Data Mining & Complex Experimental Designs
For Engineering Research
EMEN 5620

Course Syllabus
&
Tentative Content Outline

1. **Course Description**

Combines intermediate and advanced statistical methods with practical research applications and computer software. Develops commonly used statistical models such as Simple and Multiple Regression Analysis, the Analysis of Variance, as well as the analysis of Fractional Factorial Designs for the solution of common business and industrial research problems. The statistical models are implemented and interpreted in the context of actual data sets using available statistical software. Prerequisites: EMEN 5900 & 5610; or APPM 5580 & 7400a; or the equivalent, with the permission of the instructor.

2. ***Course Goals and Objectives***

This course is intended to serve as the fourth course in a four-course sequence in Managing Applied Research in Technology. As the final course in this sequence, more advanced statistical methods than those presented in EMEN 5610 will be investigated. At the conclusion of this course, the student should possess the ability to perform required statistical analyses for any univariate application in a business / industrial setting.

Specifically, at the conclusion of this course, the student will be capable of performing the following analyses / tasks:

- Perform Simple, Multiple, and Nonlinear Regression Analyses, including the analysis of all underlying assumptions associated with these models;
- Performing all of the above analyses, as associated with nominal and ordinal data applications/measurements;
- Designing cost-effective and efficient Fractional Factorial Designs; and
- Combining Fractional and Full Factorial Designs with Simple and Multiple Regression applications for the purpose of Data Mining

To master these techniques, data generated from a series of research studies drawn from contemporary business and industrial applications will be employed. These examples have been extracted from actual studies conducted for firms such as Anheuser-Busch; the Earthgrains company; ALCOA, and ALCOA of Australia; Molex, and Molex-Singapore; the Applied Magnetics Corporation; the Inland Steel company; Ford Motor Company; Motorola - Semi-Conductor Division; and the Oregon Saw Chain company.

As a result of successfully completing the four course sequence associated with the MART Certificate, the student will be capable of performing a vast array of activities in business and industry utilizing the principles and tools of applied statistical methods and experimental design techniques. Specifically, when faced with a *statement of a problem* in either a production or administrative setting, in the context of a product or a service, the student will be capable of:

(a) properly classifying the problem/issue as a candidate for the *Problem-Solving Strategy* versus the *Quality Improvement* (i.e. Variability Reduction) *Strategy*;

(b) describing an appropriate (most efficient in balancing power and cost) *research design* to respond to the statement of the problem;

(c) developing a high-power, cost-effective *experimental design* to test the required hypotheses which will guard against threats to External and Internal Validity;

(d) designing the appropriate *sampling plan* in relation to the experiment, including the calculation of a defensible sample size, and selecting replications, or repetitions, or both in the conduct of the design;

(e) explaining the methods which must be utilized to *conduct and control the execution of the study* in the business and industrial environment;

(f) designing an appropriate *plan for the statistical analysis of the data*, taking internal and external customer issues, as well as cost and profitability, into account; then

(g) *executing the analytical plan* and correctly answering the research questions posed; and finally

(h) *preparing and presenting the results of the study* in a professionally acceptable format for decision-making purposes at the highest level of an organization.

The analyses taught by the instructor, and utilized by the student, in this course will require the assessment of criterion measures evaluated on nominal, ordinal, and continuous data scales (in some cases, all within a single research study). Further, the underlying assumptions related to each statistical test and its interpretation will be thoroughly reviewed.

3. ***Rationale***

The application and use of applied statistical methods in business and industry today does not take place within a vacuum. The engineering manager in contemporary business organizations plays a vital role in the enhancement of profitability through focused cost reduction, quality improvement, problem-solving, and increasing asset utilization efforts. As part of a cross-functional team, it is the engineering manager that is depended upon to create those conditions within which disciplined and controlled studies may take place, and where generated (versus collected or gathered) data may be interpreted and disseminated for decision-making purposes.

