**Fall 2017**

**IMSE 991 Multiple Criteria Decision Making**

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**Description**

Decisions that rank alternatives based on several criteria measured with subjective and objective data are best modeled by multiple criteria decision making methodologies. This course investigates multiple criteria decision making methods and focuses on the “real world” application of these methods to solve business problems. This course will walk students through the process of setting up the problems by understanding corporate objectives, establishing decision criteria, analyzing data, understanding and applying decision-making methods, ranking the alternatives selecting from various decision methodologies, performing sensitivity analysis and using the ranking to allocate resources. Case studies are reviewed to provide students a view of how these techniques are used in industry and government applications. Additionally, software is available for use with some of the decision making methods.

**Lectures**

* Mondays at 4:00 pm - 6:50 PM US Central Time
* Lectures are webcasted live during class time noted above.
* Students are strongly encouraged to participate live in class
* Students are strongly encouraged to attend the team project presentations
* Archived lectures are posted on Canvas

**Grading**

Participation 25

Homework 75 (3 Sets of homework problems - 25pts each)

Midterm 100

Final Exam 100

Team Project 150 (Three 25 point project reviews, 75 point final report)

Total Points 450

**Required Textbooks**

**NOTE: Although a number of books/ebooks are listed, they are not cost prohibitive.**

**Required**

*Multi-criteria Decision Analysis: Methods and Software*, 1st Edition, Alessio Ishizaka, Philippe Nemery, Wiley, 2013, ISBN-10: 1119974070

*Multiple Attribute Decision Making: An Introduction (Quantitative Applications in the Social Sciences)*, 1st Edition, K . Paul Yoon, Ching-Lai Hwang, SAGE Publications, Inc,, 1995, ISBN-10: 0803954867

*EBook: The Science of Common Sense: Best Practical Decision Science Methods*, Tillman, Frank A., Cassone, Deandra T., HTX, Incorporated, Osage Beach, MO, Web. October 21, 2015

**Optional**

*EBook: Strategic Planning and New Product Development*, Tillman, Frank A., Cassone, Deandra T., Financial Times Press/Pearson Education, Upper Saddle River, NJ, Web. May 31, 2012.

*EBook: Investment Strategy for Product Development in the Aerospace Industry*, Tillman, Frank A., Cassone, Deandra T., Financial Times Press/Pearson Education, Upper Saddle River, NJ, Web. May 31, 2012.

**Video Conferencing Information**

Live participation online can be done through Zoom with the following links and information.

Join from PC, Mac, Linux, iOS or Android: <https://ksu.zoom.us/j/879289556>

Or iPhone one-tap (US Toll): +14086380968,,879289556# or +16465588656,,879289556#

Or Telephone:

Dial: +1 408 638 0968 (US Toll) or +1 646 558 8656 (US Toll)

Meeting ID: 879 289 556

International numbers available: <https://ksu.zoom.us/zoomconference?m=70C6wcSWEljdRWmNPbr8k46LoEgVnnjE>

Or Skype for Business (Lync):

<https://ksu.zoom.us/skype/879289556>

**IMSE 991 Multiple Criteria Decision Making Schedule**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Date | Lecture | Topic | Reading Assignment | Homework Due | Project  Activity |
| August 21, 2017 | Intro/1 | Course Introduction | Chapter 1(Yoon)  Chapter 1-2 (Tillman/Cassone) | Email Bios |  |
| August 28, 2017 | 2 | Goals, Objectives and Decision Criteria | Chapter 2 (Yoon)  Chapter 5 (Tillman/Cassone) |  |  |
| September 4, 2017 |  | ***Labor Day – <No Class>*** | Watch Video Lectures – Dr. Frank Tillman |  |  |
| September 11, 2017 | 3 | Metrics and Data Analysis | Chapter 2 (Yoon) Chapter 7 (Tillman/Cassone) |  |  |
| September 18, 2017 | 4 | Non-Compensatory Methods | Chapter 3 (Yoon) | HW #1 |  |
| September 25, 2017 | 5 | Analytic Hierarchy Process | Chapter 2 (Ishizaka) |  | Team Project - First Presentation |
| October 2, 2017 | 6 | Multi-Attribute Utility Theory  and MACBETH | Chapter 4 and 5 (Ishizaka) |  |  |
| October 9, 2017 | 7 | TOPSIS and SAW | Chapter 3 (Tillman/Cassone) Chapter 5 (Yoon) | HW #2 |  |
| October 16, 2017 | 8 | ***Midterm Exam <No Class>*** |  | Midterm Exam |  |
| October 23, 2017 | 9 | PROMETHEE | Chapter 6 (Ishizaka) |  |  |
| October 30, 2017 | 10 | ELECTRE | Chapter 7 (Ishizaka) |  | Team Project – Second Presentation |
| November 6, 2017 | 11 | Strategic Planning and New Product Development | Case Study (Tillman/ Cassone) |  |  |
| November 13, 2017 | 12 | Investment Strategy for Product Development in the Aerospace Industry | Case Study  (Tillman/ Cassone) | HW #3 |  |
| November 20, 2017 |  | Thanksgiving – No class |  |  |  |
| November 27, 2017 | 13 | Value Based Budgeting/ Resource Allocation/ Sensitivity Analysis | Chapter 9  (Tillman/Cassone) |  |  |
| December 4, 2017 | 14 | Student Projects -  Final Presentation and Final Report |  |  | Team Project – Final Presentation |
| December 11, 2017 | 15 | *Final Exam<No Class>* |  | Final Exam |  |

**Team Project**

This course will have a team project. Teams for the team project will comprise two or more individuals. The team project will involve utilizing the techniques described in the class to model corporate decision making. The project will consist of the following elements.

