Uncertainty, Data and Judgment

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COURSE OBJECTIVES

Regardless of the setting, management decisions are necessarily made under conditions of uncertainty. This course introduces a framework for thinking about problems involving uncertainty and, building on this framework, develops some tools for interpreting data. While some technical analysis is essential, the course material is developed and presented from the perspective of a future manager, rather than from the viewpoint of a technician. The goal is to provide an appropriate foundation in probability and statistics for subsequent courses at INSEAD and for a management career later on.

CLASS FORMAT

The course is conducted as a series of lectures, exercises and case discussions. Computer software is used in the lectures and cases as a tool for doing computations and for plotting and analysing data.

READINGS

Some chapters of the manuscript Basic Statistics: A User Oriented Approach (by S. Makridikis and R.L. Winkler) are included in your course packet, along with some other supplementary readings from other books and business periodicals. At various times during the term additional handouts will be distributed. You should read the assigned material (listed in the course outline) before coming to class.

EXERCISES

The material for this course cannot be effectively mastered by only reading and listening in class. These are necessary but not sufficient activities. The course packet also includes exercises for most sessions (only Sessions 1, 11, and 16, have no assigned exercises). You are strongly recommended to attempt the exercises assigned for a session prior to that session. In each session, you may be randomly called upon to solve some of the exercises in class. Solutions to these exercises will be posted on the course web-site after each the session.

CASES

Short cases have been assigned for some of the sessions (given in the course outline). These cases are more like longer versions of the exercises and typically involve only a page or two of text. The purpose is to give realistic settings without overwhelming you with artificial complexity. In many of the cases, the questions may appear to be somewhat open-ended. The effort in preparing a case should be focused not so much on finding a precise answer as on appropriately understanding the particular statistical situation or problem. You should expect to be called upon to lead a discussion and you should pay
careful attention to the comments in class. The cases may provide background settings for questions in the final exam.

GROUP ASSIGNMENTS

Two group assignments (for Session 10 and session 13) will not be graded. Groups will be randomly called upon to present their solutions. The third assignment is due in Session 16 and is based on the case Harmon Foods. This assignment will be graded and a few groups will be randomly called upon to present their solution in class. Solutions to these assignments will be discussed at the end of each session.

TUTORIALS

There will be a teaching assistant for the course, Michele Hibon, who will organize tutorial sessions throughout the term to assist you in keeping up with the class, if deemed necessary by you. For example, if after a particular session, you feel that you might require additional tutoring on the concepts discussed in class and associated exercises, please feel free to attend one of the sessions she proposes. More on this will be explained during the course. This set-up, of course, does not preclude you from approaching me outside the class and you should feel free to contact me whenever necessary.

GRADING

Grades will be based on the following:
Group assignment  10%
Class Participation  10%
Final Exam     80%

Although class participation grades are inevitably subjective and imprecise, they are not given randomly. Being prepared in terms of the assigned readings, cases, and exercises will, for example, help in class participation.

COURSE PACKET

The course packet includes the following:

1  Chapters from:
   Basic Statistics: A User Orientated Approach, (Manuscript), S. Makridakis and R. L. Winkler. (called BS in the course outline)
   Forecasting Methods for Management (5th Edition), S. Makridakis and S. Wheelwright. (called FMM in the course outline)
2  Cases mentioned in the course outline below.
3  Exercises for most sessions.
4  Statistical tables (given at the end of the course packet).
5  Some miscellaneous handouts.

OPTIONAL REFERENCES

In addition to the course packet, the following may be useful:
   How to Lie with Statistics, D. Huff, 1993
These books are available at Footnote.
COURSE OUTLINE

SESSION 1
Presentation of Data
Manipulation of Statistics
Read: Chapter 2 in BS
    "They Play to Win", Forbes
Case: How Much to Ask (A)

SESSION 2
Summarizing Data
Read: Chapter 3.1 to 3.3, and 3.6, in BS
    "In Plato's Cave", The Economist
Exercises: Set 2
Case: Risk and Return of Commodity Funds