Within this context, statistics, and the statistical analysis of data, is primarily a tool; not an objective. In this regard, applied statistics should be learned in the same way; that is, as a tool employed within a larger strategy for the purposes that will be found in the business environment. The student will find that all of the following research questions:

1. What is the quality of the telephone response rate among the inside sales group, and is there a day-of-the-week or time-of-day effect(s)?
2. What temperature setting , feed rate, and atmosphere condition should be used for our new heat treat furnace to maximize quality, and yet minimize cost?

3. How much magnesium and manganese should be included in the aluminum alloy used for our customers making soft drink cans in Singapore so as to minimize our costs, but increase their production rates with no consumer complaints ?

4. What is the superior inside spray formulation to use if we wish to control off-taste in beer ?

5. Which of the 67 possible variables affecting plugging on the caster must be controlled, and at what targets, in order to realize an additional profit of $33,000,000.00 per year?

may all be answered through controlled and designed experimentation followed by appropriate statistical analyses (in some of the cases above, the same statistical tests), but that the focus and purpose of the activity is **not** to obtain *t*, *F*, X^2 and p-

values, but to correctly answer the research question(s) at the lowest possible cost. Additionally, some of the studies required to answer these research questions may cost a company tens or hundreds of thousands of dollars to execute ..... you get one chance at the experiment, and there are no 'do-overs'. Therefore, threats to the internal validity, and subsequent external validity, of the design employed must be understood by the engineering manager (researcher). Statistical methods may often be robust against certain violations of underlying assumptions, but no test statistic known can save the engineering manager from a flawed experimental design. This is of particular concern when one notes that performing research in many industrial situations is nothing like conducting experiments in a laboratory, classroom, or at the end of a chapter in a textbook. Most continuous distributions encountered are not normal; many planned sample sizes are not realized; subjects or test units are often lost; data turns up missing; gauges are modified in mid-study. Knowing how to adjust and control for all of these types of occurrences can make the difference between a successful research effort and a catastrophic event.

Finally, the contemporary engineering manager must manage and/or conduct all research and statistical analyses mindful that obtaining a correct answer in business and industry today is not enough; if that answer is not associated with a set of conditions or outcomes that may be achieved at the lowest possible cost, and highest profit, to the organization implementing the solution. Concurrent with this observation is the realization that no solution will be implemented by upper-level management (particularly the high risk variety) if the engineering manager cannot present the results of his/her analysis in such a way so as to convince those who do not understand the difference between alpha and beta (i.e. Type I and II error), much less the revelations offered by Levene’s Improved Test for homogeneity of dispersion versus variance, why a particular solution is the right one. It is the researcher's responsibility to translate the analysis conducted from the universal language used to discuss variability (i.e. statistics) into the language of business (dollars). This also is a skill set possessed by the successful engineering manager.

Given the rationale presented, this course has been organized by the instructor to maximize the probability that the student successfully learning this content will be able to operate in the manner described above. Each case study presented will require the student to select an appropriate investigative strategy, select an appropriate statistical analysis plan (mindful of the nature of the data available, and the underlying assumptions associated with the test involved), correctly execute the analytical plan, and make recommendations for further research / action in a format consistent with the presentation of such data in a business environment. Each case study has been carefully selected so as to make certain that the student will have covered a significant number of diverse statistical analyses by the end of the course.

4. ***Instructor***

Dr. Jeffrey T. Luftig
ECOT 414
303-492-1591
e-mail : Jeffrey.Luftig@colorado.edu
Office Hours: TBA

5. ***Course Website***

All students must register on the web at XXXXXXXXXXXXXXXXXXX for access to eCompanion (look for the *register* link). ALL of the lectures and materials used in this course are contained on this website. Additionally, all communication associated with this course will take place via the e-mail function on the course website; students will be responsible for checking their e-mail frequently enough to be knowledgeable about the information sent by the instructor to them using this utility throughout the semester.

