AG 505.01W – STATISTICAL METHODS IN AGRICULTURE
COLLEGE OF AGRICULTURAL SCIENCES AND NATURAL RESOURCES
FALL 2018

COURSE SYLLABUS

Instructor

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Class Time

Web Based Course

Office Hours

For immediate consultation I will be available Mondays, Wednesdays, and Fridays from 9:30 a.m. – 10:00 a.m., 11:00 a.m. – 12:00 p.m., and 1:00 – 1:30 p.m. or by appointment. You are also welcome to stop by my office at any other time. If I am unable to meet with you at that time, send me an email and we will schedule an appointment. The best way to contact me is via email at Jose.Lopez@tamuc.edu. You can also email me from D2L (myleoonline.tamuc.edu). I generally answer emails within 1 business day (8:00 AM-5:00 PM). Emails that arrive after 5:00 PM will be answered the next business day. I don't answer emails on weekends or during university holidays, so make sure you contact me in time.

COURSE INFORMATION

Required Text

Statistics: Informed Decisions Using Data, by Michael Sullivan, Prentice-Hall, Inc., New York, 5th Edition, 2016. (ISBN-13: 9780134133539 or ISBN-10: 0134133536)

Note: Older editions of the textbook such as 4th or 3rd edition are also acceptable; however, the section numbering may not match. Students who decide to purchase older editions of the textbook are responsible for matching the section numbering provided in the course calendar (refer to Course Calendar at the end of this syllabus) with the section numbering in their textbook.

Required Software

Microsoft Excel 2010 or newer version. Note: Older versions will work fine but procedures may not be the same as in Excel 2010 or in a newer version. The student will be responsible for figuring out the steps and procedures if using an older version than Excel 2010.

Prerequisites
None.

Teaching Philosophy
1. A course must deliver information, concepts and methods that will be useful in the student's professional life. However, learning analytical reasoning skills and improving the ability to process and use information efficiently is more important than memorizing facts and formulas and performing procedures repeatedly.
2. Students learn best when theories, concepts and procedures are explained in plain language as well as formally, and are complemented with examples or applications that are relevant to the students.

Character Formation
It is important during your graduate education to learn the values and rewards of hard work, responsibility, and honesty. The professor will promote character formation while teaching the course.

Course Description
Discussion of descriptive statistics, probability distributions, inference, and regression analysis.

Student Learning Outcomes
Upon satisfactory completion of the course the students will be able:

- To compute measures of central tendency and dispersion, and use them to analyze and summarize datasets.
- To compute and measure the correlation between two agricultural variables and explain the difference between correlation and causation.
- To estimate least-squares regression models.
- To understand different probability distributions.
- To conduct hypothesis tests (*t* tests, and *z* tests) using one sample.
    - To determine null and alternative hypotheses, explain Type I and Type II errors, and state conclusions to hypothesis tests for population mean with known or unknown population standard deviation and for a population proportion.
- To conduct hypothesis tests (*t* tests, and *z* tests) using two samples.
    - To determine null and alternative hypotheses, explain Type I and Type II errors, and state conclusions to hypothesis tests for two means when samples are dependent, two means when samples are independent, and two population proportions.
- To conduct hypothesis tests regarding a probability distribution, hypothesis tests regarding two categorical variables from one population (chi-square test for independence), and hypothesis tests regarding two or more populations for one categorical variable (chi-square test for homogeneity of proportions).
- To conduct hypothesis tests for three or more means using one-way analysis of variance (one-way ANOVA).
    - To determine null and alternative hypotheses, explain Type I and Type II errors, and state conclusions to hypothesis tests for three or more means
- To conduct post hoc tests on one-way ANOVA using Tukey test.
    - To summarize the conclusions of Tukey test

Topics

Part I: Descriptive Statistics

- **Topic 1: Numerically Summarizing Data**
  - Measures of Central Tendency
    - Discussion, computation, and interpretation of measures of central tendency (mean, media, and mode) and the relationships between them; explanation of resistance.
  - Measures of Dispersion
    - Discussion, computation, and interpretation of measures of dispersion (range, variance, and standard deviation) and the relationships between them; use of the empirical rule to describe data that are bell shaped (percent of observations lying within one two, and three standard deviation from the mean).
  - Measures of Position and Outliers
    - Explanation of measures of positions (the z-score, the percentile, the interquartile, the interquartile range, and outliers); computation and interpretation z-scores, percentiles, quartiles, and interquartile range; checks for outliers.
- **Topic 2: Describing the Relation between Two Variables**
  - Pearson product moment correlation coefficient
    - Properties, computation, and interpretation of the linear correlation coefficient; discussion of confounding and lurking variables.
  - Least-Squares Regression and Diagnostics
    - The model, specification, estimation, regression coefficients, interpretation, regression statistics, measures of fit, multicollinearity.

