

# Interactive Decision Theory

<b>Course</b>	Interactive Decision Theory, 41.7002 (German: Interaktive Entscheidungstheorie, 41.5038)
Allocation at h_da	MSc <i>Computer Science</i> , MSc <i>Data Science</i> , MSc <i>Applied Mathematics</i>
Responsibility	Prof. Dr. Oliver Skroch
Language	English
<b>Content</b>	<ul style="list-style-type: none"><li>— Preliminary basic concepts</li><li>— Extensive form, strategic form, mixed extension</li><li>— Equilibrium approach, maximin principle</li><li>— Non-cooperative scenarios<ul style="list-style-type: none"><li>- Two-person zero-sum conflicts</li><li>- Bimatrix scenarios</li></ul></li><li>— Cooperative scenarios<ul style="list-style-type: none"><li>- Two decision-makers</li><li>- More than two decision-makers</li></ul></li></ul> <p>(Knowledge of non-interactive decision theory is an advantage, but no prerequisite.).</p>
<b>Learning objectives</b>	<p>The course deals with interactive decision situations in which two or more rational (or rather, intentionally rational) decision-makers each pursue their own economic interests. Such situations occur in almost all practically significant conflict scenarios in business informatics, but also e.g. in economics or politics. Well known examples include auctions (mobile network frequencies, auction portals on the Internet) or, the development of relationships in social networks.</p> <p>Students should be able to</p> <ul style="list-style-type: none"><li>— recognize, understand and be able to critically discuss how the consequences of decisions of each party also depend on the decisions of the others, while everyone pursues their own goals, which can lead to conflicts,</li><li>— classify and formally describe different interactive decision scenarios that occur in practice,</li><li>— apply models and methods proposed by interactive decision theory to typical example scenarios,</li><li>— develop the ability to recognize the possibilities and limitations of the theory on the basis of numerous, application-oriented examples,</li><li>— critically discuss the problem of how “rational decision-making” and “optimal decisions” can be defined and adequate solutions identified.</li></ul>
<b>Type, weekly hours, credit points</b>	90 min. lecture per week + 90 min. practical per week, 6 CP; seminar-style lecture, accompanying lecture notes, practical in small workgroups, exercises with solution hints
<b>Exam</b>	Written end-term exam, graded, 90 minutes duration
Prerequisite	Successful participation in the exercises is a preliminary exam performance (not graded, exercise tasks, development or design tasks)
Registration	Explicitly required for the exam, in addition to the course registration
<b>Literature</b>	<p>Aumann R, Maschler M: „Some Thoughts on the Minimax Principle“. <i>Management Science</i>, (18) 5-II, 54-63 (1972).</p> <p>Bamberg G, Coenenberg A, Krapp M: <i>Betriebswirtschaftliche Entscheidungslehre</i>, 16th rev. ed. Munich (2019). (in German)</p> <p>Holler M, Illing G, Napel S: <i>Einführung in die Spieltheorie</i>, 8th ed. Berlin et al. (2019). (In German)</p> <p>Luce RD, Raiffa H: <i>Games and Decisions: Introduction and Critical Survey</i>. New York, New York, USA (1957), reprint: New York, New York, USA (1989).</p> <p>Nash J: „Non-cooperative games“. <i>Annals of Mathematics</i>, (54) 2, 286-295 (1951).</p> <p>Osborne M: <i>An introduction to game theory</i>. Oxford University Press, New York, New York, USA et al. (2009).</p> <p>von Neumann J, Morgenstern O: <i>Theory of Games and Economic Behavior</i>, 3rd ed. Princeton, New Jersey, USA (1953), 4th reprint of the „Sixtieth-Anniversary Edition“, Princeton, New Jersey, USA (2007).</p> <p>(Further literature will be discussed during the course.)</p>