A Note on e-Mail Addresses

When you register on ECollege, you can set your e-mail address to be sent from the course website to any address you choose. I know it can be a hassle to check multiple e-mail locations on a daily / regular basis, but may I suggest that you use you CU e-mail address for this purpose (e.g. firstname.lastname@colorado.edu). If you do not know your assigned CU address, contact ITS (dial 5-HELP from any on-campus phone) and they will provide it to you. The reason I mention this is because in the past, I have sent e-mails to students with attachments of interest as the course proceeds. In some cases, where students have used their work e-mail address, the e-mail goes through but the attachment is blocked. In some rare cases, fire-walled work systems, when blocking an attachment, block the associated e-mail as well, and provide no indication to the student that anything was sent out by me and subsequently blocked. It is *your* responsibility to be cognizant of any information sent via the course website by me, so it might be useful to use either a CU or at least personal e-mail address that will not present this sort of possibility.

Additional information associated with the use of the ECollege website and accessing videos of the lectures are available on the ECollege website, under the **Course Home** section, in the Content Item labeled '**Instructions**'.

6. ***Textbook / References / Software***

After careful review, the instructor has determined that no single text can adequately comprise a resource for **all** of the topics we will review in this course. Instead, the instructor will provide students with extensive handouts and support material on the course website. If support texts are desired, a useful text would be *Design of Experiments in Quality Engineering*, by Jeffrey Luftig & Victoria Jordan, McGraw-Hill Publishing Company, 1998. A textbook that is also recommended highly as a compendium of statistical tests is the *Handbook of Parametric and Non- Parametric Statistical Procedures* by David Sheskin, published by CRC Press. The primary computer software used in this course is SPSSPc for Windows and MVPStats.

Some of the other textbooks which may be used as references for some or most of the material reviewed in this course (these are only sample references; this is not intended to constitute a collectively exhaustive list) include the following publications:

Box & Draper	*Evolutionary Operation*, John Wiley & Sons
Box, Hunter, and Hunter	*Statistics for Experimenters*, John Wiley & Sons
Campbell & Stanley	*Experimental & Quasi-Experimental Designs for Research*, Rand McNally College Publishing Co.
Daniel, C.	*Applications of Statistics to Experimental Design*, John Wiley & Sons
Draper & Smith	*Applied Regression Analysis*, John Wiley & Sons
Dowdey & Wearden	*Statistics for Research*, John Wiley & Sons
Gibbons, J.	*Nonparametric Methods for Quantitative Analysis*, American Sciences Press
Hicks, C.	*Fundamental Concepts in the Design of Experiments*, Holt, Rinehart, and Winston
Luftig, J.	*Special Techniques for the Analysis of Unreplicated Fractional Factorial Designs*, Luftig & Warren International
Siegel & Castellan	*Nonparametric Statistics for the Behavioral Sciences*, McGraw-Hill

For all of the statistical analyses presented and conducted, the student will make use of an extensive array of computer software. The primary software programs utilized in this course will be SPSSPc for Windows and MVPStats (which all students should already own from the prerequisite courses). Both of these programs are also resident and available for use by students in the computer labs on the second floor of the Engineering Building.

All students enrolled in this course should already possess MVPStats. If you have not purchased this program in previous courses, you should download the software from the following URL:

http://www.mvpprograms.com/html/student.html

This URL will allow you to purchase the software for $65.00 versus the normal price to the 'public' of $395.00; through an agreement with the software producer.

The second program we will use extensively, which is installed on many of the computers in the Engineering building, will be SPSSPc for Windows. SPSSPc is available from a number of sources, with rates that vary widely. DO NOT purchase the Student Version. It is a limited version that does not include all of the modules you will need, and handles data files of limited size. The Graduate Version/Pack is the minimum system you will require. The Graduate Version/Pack can be purchased from a number of sites. The lowest price I have identified for the Graduate Version/Pack is for $190-$210, with a perpetual license at JourneyEd: http://www.journeyed.com/ . The SPSSPc Graduate Version can also be leased for a 6 or 12 month period from: http://www.e-academy.com/. The last time I checked, a 6 month lease was $80.

