will be used to modify your team performance grade. This will result in good students getting their just reward for the extra work they put in and laggards getting their just desserts. Details of how this process will work can be found on the Peer Evaluation Form found on canvas. A practice peer evaluation will take place after about 1/3 of the semester has passed. By this time, any problems within the team should be obvious and corrective measures can be taken to improve the performance of individual team members.

First Week Attendance Policy

At the instructor's discretion, any student registered for a class in the Department of Mathematics and Statistics who does not attend at least one of the first two scheduled meetings of the class (or does not attend the first scheduled meeting of a class that meets once a week) MAY be administratively dropped from the class. Students will be notified by e-mail if they will be dropped. Students who fail to attend should not assume they will be administratively dropped by their instructor; it is the students responsibility to drop the course on their own or they will receive a grade at the end of the semester. All students are responsible for verifying the accuracy of their schedules and changes made in their schedules.

Absence Policy

You are expected to attend all classes. No penalties are incurred for missed tests because of a medical condition or other reason over which you have no control. Please notify me as soon as possible if such a situation arises to make appropriate arrangements. You will be expected to show proof of the reason. If you miss a test due to an excused absence a make-up test will be given within 1 week of the original test date. If you do not take the make-up within 1 week of the original test date you will receive a 0 for that test. Please remember to notify me as soon as possible!

Special Needs

If you need adaptations or accommodations because of a disability, if you have emergency medical information to share with me, or if you need special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible. My office location and contact information are given above. To document a disability you must register with the Office of Disability Services located in the Student Success Center Room 1202 and you may call (540) 568-6705 for more information.

Changes to this Syllabus

I reserve the right to make changes to the syllabus during the course. Any necessary changes will be announced in class and posted online.

Honor Code

This class follows the current Honor Code. This Honor Code will be strictly enforced. All work (with the exceptions noted above) must be your own work

General JMU policy

Go to `www.jmu.edu/syllabus` for university wide policies on Attendance, Academic Honesty and SafeAssign, Adding/Dropping Courses, Disability Accommodations, Inclement Weather and Religious Accommodations.