Part II: Probability Distributions

- **Topic 3: Probability Distributions**
  - Normal distribution
  - Standard Normal Distribution
  - Chi-Square Distribution
  - The F-Distribution

Part III: Inference

- **Topic 4: Hypothesis Tests Regarding a Parameter**
  - The Language of Hypothesis Testing
    - Determination of the null and alternative hypothesis; explanation of Type I and Type II errors; and stating conclusions to hypothesis testing.
  - Hypothesis Tests for a Population Mean – Population Standard Deviation Known
    - Hypothesis testing about a population mean with standard deviation known using the classical approach, using P-values, and using confidence intervals with small and large samples; consideration one and two tail tests; discussion of statistical significance and practical significance.
  - Hypothesis Tests for a Population Mean – Population Standard Deviation unknown
    - Hypothesis testing about a population mean with standard deviation unknown using the classical approach, using P-values, and using confidence intervals with small and large samples; consideration of one and two tail tests.

- Hypothesis Tests for a Population Proportion
  - Hypothesis testing about a population proportion with small and large samples; consideration of one and two tail tests.

- **Topic 5: Inference on Two Samples**
  - Inference about two means: dependent samples
    - Hypothesis testing regarding the difference of two dependent means using the classical approach, using P-values, and using confidence intervals. Discussion of matched-pairs data and hypothesis test requirements.
  - Inference about two means: independent samples
    - Hypothesis testing regarding the difference of two independent means using the classical approach, using P-values, and using confidence intervals. Discussion of completely randomized designs, hypothesis test requirements, equal and unequal population standard deviations, Welch's approximate *t*, and pooled two-sample *t*-tests.
  - Inference about population proportions
    - Hypothesis testing regarding the two population proportions from independent samples using the classical approach, using P-values, and using confidence intervals. Discussion of completely randomized designs, hypothesis test requirements, the pooled estimate of p, sample size necessary for estimating the difference between two population proportions.
    - Hypothesis testing regarding the two population proportions from dependent samples using the classical approach, using P-values, and using confidence intervals. Discussion of matched-pairs data, hypothesis test requirements, McNemar's test, contingency tables, sample size necessary for estimating the difference between two population proportions.
  - Inference for two population standard deviations
- **Topic 6: Inference on Categorical data**
  - Goodness-of-Fit Test
    - Hypothesis tests regarding a probability distribution. Discussion of the chi-square distribution, mutually exclusive outcomes, expected counts, hypothesis test requirements, chi-square test statistic, chi-square critical values, and stating conclusions.
  - Test for independence and the homogeneity of proportions
    - Hypothesis tests regarding two categorical variables from one population (chi-square test for independence). Discussion of expected counts, hypothesis test requirements, contingency tables, chi-square test statistic, chi-square critical values, calculation of p-values, and stating conclusions.
    - Hypothesis tests regarding two or more populations for one categorical variable (chi-square test for homogeneity of proportions). Discussion of expected counts, hypothesis test requirements, contingency tables, chi-square test statistic, chi-square critical values, calculation of p-values, and stating conclusions.
- **Topic 7: Compering three or more means**
  - One-way analysis of variance
    - Hypothesis testing regarding three or more means using one-way ANOVA. Discussion of hypothesis test requirements, between-sample variability versus within sample variability, mean square due to

treatments, mean square due to error, F-test statistic, ANOVA tables, F-critical values, calculation of p-values, and stating conclusions.

- Tukey Test
- The randomized complete block design
- Two-way analysis of variance
  - Hypothesis testing regarding two-way ANOVA.