Other programs which we will employ in this course will include: CHAID and Answer Tree; Samplepower; Trialrun; TableCurve 2D and 3D; Design Array; PHStat (an EXCEL add-in) and ANOVA TM. In some cases, these packages will be provided by the instructor to the students, and subsequently utilized in assignments and projects. In other cases, these packages will be demonstrated by the instructor during lecture sessions.

7. ***Course Structure / Approach***

The course topic outline which follows identifies the proposed and tentative lecture topics (some topics may be added or dropped based upon student input and projects of interest which may arise during the semester) which will be presented throughout the semester in order to allow the student to achieve the goals and objectives of the course.

For each topic covered, it will be the student's responsibility to:

(a) have read any assigned material identified by the instructor ***before*** the corresponding lecture; and

(b) attend the lecture, and participate in classroom discussions of the material presented (on-campus students)

OR

review the lecture, and post questions associated with the content on the course website (distance students); and

(c) complete all homework assigned following each lecture. These assignments are designed to allow the student to confirm that the content presented in any given lecture has been learned and mastered, before material of increased complexity is presented in subsequent lectures.

The course requirements are as follows:

(1) Each student will ***individually*** complete and electronically submit all homework assignments. The N assignments in this course are equally weighted, and the number of assignments submitted will be a function of how much content is ultimately covered. The assignments **MUST** be submitted via the dropbox utility on the course website. ***No assignments will be opened, much less accepted, if submitted in any other fashion, including as e-mail attachments***.

(2) Students will be assigned to teams, and each team will be provided with a research problem and associated data set(s) from an actual business application. It will be the team's responsibility to:

(a) Perform all correct and appropriate statistical analyses required to answer the research question(s);

(b) Prepare a report suitable for presentation to a Chief Executive Officer and management team in business or industry; and

(c) Provide a presentation to the class on the methods utilized, techniques employed, and the results obtained. The members of each team will receive the same grade for the final project.

8. ***Grading & Final Course Grade Calculation***

The final grade for the course will be assigned on the basis of the following weighting:

- Homework Assignments	75%
- Team Project	25%

For purposes of illustration, the final grade will be calculated by assigning the weighted averages of the scores received

e.g.	Homework Assignment 1:	B +	=	3.30
	Homework Assignment 2:	A	=	4.00
	Homework Assignment …….	….	=	…..
	Homework Assignment N:	A-	=	3.70
	Homework Assignment Sub-Total Grade: (For All N Assignments)	B+	=	3.30
	Research Project :	A-	=	3.70

Final Grade = { (75 * 3.30) + (25 * 3.70) } / 100 = **3.40 = B+**

When compared to the following scale:

3.85 - 4.3000	A	
3.50 - 3.8499	A-	
3.15 - 3.4999	**B+**	(the category within which the example above falls)
2.85 - 3.1499	B	
2.50 - 2.8499	B-	
2.15 - 2.4999	C+	
1.85 - 2.1499	C	
1.50 - 1.8499	C-	
1.15 - 1.4999	D+	
0.85 - 1.1499	D	
0.70 - 0.8499	D-	
< 0.70	F	

The ECollege Gradebook:

Each submission is assigned a letter grade and GPA value (A+ is possible), which is converted by the ECollege Gradebook into a percentage which is equivalent to the GPA value earned against the value of an 'A'. For example, a B is equivalent to a GPA value of 3.0. This value is divided by the value of an 'A' of 4.0, and converted into a value of 75%. B+ equals 3.3, and is converted into an 82.5%. An A+ would be 4.3/4 or 107.5%. To generate your final grade, ECollege multiplies each percentage by its weight, and generates a final cumulative percentage (fcp). You can determine your final grade by comparing your final cumulative percentage to the following table:

Final Weighted Percentage Earned - Low	Final Weighted Percentage Earned - High	Final Course Grade Equivalent
96.250	107.500	A
87.500	96.249	A-
78.750	87.499	B+
71.250	78.749	B
62.500	71.249	B-
53.750	62.499	C+
46.250	53.749	C
37.500	46.249	C-
28.750	37.499	D+
21.250	28.749	D
17.500	21.249	D-
< 17.50		F

For example, using the same grades as previously described:

Homework Assignments	B+ = 3.30
Term Project	A- = 3.70

The final cumulative percentage (fcp) generated by ECollege would be:

fcp = ((75)(3.3/4.00)) + ((25)(3.7/4.00))
= 61.875 + 23.125
= 85

Converting the fcp to a letter grade using the table immediately above, the final grade earned would be a B+ (exactly the same as previously described).

