Course number			
情411			
Year	Time of starting a course	Day period	Faculty
2016	Fall	Fri.3	EngineeringInformation Engineering
Lecture code	Subject name[English]		Number of credits
60102200	シミュレーション		2
Charge teacher name[Roman alphabet mark]			
アシャリフモハマッド			

Course content and methods

In this lecture, it is aimed to show how different real world systems could be modeled in a digital computer before making them he system could be an economic or physical or even a society with definite reaction rules. Therefore, it will be easy to study the b avior of the system, no matter what is the area to be study, simulation helps to model the system in a different environments. Fo esign engineers, managers, or for developing a hospital or hotel or to build a highway etc.all jobs and the persons who are respo ble for establishing a new infrastructure, need to know the behavior or side reactions of the new developing system. Simulation is n easy tool to access to virtual reality before having and touching the real system.

Goals and objectives

・ To understand simulation model, Discrete-Event Simulation (DES), time-advance mechanism in simulation.
・ To analysis single-sever queuing system and job-shop machine in order to evaluate the system from three points of view 1) Av age Delay in Queue. 2) Average Number of Customers in Queue. 3) Machine Utilization.
・ To understand Monte Carlo simulation method to solve different problems.
・ To get familiar with basic theory of probability & random variables.
・ Algorithms for generation uniform & non-uniform random variables in simulation.
・ To use variance reduction techniques in simulation.
・ To know about object oriented simulation languages.

Evaluation criteria and evaluation methods

Quiz 10%+Practical Simulation Work 30%+ Midterm 30%+ LastExam. 30%

Course conditions

Numerical Analysis, Computer Programming

Contents of Class

1)The nature of simulation, system, model and simulation.
2)Discrete-event simulation (DES), time-advance mechanisms.
3)Components of a DES model, Simulation of single-server queuing system.
4)Steps in a simulation study.
5)Monte Carlo and other type of simulation, other examples. Buffen's Needles Problem
6)Random variables, c.d.f., p.d.f., Joint and Marginal p.d.f. Geometric, Binomial
7)Poisson, Uniform, Normal, Exponential, Gamma, Chi-Square, Laplace,Logistic,Cauchy, Beta distributions, New random variables r old.
8)Mid -Term Examinations
9)Multidimensional random variables, Jacobian, Convolution.
10)Generating uniform random variables, Dice and machines, Pseudo-Random Numbers
11)Congruential pseudo-random number generators. Chaos System.
12)Particular method for non-uniform random variables.
13)General method for non-uniform random variables.
14)Monte Carlo Integration and Variance Reduction Techniques.

15)Simulation Softwares.
16)Last-Term Examination.

Prior learning

1-Students must study the text book and understand it.
2-Students should perform 3 simulations and submit them.
3-Students should solve some example problems to understand how to answer the examinations.

Post learning

1- After each class students should study the text book in order to understand the class.
2- After training the simulation, students should perform simulation with different conditions.
3- Students should practice each chapter problems to understand its result.

Textbook

Text book	Title	Simulation Modeling & Analysis by Averill M . Law W.David Kelton 1991 by McGraw-Hill Inc.		ISBN	9780071255196	Note	
	Author						
	Publishing company		Publishing year	NCID			
Text book	Title	Also see: http://www.mhhe.com/engcs/industrial/lawkelton/		ISBN		Note	
	Author						
	Publishing company		Publishing year	NCID			
Text book	Title	Elements Of Simulation by Byron J.T.Morgan 1995, Chapman& Hall		ISBN	0412245906	Note	
	Author						
	Publishing company		Publishing year	NCID			

Textbook Remarks

References

Reference book Remarks

Language

English

Message

The aim of this course is to read English textbook and could simulate different system in reality.
The result of simulation should be as near as possible to the result of real world.

Office Hours

Tues: 3:00-5:00, Fri:3:00-5:00

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ura.ie.classes.simulation, asharif@ie.u-ryukyu.ac.jp

URL

http://www.ie.u-ryukyu.ac.jp/~asharif/pukiwiki/index.php