GRADING

Grading

Exam 1	23.33%
Exam 2	23.33%
Exam 3	23.34%
Exercises	20.00%
Labs	10.00%
	100.00%

Note: There would be an optional final comprehensive exam (Exam 4). The optional final comprehensive exam will replace your lowest exam grade (if you decide to take it).

Grading Scale

Range	Grade
90-100.00	A
80-89.99	B
70-79.99	C
60-69.99	D
Less than 60	F

Exams

Make sure you take all the mandatory exams (see Course Calendar below). No makeup exams will be offered. A grade of zero will be assigned to any missed mandatory exams. Exams and quizzes will be administered through eCollege. Exams will be timed and are to be completed by 11:59 PM on the due date. Make sure you have internet access and a laptop battery fully charged (if using a laptop computer).

Exercises

Exercises will be graded and should be considered very important course material for your exam preparation. Exercises will involve the use of agricultural datasets or will relate to agricultural statistics decisions that students may encounter in their career as a professional. Students will be required to submit their individual answers via eCollege according to the course calendar provided (see Course Calendar below). You will have access to the corresponding course exercises on Monday mornings and they are to be completed by 11:59 PM on the date provided in the Course Calendar below.

Labs

Labs will be graded and will test your understanding of the applications of statistics to situations you may encounter in your professional career. In the Labs, you will learn the use Microsoft

Excel to solve practical problems and make informed decisions using data. Students will be required to submit their individual answers via eCollege according to the course calendar provided (see Course Calendar below). You will have access to the corresponding Labs on Monday mornings and they are to be completed by 11:59 PM on the date provided in the Course Calendar below.

Review Questions

Review Questions will NOT be graded. Students are welcome to ask questions during office hours. Review Questions are designed to help you understand and/or highlight the material you should understand after you complete a module. The students are NOT required to submit their answers to the Review Questions.

Practice Questions

Practice Questions will NOT be graded. Students are welcome to ask questions during office hours. Practice Questions will be selected from the textbook. Practice Questions are provided for those students who wish to practice additional questions than the ones provided in each of the section Exercises (refer to Exercises section above). The students are NOT required to submit their answers to the Practice Questions.

Class Preparation and Attendance

It is your responsibility to read and study the book chapters that will be covered, to read and study all handouts, to complete and submit all course assignments in-time, and to take all the mandatory exams before the deadline. Students are strongly encouraged to contact the instructor if they have any questions or comments. Email is the best way to contact me. I will be available for in-person consultation in my office by appointment only.

TECHNOLOGY REQUIREMENTS

This course will be offered online using D2L, the learning management system used by Texas A&M University-Commerce. Students will be required to download PowerPoint presentations and other important class material from the D2L website for the course.

Browser support

D2L is committed to performing key application testing when new browser versions are released. New and updated functionality is also tested against the latest version of supported browsers. However, due to the frequency of some browser releases, D2L cannot guarantee that each browser version will perform as expected. If you encounter any issues with any of the browser versions listed in the tables below, contact D2L Support, who will determine the best course of action for resolution. Reported issues are prioritized by supported browsers and then maintenance browsers.

Supported browsers are the latest or most recent browser versions that are tested against new versions of D2L products. Customers can report problems and receive support for issues. For an optimal experience, D2L recommends using supported browsers with D2L products.

Maintenance browsers are older browser versions that are not tested extensively against new versions of D2L products. Customers can still report problems and receive support for critical issues; however, D2L does not guarantee all issues will be addressed. A maintenance browser becomes officially unsupported after one year.

Note the following:

- Ensure that your browser has JavaScript and Cookies enabled.
- For desktop systems, you must have Adobe Flash Player 10.1 or greater.
- The Brightspace Support features are now optimized for production environments when using the Google Chrome browser, Apple Safari browser, Microsoft Edge browser, Microsoft Internet Explorer browser, and Mozilla Firefox browsers.