All assignments are expected to be completed in conformance with generally accepted standards associated with Academic Honesty. The CU Honor Code website provides and explanation of these standards; as well as the Pledge each student will be asked to sign for each major course requirement submitted. If you at any time have any questions regarding what is and is not appropriate in this area, make certain to speak with the Instructor.

9. ***Lecture Topics & Associated Discussion Points***

Primary Lecture Topic	Case Studies / Reference Material	Statistical Tests Reviewed & Discussion Points
Introduction to the Course & Course Requirements * Syllabus * Content Outline * Individual Homework Assignments / Term Project * Suggested Support References	N.A.	N.A.
Review of Critical Material from EMEN 5610 / APPM 7400a	Posted Materials and Handouts Provided by the Instructor (Posted on the Course Website – Course Home Unit Tab – *Updated and Review Materials from 5610* Content Item)	- Updated Lecture Presentation: Two Way ANOVA – Model III – Fully Crossed Analyses - Updated Lecture Presentation: Two Way ANOVA – Model III – Nested Analyses - Homework Assignment # 9 (Final Assignment): Review of Correct Solutions - Term Project Solution
Measures of Relationship : Indices of Association and Correlation	Lecture Presentation Handout (pdf file) Provided by the Instructor Measures of Relationship Flow Chart Likert Scales and Data Analysis Article Ordinate Values for the Normal Curve at Values of z Small Sample Size Critical Values for the ρ_{Sp} (Posted on the Course Website – Relationships Unit Tab)	An overview of the major indices and tests associated with measures of relationship for Nominal, Ordinal, and Continuous variables; including: * Contingency Table Analysis; Phi, C, V * Youden's J-Index of Predictive Efficiency * Cohen's Kappa * Kendall's Coefficient of Concordance * Spearman's Rank Correlation Coefficient * The Biserial and Point-Biserial Coefficients of Correlation

Primary Lecture Topic	Case Studies / Reference Material	Statistical Tests Reviewed & Discussion Points
An Overview of Simple Linear Regression and Correlation	Lecture Presentation Handout (assorted pdf files) Provided by the Instructor Appendix B-9 *Multiple Regression: Procedure REGRESSION* SPSSPc Guide (Out of Print) Durbin-Watson Tables of Critical Values (Posted on the Course Website – Simple Regrsn Unit Tab)	* Using Simple Regression to Describe a Linear Relationship * Testing Inferences About the Population Regression Line, the Intercept (β_0), and Slope (β_1), and the Underlying Assumptions of the Model * Assessing the Fit of the Regression Line – Using the ANOVA Table * The Coefficients of Correlation, Determination, and Alienation * Generating and Interpreting Confidence and Prediction Limits * Testing The Basic Assumptions of the Model - Linearity - Homoscedasticity - Normality - Independence of Errors (Serial Correlation) * Residual Analysis and Corrections for Model Violations * Detecting the Presence of 'Outliers' on the X and Y Dimension * Detecting the Presence of High Leverage and Influential Measures * Using MVPStats and SPSSPc for Simple Linear Regression Analyses.

