【Course Title】 Social Systems Modeling

【Credits】2-0-0

【Lecturer】
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【Aims and Requirements】
Mathematical modeling methods and mathematical analysis methods for social systems are presented through lectures and exercises. This course covers definitions, examples and analysis methods of games in normal form, games in extensive form, option forms, graph models, simple games, games in characteristic function form, and so on, as models for analyzing decision making situations. Methods of coalition formation analysis and relation analysis are also introduced.

Students are required to submit three reports: a report on the background and the detail of a real-world decision making situation (Background Report), that on the model of the situation (Model Report) and that on the analysis of the situation (Analysis Report). Also, they are required to give a poster presentation based on these reports at the end of the term.

This course aims to cultivate the students' abilities to: select an appropriate model for analyzing a focal decision making situation; describe a real-world decision making situation by a model; analyze the model and take out some insights on the situation from the results of the analysis; convey the analysis results to others concisely.

【Schedule and Class room】
Every Thursday, 15:05-16:35, Room W936

Week 1 (Oct. 3): Lecture plan, Preliminaries on mathematical symbols, Classification of decision making situations
Week 2 (Oct. 10): Competitive decision making situations 1: Games in normal form
Week 3 (Oct. 17): Competitive decision making situations 2: Games in extensive form with perfect information
Week 4 (Oct. 24): Competitive decision making situations 3: Games in extensive form with imperfect information
Week 5 (Oct. 31): Competitive decision making situations 4: Option forms
The deadline for submitting Background Report
Week 6 (Nov. 7): Feedback on Background Report
(No class on Nov. 14)
Week 7 (Nov. 21): Competitive decision making situations 5: Graph models
Week 8 (Nov. 28): Social decision making situations 1: Simple games and committees
Week 9 (Dec. 5): Social decision making situations 2: Games in characteristic function form
Week 10 (Dec. 12): Advanced Analysis Methods 1: Coalition analysis of competitive decision making situations
The deadline for submitting Model Report
Week 11 (Dec. 19): Feedback on Model Report
Week 12 (Jan. 9): Advanced Analysis Methods 2: Attitude analysis of competitive decision making situations
(No class on Jan. 16 (Monday classes will be given))
Week 13 (Jan. 23): Advanced Analysis Methods 3: A mathematical model of consensus building
Week 14 (Jan. 30): Presentations
Week 15 (Feb. 6): Presentations
The deadline for submitting Analysis Report

【Evaluation】
Evaluation will be based on three reports (20% each), presentation (20%), and poster (20%)

【Comments from the lecturer】
Prospective students should be familiar with mathematical expression and analysis and have interests in social problems.

This course is designated as one of the elective courses for the Education Program for Consensus Building (http://www.ipcob.org/course/), for the Education Program for Service Innovation (http://www.service-i.titech.ac.jp/), and for the Education Program for Science of Policy for Science & Technology. The students are recommended to be enrolled in at least one of these Education Programs. Detailed explanations on the enrollment in these courses can be found in each web site. Contact courses_at_valdes.titech.ac.jp for more inquiry.