Desktop Support

Browser	Supported Browser Version(s)	Maintenance Browser Version(s)
Microsoft® Edge	Latest	N/A
Microsoft® Internet Explorer®	N/A	11
Mozilla® Firefox®	Latest, ESR	N/A
Google® Chrome™	Latest	N/A
Apple® Safari®	Latest	N/A

Tablet and Mobile Support

Device	Operating System	Browser	Supported Browser Version(s)
Android™	Android 4.4+	Chrome	Latest
Apple	iOS®	Safari, Chrome	The current major version of iOS (the latest minor or **point** release of that major version) and the previous major version of iOS (the latest minor or **point** release of that major version). For example, as of June 7, 2017, D2Lsupports iOS 10.3.2 and iOS 9.3.5, but not iOS 10.2.1, 9.0.2, or any other version. Chrome: Latest version for the iOS browser.
Windows	Windows 10	Edge, Chrome, Firefox	Latest of all browsers, and Firefox ESR.

- You will need regular access to a computer with a broadband Internet connection. The minimum computer requirements are:
    - 512 MB of RAM, 1 GB or more preferred
    - Broadband connection required courses are heavily video intensive
    - Video display capable of high-color 16-bit display 1024 x 768 or higher resolution

- You must have a:
    - Sound card, which is usually integrated into your desktop or laptop computer
    - Speakers or headphones.
    - *For courses utilizing video-conferencing tools and/or an online proctoring solution, a webcam and microphone are required.

- Both versions of Java (32 bit and 64 bit) must be installed and up to date on your machine. At a minimum Java 7, update 51, is required to support the learning management system. The most current version of Java can be downloaded at: JAVA web site http://www.java.com/en/download/manual.jsp

- Current anti-virus software must be installed and kept up to date.

Running the browser check will ensure your internet browser is supported.
Pop-ups are allowed.
JavaScript is enabled.
Cookies are enabled.

- You will need some additional free software (plug-ins) for enhanced web browsing. Ensure that you download the free versions of the following software:
    - Adobe Reader https://get.adobe.com/reader/
    - Adobe Flash Player *(version 17 or later)* https://get.adobe.com/flashplayer/
    - Adobe Shockwave Player https://get.adobe.com/shockwave/
    - Apple Quick Time http://www.apple.com/quicktime/download/

- At a minimum, you must have Microsoft Office 2013, 2010, 2007 or Open Office. Microsoft Office is the standard office productivity software utilized by faculty, students, and staff. Microsoft Word is the standard word processing software, Microsoft Excel is the standard spreadsheet software, and Microsoft PowerPoint is the standard presentation software. Copying and pasting, along with attaching/uploading documents for assignment submission, will also be required. If you do not have Microsoft Office, you can check with the bookstore to see if they have any student copies.

ACCESS AND NAVIGATION

This course will be offered online using D2L, the learning management system used by Texas A&M University-Commerce. To log into the course, go to: myleoonline.tamuc.edu

You will need your campus-wide ID (CWID) and password to log into the course. If you do not know your CWID or have forgotten your password, contact the Center for IT Excellence (CITE) at 903.468.6000 or helpdesk@tamuc.edu**.**

Note: Personal computer and internet connection problems do not excuse the requirement to complete all course work in a timely and satisfactory manner. Each student needs to have a backup method to deal with these inevitable problems. These methods might include the availability of a backup PC at home or work, the temporary use of a computer at a friend's home, the local library, office service companies, Starbucks, a TAMUC campus open computer lab, etc.

COMMUNICATION AND SUPPORT

Brightspace Support

Need Help?

Student Support

If you have any questions or are having difficulties with the course material, please contact your Instructor.

Technical Support

If you are having technical difficulty with any part of Brightspace, please contact Brightspace Technical Support at 1-877-325-7778 or click on the **Live Chat** or click on the words "click here" to submit an issue via email.

System Maintenance

Please note that on the 4th Sunday of each month there will be System Maintenance which means the system will not be available 12 pm-6 am CST.

COMMUNICATION WITH INSTRUCTOR

Interaction with Instructor Statement

The primary form of communication with the class will be through course Announcements and emails. Any changes to the syllabus or other important information critical to the class will be disseminated to students via class Announcements and/or via email through your official university email address available to you through MyLeo. It will be your responsibility to check the course Announcements and your university email regularly.

During regular working days and hours (M-F from 8:00 AM – 5:00 PM), I generally answer emails within 24 hours. Students who email me outside of regular working days and hours can expect a reply within 24 hours from 8:00 AM of the next business day (M-F). Students who email me during holidays or over the weekend should expect a reply within 24 hours from 8:00 AM of the next regularly scheduled business day.