Primary Lecture Topic	Case Studies / Reference Material	Statistical Tests Reviewed & Discussion Points
Introduction to Multiple Regression Analysis	Lecture Presentation Handout (assorted pdf files) Provided by the Instructor Appendix B-9 *Multiple Regression: Procedure REGRESSION* SPSSPc Guide (Out of Print) Durbin-Watson Tables of Critical Values (Posted on the Course Website – Simple and Mult. Regrsn Unit Tabs)	* Underlying Theory & Assumptions – Linear Models * Testing Inferences About the Regression Coefficients * Assessing the Fit of the Regression Line; the ANOVA Table, the Coefficient of Determination and the Multiple Correlation Coefficient, Part and Partial Correlation Coefficients * Full & Reduced Models; Forward and Backward Regression Approaches * Prediction Using the Multiple Regression Model * Testing The Basic Assumptions of the Model - Linearity - Homoscedasticity - Normality - Independence of Errors (Serial Correlation) * Residual Analysis and Corrections for Model Violations * Multicollinearity * Detecting the Presence of 'Outliers' on the X and Y Dimension * Detecting the Presence of High Leverage and Influential Measures * Generating Response Surfaces * Multiple Regression and Model-Fitting Utilizing TableCurve3D. * Creating Dummy Variables for Nominal Variables * Testing for Interaction Effects in Multiple Regression Analyses * Lagging Variables in Time Series Analyses * Generating Output with SPSSPc

Primary Lecture Topic	Case Studies / Reference Material	Statistical Tests Reviewed & Discussion Points
Introduction to Non-Linear Regression Analysis	Lecture Presentation Handout (assorted pdf file) Provided by the Instructor (Posted on the Course Website – Non-Lnr Unit Tab)	* Fitting Curvilinear Relationships - Polynomial Regression & 2nd Order Models - Reciprocal Transformation of the X Variable - Log Transformation of the X Variable - Log Transformations of Both the X and Y Variables * Non-Linear Regression and Model-Fitting Using MVPStats and Table Curve2D.
Introduction to Fractional Factorial Designs & Considerations Related To Conducting Screening Experiments	Lecture Presentation Handout (assorted pdf files) Provided by the Instructor *Conducting Effective Screening Experiments* *A Procedure for a Statistical Start-Up of New and Existing Production Systems* *Methods for the Analysis of Unreplicated Fractional Factorials* *AET Selection Flow Chart for Data Analysis in Fractional Designs* *Plackett-Burman Designs (*Nelson) Multiple Fractional Factorial Case Studies for Design and Review (Posted on the Course Website – Screening DOE Unit Tab)	* The Fractional Factorial Design - Basic Theory * Developing of Extreme Screening Designs: Plackett-Burman Matrices and other Fully Saturated Design Approaches * Developing High(er) Resolution Designs * Extending the Latin Square : Orthogonal Arrays * Special Techniques for the Analysis of Unreplicated Fractional Factorial Designs; including the Use of Lenth's Procedure for Dispersion Analysis * Setting Up Screening Experiments in Real Life: Guidelines and Recommendations for the Engineering Manager * The Engineering Log & It's Post-Hoc Use in Error Term Analysis

Primary Lecture Topic	Case Studies / Reference Material	Statistical Tests Reviewed & Discussion Points
Introduction to Data Mining	Lecture Presentation Handout (assorted pdf file) Provided by the Instructor Multiple Mining Case Studies for Design and Review (Posted on the Course Website – Data Mining Unit Tab)	* In Introduction to Data Mining, Happenstance Data Analysis, and Associated Statistical Procedures for the Identification of Potentially Critical Factors and Interactions * CHAID and associated analytical procedures * Combining CHAID analyses with factorial designs, ANOVA, and multiple regression analysis to identify critical, significant, and trivial factors and variables

10. ***Additional University Provisions Recommended for Inclusion by the Office of Undergraduate Education and the Engineering Management Program, University of Colorado – Boulder***

a. If you qualify for accommodations because of a disability, please submit a letter to me from Disability Services in a timely manner so that your needs may be addressed. Disability Services determines accommodations based on documented disabilities. Contact: 303-492-8671, Willard 322, or http://www.Colorado.EDU/disabilityservices

b. Campus policy regarding religious observances requires that faculty make every effort to reasonably and fairly deal with all students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. In this class, my expectation is that each student will review the policy details http://www.colorado.edu/policies/fac_relig.html) and religious holiday calendar (http://www.interfaithcalendar.org/) during the first week of class, and by the end of the second week of class notify the instructor via e-mail as to what dates the student anticipates they will not be in class, and the religious holiday they will be observing.

