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# COURSE SYLLABUS

## BUSINESS SIMULATIONS

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### INTRODUCTION

As an introduction to the world of business simulations, the expedited version of the course will serve the objective of providing a very good introduction treatment of all the important aspects of a simulation study including modeling, model verification, input modeling, random number generators, simulation software, statistical design and analysis of simulation experiments.

### COURSE DESCRIPTION

It is **not** a typical theoretical course where only slides will be covered. The goal is to build models and analyze given ones. It is a **highly hands-on course** where students (as well as instructor!) will be analyzing business scenarios and constructing working simulation models.

Simulation while not an easy exercise in any manner, is a very important method to test what-if scenarios in a world where uncertainty is the norm of the situation. In a world where services are gaining more and more prominence, simulation exercise becomes the only method to experience reality without actually doing it – production area has already benefited long from the method. Think about the popularity of reality shows on TV – how those have changed our take on entertainment. Similarly, simulation is the reality show of “business process world” without actually investing in them.

ExtendSim ([www.ExtendSim.com](http://www.ExtendSim.com)) will be the primary tool of simulation modeling. Other tools like Simul8 ([www.Simul8.com](http://www.Simul8.com)) will be discussed as needed.

Some overall questions will span the general class theme. For any given challenge,

- How to model the given system
- What data and knowledge about the data exist and what are the constraints
- How to analyze the output for model validation
- How to suggest improvements from the model and its behavior

### STUDENT LEARNING OUTCOMES

At the conclusion of the course the student should have:

- Gain an understanding of integrating business management principles and practice the theory in an interdisciplinary environment
- Develop skills that are necessary to solidify a business situation using what-if scenarios
- Obtain the knowledge and skill to analyze a business process – not just at high-level
- Work as a member of a team in completing everyday business tasks and making decisions relating to the overall operation of the business and growth of the business
- Apply critical thinking and problem solving skills in a rapidly evolving environment
- Develop the skills necessary to effectively participate in primary business function:
  - Human Resources
  - Operations
  - SCM
  - Marketing/Sales
  - Finance
  - Services

## COURSE MATERIAL

- **Text:** Business Process Modeling, Simulation and Design, Manuel Laguna, Johan Marklund , 2004, Prentice Hall
- **Reference:** Simulation Modeling and Analysis, Averill M. Law, 4th Edition, 2008, Tata McGraw
- **Additional Reading Material/Models/Cases:** These will be shared online or in the class

## TENTATIVE SESSION PLAN

SESSION	CONTENT	READING
<b>MODULE A – BUSINESS VALUE AND SIMULATION</b>		
1	Introduction/course outline Business Value of Process Reengineering Reengineering, Scenarios and Simulation Why Simulation?	TEXT Chapter 1/2
2	Simulation-based Framework Simulation and Queuing Systems Practice with Existing Model of an Inventory System Theory Connects with Practice	TEXT Chapter 3/4/5/6 USER GUIDE
<b>MODULE B –TYPES OF SIMULATION MODELS AND BUSINESS ANALYSIS</b>		
3	Continuous Simulation Models Random Variables Relevant Case Studies Assignment #1 – Build and Analyze a Model Practice Simulation with ExtendSim	TEXT Chapter 7/8/9 USER GUIDE
4	Discrete Simulation Models Probability Distributions Relevant Case Studies Assignment #2 – Build and Analyze a Model Practice with ExtendSim	TEXT Chapter 7/8/9 USER GUIDE
<b>MODULE C – MODELNG COMPLEX SYSTEMS</b>		
5	Steps in a Simulation Study System Complexity – Case Studies Assignment #3 – Build and Analyze a Model How Complex It Can Get	TEXT Chapter 7/8/9 USER GUIDE
6	Other Types of Simulation Revisit Business Value and Simulation Assignment #4 – Build and Analyze a Model Practice with ExtendSim	TEXT Chapter 7/8/9 USER GUIDE
<b>MODULE D – ADVANCED TOPICS</b>		
7	Sensitivity Analysis Scenario Analysis Observe What Simulation Can Do	TEXT Chapter 7/8/9 USER GUIDE
8	Wrap-up In-class Assignment Analyze a Given Business Model	

Obviously, the division of sessions over the allotted classes will depend on our speed and mutual clarity on what we are able to learn. As a deliberate effort, I would include more models if class prefers – this increases interaction in the class.

Every class session, the theory will be followed up by extensive hands-on modeling exercises for

various business situations.

## EVALUATION

Tentatively, the overall grade will be based on the following four components:

Class participation	20%
Mid-term	20%
Assignments	20%
Final	40%

We will discuss and finalize the distribution and requirements in the first class.

## ACADEMIC INTEGRITY

Any breach of integrity sensed by the instructor may result in a Fail grade for the class – the decision will be final in such cases.

## CLASS PARTICIPATION

**Heaviest possible interaction through hands-on modeling will be the learning method in this class.** Pedagogically, this course will rely very heavily on experiential learning built around the following elements: class discussion of models, thought sharing, and video supplements. For the course to be useful to you, it is essential that, besides reading assigned chapters/articles from the book and the conceptual articles, you come to each class well prepared to discuss your analysis of the assigned material. I would strongly encourage active class participation.

- My experience has been that students generally tend to under - (rather than over) estimate the worth of what they have to say. Thus, if you are ever in doubt, I would encourage you to participate rather than to keep quiet.
- Note that probing questions are as useful a form of class participation as presentations of logical analyses.
- Finally, needless to add, the quantity of your class participation would count positively only if the substantive quality of your comments and/or questions adds value to the class discussions.

## ATTENDANCE POLICY

A very significant portion of your learning is likely to take place in the classroom as you participate in and listen to conceptual discussion and model/case analyses. Therefore, it is essential that, barring a job-related or personal crisis, each student attend every class. In case of any such exigencies, you must let me know either ex-ante or ex-post. Also, please note that if you miss more than two classes – for any reason – you run the risk of getting an “incomplete” grade in the course.

## **SPECIAL NEEDS**

Given this is an expedited version of the course, any student with special needs should bring this to the attention of the instructor as soon as possible, but not later than the first week of class.