COURSE AND UNIVERSITY PROCEDURES/POLICIES

Course Specific Procedures

Academic Honesty

Students who violate University rules on scholastic dishonesty are subject to disciplinary penalties, including (but not limited to) receiving a failing grade on the assignment, the possibility of failure in the course and dismissal from the University. Since dishonesty harms the individual, all students, and the integrity of the University, policies on scholastic dishonesty will be strictly enforced. In **ALL** instances, incidents of academic dishonesty will be reported to the Department Head. Please be aware that academic dishonesty includes (but is not limited to) cheating, plagiarism, and collusion.

Cheating is defined as:

- Copying another's test of assignment
- Communication with another during an exam or assignment (i.e. written, oral or otherwise)
- Giving or seeking aid from another when not permitted by the instructor
- Possessing or using unauthorized materials during the test
- Buying, using, stealing, transporting, or soliciting a test, draft of a test, or answer key

Plagiarism is defined as:

- Using someone else's work in your assignment without appropriate acknowledgement
- Making slight variations in the language and then failing to give credit to the source

Collusion is defined as:

- Collaborating with another, without authorization, when preparing an assignment
  If you have any questions regarding academic dishonesty, ask. Otherwise, I will assume that you have full knowledge of the academic dishonesty policy and agree to the conditions as set forth in this syllabus.

Attendance Policy

Students are expected to attend class and actively participate. Student participation/activity will be monitored by the professor. Students should plan to dedicate approximately 15-20 hours/week of time to this course.

APA Citation Format Policy

It is very important that you learn how to cite properly. In some ways, citations are more important than the actual text of your paper/assignment. Therefore, you should take this task seriously and devote some time to understanding how to cite properly. If you take the time to understand this process up front, it will save you a significant amount of time in the long run (not to mention significant deductions in points).

In the social and behavioral sciences, we generally follow the APA (American Psychological Association) formatting style. As a rule of thumb, one cites whenever they are paraphrasing other people’s words or when they quote other’s words directly. You may learn to cite from a variety

of different sources including the APA Tutorial and the sources listed below and in the Getting Started section of your course.
www.apastyle.org
http://owl.english.purdue.edu/owl/resource/560/02/
www.library.cornell.edu/resrch/citmanage/apa

It is the student's responsibility to understand how to cite properly. If you have questions, feel free to ask.

Late Work

It is the student's responsibility to plan accordingly and submit their assignments in a timely manner. Class assignments will be announced. The instructor reserves the right to assign a grade of zero to any late assignment.

Drop Course Policy

Students should take responsibility for dropping themselves from the course according to University policy should this become necessary.

Syllabus Change Policy

The syllabus is a guide. Circumstances and events, such as student progress, may make it necessary for the instructor to modify the syllabus during the semester. Any changes made to the syllabus will be announced in advance

University Specific Procedures

ADA Statement - Students with Disabilities:

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you have a disability requiring an accommodation, please contact:
Office of Student Disability Resources and Services
Texas A&M University-Commerce
Gee Library- Room 132
Phone (903) 886-5150 or (903) 886-5835
Fax (903) 468-8148
University Email address: StudentDisabilityServices@tamuc.edu
University Website address:
http://www.tamuc.edu/campuslife/campusservices/studentDisabilityResourcesAndServices/default.aspx

Student Conduct

All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment. See Student's Guide Handbook, Rules and Procedures, Code of Student Conduct (http://www.tamuc.edu/CampusLife/documents/studentGuidebook.pdf).

Students should also consult the Rules of Netiquette for more information regarding how to interact with students in an online forum: http://www.albion.com/netiquette/corerules.html

Nondiscrimination Notice

Texas A&M University-Commerce will comply in the classroom, and in online courses, with all federal and state laws prohibiting discrimination and related retaliation on the basis of race, color, religion, sex, national origin, disability, age, genetic information or veteran status. Further, an environment free from discrimination on the basis of sexual orientation, gender identity, or gender expression will be maintained.

Counseling Center

A student that faces a crisis or a serious and unforeseeable event that affects his/her class performance must contact the Counseling Center, Student Services Building, Room 204, Phone (903) 886-5145. If important class material or course assignments are missed because of such crisis or event, the student must contact the instructor as soon as possible.