Team Presentation #1

* Selecting a representative organization
* Providing an understanding of the operating environment
* Developing corporate goals, decision criteria and metrics
* Developing an importance weighting for the objectives and decision criteria

Team Presentation #2

* Selecting a multiple criteria decision making method to solve a corporate problem
* Developing alternatives for analysis
* Developing data to support the model
* Running the multiple criteria decision making model

Team Presentation #3

* Performing sensitivity analysis
* Performing resource allocation with the ranked list of alternatives
* Providing the recommended solution and associated rationale.

The team project will be divided up onto three presentations so that the instructor and class can provide feedback on the class projects. A summary of the project presentations are given below with additional instruction provided in class.

**Presentation 1**: The team presentation will consist of developing a realistic set of objectives, decision criteria and metrics, weighting those objectives, an assessment of key components of the operating environment and presenting the results to the class. This team presentation should not exceed 15 minutes per team.

**Presentation 2:** The team presentation will consist of selecting a multiple criteria decision making method to solve the problem, developing the alternatives for the analysis, developing the data to support the model and running the multiple criteria decision making model. This team presentation should not exceed 15 minutes per team.

**Presentation 3**: The team presentation will build on the previous presentations and include new information on sensitivity analysis, performing resource allocation with the ranked list of alternative and providing the recommended solution for the project. It will provide an overview of the fully developed project based. This team presentation should not exceed 30 minutes per team.

**Final Report:** The team should produce a final report which aligns with the three project presentations and the elements listed for the team project.

**Submission Requirements**

1. Submit to Canvas documents labeled “**IMSE\_991\_WillieWildcat\_Hw1.doc**” or similar.
2. For analytical exercises on homework and exams, **please show your work** and highlight your final answer.
3. For open-ended response questions, **please demonstrate understanding** by offering interpretations as well as recitation of facts.

**Miscellaneous**

1. Homework assignments, lecture notes, solutions, and grades will be posted in Canvas
2. **Assignments must be submitted prior to the start of class on the due date.**
3. **Presentations must be submitted at least 1 hour prior to the start of class.**
4. Archived lectures will be available for viewing via Canvas
5. Classroom participation is encouraged!

**Honor and Integrity Statement**

Kansas State University has an Honor & Integrity System based on personal integrity which is presumed to be sufficient assurance in academic matters one's work is performed honestly and without unauthorized assistance. Undergraduate and graduate students, by registration, acknowledge the jurisdiction of the Honor & Integrity System. The policies and procedures of the Honor System apply to all full and part-time students enrolled in undergraduate and graduate courses on-campus, off-campus, and via distance learning.

A component vital to the Honor & Integrity System is the inclusion of the [Honor Pledge](http://www.k-state.edu/honor/honorsystem/pledge.htm) which applies to all assignments, examinations, or other course work undertaken by students. The Honor Pledge is implied, *whether or not* it is stated: **"On my honor, as a student, I have neither given nor received unauthorized aid on this academic work."**

The default in this class is that ALL work will be accomplished individually, UNLESS my permission is given in advance of an assignment/quiz/exam/take-home exam/final. If you are in doubt, please ask

A [grade of XF](http://www.k-state.edu/honor/faculty/xfagree.html) can result from a breach of academic honesty. The F indicates failure in the course; the X indicates the reason is an Honor Pledge violation.

For more information, visit the Honor & Integrity System home web page at: <http://www.k-state.edu/honor/>

**Students with Disabilities**

Students with disabilities who need classroom accommodations, access to technology, or information about emergency building/campus evacuation processes should contact the Student Access Center and/or their instructor.  Services are available to students with a wide range of disabilities including, but not limited to, physical disabilities, medical conditions, learning disabilities, attention deficit disorder, depression, and anxiety.  If you are a student enrolled in campus/online courses through the Manhattan or Olathe campuses, contact the [Student Access Center](http://www.k-state.edu/accesscenter/) at [accesscenter@k-state.edu](mailto:accesscenter@k-state.edu?subject=Student%20Accommodation), 785-532-6441; for Salina campus, contact the [Academic and Career Advising Center](http://salina.k-state.edu/acac/index.html) at [acac@k-state.edu](mailto:acac@k-state.edu?subject=Student%20Accommodation), 785-826-2649.

**Statement Defining Expectations for Classroom Conduct**

All student activities in the University, including this course, are governed by the [Student Judicial Conduct Code](http://www.k-state.edu/sga/judicial/) as outlined in the Student Governing Association [By Laws](http://www.k-state.edu/sga/documents/sgadocs/ByLaws.pdf), Article V, Section 3, number 2. Students who engage in behavior that disrupts the learning environment may be asked to leave the class.

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