SESSION 3
Cognitive Processes in Judgments
Random Variables and Probability Distributions
Binomial Distribution
Read: Chapter 5.1 and 5.2 in BS
    "Getting the Goat," The Economist
    "Mug's game," The Economist
    "Living Dangerously," The Economist
    "Freud, Finance and Folly," The Economist
Exercises: Set 3

SESSION 4
Poisson and Normal Distributions
Read: Chapter 5.3 and 5.4 in BS (in the reading for Session 3)
    "Too clever by half", The Economist
Exercises: Set 4

SESSION 5
Functions of Random Variables
Covariance and Correlation
Read: Note on Covariance, Correlation, and Linear Functions of random variables
Functions of a Random Variable
Exercises: Set 5
Case: Eurocomp Inc.

SESSION 6
Sampling and Accuracy of Samples
Estimation with Large Samples
Read: Chapter 3.4 in BS (see the reading for Session 2)
    Chapters 7 and 8 in BS
Exercises: Set 6

SESSION 7
Estimation with Large Samples (continued)
Read: Re-read Chapter 8 in BS
    "Science Brief," The Economist
Exercises: Set 7
Film: The Five-Edge Razor
SESSION 8
Estimation with Small Samples
Read: Chapter 9 in BS
Exercises: Set 8

SESSION 9
Hypothesis Testing (about Means)
Read: Chapter 11.1 to 11.4 in BS
“Trampling Science in a Rush to Judgment,” Business Week
Exercises: Set 9

SESSION 10
Hypothesis Testing (about Means, continued, and about Proportions)
Read: Chapter 11.5 and 11.6 in BS (see the reading for Session 9)
Exercises: Set 10
Case: Loyalty Scheme Direct Mail Campaigns Case
Be ready to present in class; nothing to turn in.

SESSION 11
Simple Regression Models
Read: Chapter 8 in FMM

SESSION 12
Multiple Regression Models
Read: Chapter 9 (up to page 191) in FMM
"Can Math Predict a Wine?", International Herald Tribune
Optional reading: “Red Wines of Medoc: What is Wine Tasting Worth?”
Exercises: Set 12

SESSION 13
Multiple Regression: Creating Models
Exercises: Set 13
Case: Firing an Expert
Be ready to present in class; nothing to turn in.

SESSION 14
Testing the Validity of Regression Models
Read: Chapter 9, p. 191 onwards, FMM (see reading for Session 12)
Exercises: Set 14

SESSION 15
Regression: Transformations
Time Series and Spurious Correlations
Optional reading: "Transformations in Regression"
Exercises: Set 15

SESSION 16
Applying Regression
Due: Group assignment on Harmon Foods, Inc.
Case: Harmon Foods, Inc. (report due at the beginning of the session)
Be ready to present solution in class.
Wrap-up and general overview of the course.
Enrico Diecidue graduated in Economics from Bocconi University, Italy, in 1996 with a specialization in Mathematical Economics. He then joined the CentER (Center for Economic Research), Tilburg University, The Netherlands, where he received his Ph.D. in 2001. Since 2001 he has been a resident faculty member at INSEAD, except for 2008-2009 when he was a Visiting Professor at Wharton and 2010-11 when he was on sabbatical at the Erasmus School of Economics (The Netherlands). His main research interests are in individual decision making under uncertainty, health decisions, and experimental economics. He is interested in the role of regret, aspiration levels, and time in individual decisions. His current research is also addressing the role of groups in complex decisions. Enrico’s research has appeared in leading journals including *Decision Analysis*, *International Economic Review*, *Journal of Economic Theory*, *Journal of Mathematical Psychology*, *Journal of Risk and Uncertainty*, *Management Science*, *Mathematical Social Sciences*. He is in the Editorial Board of *Journal of Risk and Uncertainty* and Associate Editor for *Decision Analysis*.

He regularly gives talks and consults for a number of organizations in the area of Decision Making Processes. He teaches Uncertainty, Data & Judgment (MBA, EMBA), Management Decision Making (MBA), Risk Management (MBA), Executive modules on decision making and risk management (EDP), and Decision Sciences (Ph.D.). He has won teaching awards at INSEAD and Wharton. His personal interests are in reading, sport, music, and traveling.