SCUPI
Sichuan University - Pittsburgh Institute

IE 1082 – Probabilistic Methods in Operations Research
Spring 2019
Course Syllabus

Instructor
Dr. Surya D. Liman (email: surya.liman@scupi.cn)
Office: 4-220
Office Hours: Tuesdays and Thursdays, 10:15 AM – 11:45 AM

Teaching Assistant
TBA
Office:
Office Hours:

Lecture
Tuesday and Thursday, 3:40 PM - 5:10 PM; Room: Zone 4-201

Catalog Course Description
Introduction to probabilistic methods in Operations Research. Models include game theory; decision analysis; stochastic decision modeling techniques including discrete-time Markov chains, continuous-time Markov chains; and queuing theory. 3 credit hours.

Course Pre-Requisites
MATH 0240, MATH 0280, IE 1070, IE 1081.

Course Objectives
1. To acquaint students with probabilistic analytical/OR modeling techniques that can be used to support various optimal decision making,
2. To give students experience in building models, deriving solutions and analyzing results through some case studies and assigned homework exercises.

Applicable ABET Outcomes
1. An ability to apply knowledge of mathematics, science and engineering.
2. An ability to design and conduct experiments, as well as analyze and interpret data.
3. An ability to identify, formulate and solve engineering problems.
4. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Textbook
Hillier, F.S. and Lieberman, G.J. (2015, 10th Edition), *Introduction to Operations Research*, McGraw-Hill Education, New York, New York, USA.

Assessments

Homework assignments, projects, and exam questions related specifically to the objectives above.

Attendance:	10 %
Homeworks & Assignments:	20 %
Mid-Semester Examination:	30 %
Final Examination:	40 %
	100 %

Score	Letter Grade
90.00 – 100.00	A
85.00 – 89.99	A–
80.00 – 84.99	B+
76.00 – 79.99	B
73.00 – 75.99	B–
70.00 – 72.99	C+
66.00 – 69.99	C
63.00 – 65.99	C–
61.00 – 62.99	D+
60.00 – 60.99	D
0.00 – 59.99	F

Attendance

There are 26 90-minute lecture periods in the semester. Attendance will be taken for each lecture period. Each student is allowed **three absences**. Each absence, after the third absence, will result in a **1% deduction** from the attendance grade. After the **thirteenth** absence, the student will **not** be allowed to take the final exam.

Homework and Other Assignments

Homework problems and other assignments will be assigned periodically and are due as stated. Late submission **will not** be accepted. Submissions must be done on **A4 papers** and **stapled** together at the top left-hand corner. Students' names and ID numbers must be listed on the first page at the top right-hand corner.

Exams

There will two exams, all are CLOSED BOOK, CLOSED NOTES, CLOSED COMPUTER. Students are allowed to bring one A4 page note and it must be hand-written on one side of the paper only. It cannot be a photo copy. If you must miss an exam, you should make alternative arrangements with the instructor before the exam is given. If you miss an exam without prior notification, you will receive a score of "zero" for that exam except under extenuating circumstances.

Make-Up Exams

Students who have not taken both mid-semester and final exams are not eligible for make-up exams. Make-up exams can only be taken by students who have attained between 50.00 % and 59.99 % (out of 100 %) of the total score. Only 75 % of the make-up exam grade can be used to **replace** the final exam grade. Students taking make-up exams can only attain at most a "**D**" grade.

Avoiding Plagiarism

1. Unacknowledged direct copying from the work of another person, or the close paraphrasing of somebody else's work, is called plagiarism and is a serious offence, equated with cheating in examinations. This applies to copying both from other students' work and from published sources such as books, reports or journal articles.
2. Paraphrasing, when the original statement is still identifiable and has no acknowledgement, is plagiarism. A close paraphrase of another person's work must have an acknowledgement to the source. It is not acceptable for you to put together unacknowledged passages from the same or from different sources linking these together with a few words or sentences of your own and changing a few words from the original text: this is regarded as over-dependence on other sources, which is a form of plagiarism.

SCUPI
Sichuan University - Pittsburgh Institute

Tentative Course Schedule

Week	Day	Dates	Topics	Chapter
1	Tue	Feb 26	Course Introduction and Review of Syllabus Review of Probability and Random Variables	24
	Thu	Feb 28	Review of Probability and Random Variables	24
2	Tue	Mar 5	Game Theory – Two-Person, Zero-Sum Games	15
	Thu	Mar 7	Game Theory – Games with Mixed Strategies	15
3	Tue	Mar 12	Game Theory – Graphical Solution	15
	Thu	Mar 14	Game Theory – Using Linear Programming	15
4	Tue	Mar 19	Decision Analysis – Prototype Example	16
	Thu	Mar 21	Decision Analysis – Decision Making without Experimentation	16
5	Tue	Mar 26	Decision Analysis – Decision Making with Experimentation	16
	Thu	Mar 28	Decision Analysis – Decision Trees	16
6	Tue	Apr 2	Decision Analysis – Utility Theory	16
	Thu	Apr 4	Review	
7	Tue	Apr 9	MID-TERM EXAM	
	Thu	Apr 11	Queuing Theory – Basic Structure	17
8	Tue	Apr 16	Queuing Theory – Role of Exponential Distribution	17
	Thu	Apr 18	Queuing Theory – Birth and Death Process	17
9	Tue	Apr 23	Queuing Theory – Priority Discipline	17
	Thu	Apr 25	Queuing Theory – Queueing Networks	17
10	Tue	Apr 30	Markov Chains – Stochastic Processes	29
	Thu	May 2	Markov Chains – Chapman-Kolmogorov Equations	29
11	Tue	May 7	Markov Chains – Classification of States	29
	Thu	May 9	Markov Chains – Long-Run Properties	29
12	Tue	May 14	Markov Chains – First Passage of Times	29
	Thu	May 16	Markov Chains – Absorbing States	29
13	Tue	May 21	Markov Chains – Continuous Markov Chain	29
	Thu	May 23	Review	
14	Tue	May 28	FINAL EXAM	