c. Students and faculty each have responsibility for maintaining an appropriate learning environment. Students who fail to adhere to such behavioral standards may be subject to discipline. Faculty have the professional responsibility to treat all students with understanding, dignity and respect, to guide classroom discussion and to set reasonable limits on the manner in which they and their students express opinions. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with differences of race, culture, religion, politics, sexual orientation, gender variance, and nationalities. See polices at

http://www.colorado.edu/policies/classbehavior.html and at

http://www.colorado.edu/studentaffairs/judicialaffairs/code.html#student_ code

d. All students of the University of Colorado at Boulder are responsible for knowing and adhering to the academic integrity policy of this institution. Violations of this policy may include: cheating, plagiarism, aid of academic dishonesty, fabrication, lying, bribery, and threatening behavior. All incidents of academic misconduct shall be reported to the Honor Code Council (honor@colorado.edu; 303-725-2273). Students who are found to be in violation of the academic integrity policy will be subject to both academic sanctions from the faculty member and non-academic sanctions (including but not limited to university probation, suspension, or expulsion). Additional information on the Honor Code can be found at:

http://www.colorado.edu/policies/honor.html

and at

http://www.colorado.edu/academics/honorcode/

The faculty of the Engineering Management Program (EMP) believe that a culture of integrity is essential to both the long-term, personal success of our students and to the economies and countries in which they live and work. Therefore, EMP has created an Honor Code Violation Policy that specifies program-specific consequences for a second offense of the CU Honor Code:

EMP HONOR CODE VIOLATION POLICY

Any and all violations of the CU Honor Code in EMP classes will be reported to the Honor Code Council. As per CU's policy, the faculty member will determine the academic sanction for an offense. The CU Honor Code Council will determine any additional, non-academic sanctions. *This portion of EMP's policy is a restatement of the Honor Code policy approved by the CU Board of Regents.*

A second violation of the CU Honor Code by any Engineering Management graduate student will result in an academic sanction as decided by the faculty member and an automatic expulsion of the student from the Engineering Management graduate program.

e. The University of Colorado Policy on Sexual Harassment applies to all students, staff and faculty. Sexual harassment is unwelcome sexual attention. It can involve intimidation, threats, coercion, or promises or create an environment that is hostile or offensive. Harassment may occur between members of the same or opposite gender and between any combination of members in the campus community: students, faculty, staff, and administrators. Harassment can occur anywhere on campus, including the classroom, the workplace, or a residence hall. Any student, staff or faculty member who believes s/he has been sexually harassed should contact the Office of Sexual Harassment (OSH) at 303-492-2127 or the Office of Judicial Affairs at 303-492-5550. Information about the OSH and the campus resources available to assist individuals who believe they have been sexually harassed can be obtained at:

http://www.colorado.edu/sexualharassment/

f. The Engineering Management Program (EMP) has a large distance learning population and, as such, many copyrighted materials are offered electronically to students. EMP has the responsibility to comply with the copyright law regulating distance education for a non-profit, state institution, i.e., the Technology, Education and Copyright Harmonization (TEACH) Act of 2002. It's the student's responsibility to comply with U.S. copyright law with respect to the use and sharing of the electronic materials (*this include the videos of class lectures*) provided within the program.

g. Appropriate Classroom Laptop Use

Although having a laptop in class opens up new learning possibilities for students, sometimes students utilize it in ways that are inappropriate. It is easy for your laptop to become a distraction to you and to those around you. Therefore, please refrain from instant messaging, e-mailing, surfing the Internet, playing games, writing papers, doing homework, etc. during class time. Acceptable uses include taking notes, following along with the instructor on PowerPoint, and other directed class activities, as well as working on assigned in-class activities, projects, and discussions that require laptop use.