Campus Concealed Carry

Texas Senate Bill - 11 (Government Code 411.2031, et al.) authorizes the carrying of a concealed handgun in Texas A&M University-Commerce buildings only by persons who have been issued and are in possession of a Texas License to Carry a Handgun. Qualified law enforcement officers or those who are otherwise authorized to carry a concealed handgun in the State of Texas are also permitted to do so. Pursuant to Penal Code (PC) 46.035 and A&M-Commerce Rule 34.06.02.R1, license holders may not carry a concealed handgun in restricted locations. For a list of locations, please refer to ((http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/34SafetyOfEmployeesAndStudents/34.06.02.R1.pdf) and/or consult your event organizer). Pursuant to PC 46.035, the open carrying of handguns is prohibited on all A&M-Commerce campuses. Report violations to the University Police Department at 903-886-5868 or 9-1-1.

MPORTANT DATES

Aug 27th, Monday	First day of classes.
Dec 7th, Friday	Last day of classes.
Dec 8th-14th	Week of final examinations.

COURSE CALENDAR

Every effort will be made to adhere to the course calendar below. However, unforeseen circumstances may require changes to the course calendar. In that case, changes will be announced via University Email and in Announcements. The professor reserves the right to change the course calendar if necessary and depending on the progress of the class. I highly recommend that you follow the calendar outlined below **VERY CAREFULLY** so that you are sure to complete readings as assigned and turn your assignments in on time.

AG 505 - STATISTICAL METHODS IN AGRICULTURE
Course Calendar, Fall 2018
Web Based Class

Week	Subject/Material Covered	Assignment Due By 11:59 PM on Date Provided
Week 1 Aug 27 – 31	Module 1 Sec. 3.1 + 3.2: Measures of Central Tendency and Dispersion	Exercise - SE or SA Exercise - MC Lab
Week 2 Sep 3 – 7	Module 2 Sec. 3.4 + 3.5: Measures of Position, Outliers, and Boxplots	Exercise - SE or SA Exercise - MC Lab
Week 3 Sep 10 – 14	Module 3 Sec. 4.1 + 4.2 + 4.3 + 14.3: Scatter Diagrams, Correlation, and Least-Squares Regression	Exercise - SE or SA Exercise - MC Lab
Week 4 Sep 17 – 21	Exam 1 (CH03 + Sec. 4.1, excludes Sec. 3.3)	Exam 1
Week 5 Sep 24 – 28	Module 4 Prob. Distributions + Sec. 10.1: The Language of Hypothesis Testing	Exercise - SE or SA Exercise - MC Lab
Week 6 Oct 1 – 5	Module 5 Sec. 10.3: Hypothesis Tests for a Population Mean	Exercise - SE or SA Exercise - MC Lab
Week 7 Oct 8 – 12	Module 6 Sec. 10.2 + 10.5: Hypothesis Tests for a Population Proportion	Exercise - SE or SA Exercise - MC Lab
Week 8 Oct 15 – 19	Exam 2 (Prob. Distributions + CH10)	Exam 2
Week 9 Oct 22 – 26	Module 7 Sec. 11.2+11.3: Inference about Two Means	Exercise - SE or SA Exercise - MC Lab
Week 10 Oct 29 – Nov 2	Module 8 Sec. 11.1: Inference about Two Population Proportions	Exercise - SE or SA Exercise - MC Lab
Week 11 Nov 5 – 9	Module 9 Sec. 12.1: Goodness-of-Fit	Exercise - SE or SA Exercise - MC Lab

Week 12 Nov 12 – 16	Module 10 Sec. 12.2: Test for Independence and Homogeneity of Proportions	Exercise - SE or SA Exercise - MC Lab
Week 13 Nov 19 – 23	Exam 3 (CH 11 + CH12)	Exam 3
Week 14 Nov 26 – 30	Module 11 Sec. 13.1: One-Way ANOVA	Exercise - SE or SA Exercise - MC Lab
Week 15 Dec 3 – 7	Module 12 Sec. 13.2: Post Hoc Test on One-Way ANOVA	Exercise - SE or SA Exercise - MC Lab
Week 16 Dec 10 – 14	Exam 4 - Optional Final Comprehensive Exam	Exam 4