

## Further Topics in Statistics and Probabilities

Christina Katt-Pawlowitsch

---

Classes start the second week of the semester.

Group Collège d'Économie:  
Wednesday, 16h–19h00  
Centre Assas, room 401.

Group CMI EFiQuaS:  
Thursday, 16h–19h00  
Centre Assas, room 401.

---

**Content.** In this class, we will review the fundamental concepts of probability theory and apply them to problems in mathematical economics. We will in particular discuss models of interactive knowledge and belief revision as they have been introduced by Robert Aumann's article "Agreeing to disagree" (1976).

**Competences.** Coherent mathematical reasoning; distinguishing formal proofs of arguments from interpretations; reading and discussing original research papers in English; preparing writing assignments and presentations on formal topics in English.

For our meetings in class you can bring:

- your notes from other, previous and current, classes on statistics ("Statistique 2" second semester of last year, and current course "Statistique 3") as well as any other books or lecture notes. You are allowed and encouraged to use this material for individual and group work in class.

Evaluation for this class is based on:

- your participation during the sessions, including individual and group work, presentations of written assignments, and
- a final written exam, which will take place in the second to last session of the course, (week 10 of the semester).

## Program

**Session 1:** Review: probability spaces

**Session 2:** Review: Bayes' Law

**Session 3:** Modeling information and beliefs about events: Aumann's 1976 model

**Session 4:** Aumann's (1976) result on common knowledge and agreement

**Session 5:** Bayesian Dialogues

**Session 6:** Communication via alternate bets

**Session 7:** Other extensions and applications of Bayesian dialogues

**Session 8:** Summary and conclusions

**Session 9:** FINAL EXAM

**Session 10:** Discussion of final exam

## References

- [1] Aumann, Robert J. 1976. "Agreeing to Disagree." *The Annals of Statistics* 4, 1236–1239.
- [2] Geanakoplos, John and Herakles Polemarchakis. 1982. "We can't disagree forever." *Journal of Economic Theory* 28, 192–200.
- [3] Sebenius, James K. and John Geanakoplos. 1983. "Don't bet on it : contingent agreements with asymmetric information." *Journal of the American Statistical Association* 78 (382), 424–426.
- [4] Savage, L. 1954. *The Foundations of Statistics*. New York: Wiley.
- [5] Pawlowitsch, C. 2020. *Dialogues Aumanniens*. Working Paper.
- [6] Williams, David. 1991. *Probability with Martingales*. Cambridge, UK: Cambridge University Press.