

Plano de Ensino – Quantitative Information Flow - 2026/2

Código	DCC 030 / 049 / 831
Disciplina	<i>Quantitative Information Flow (Fluxo de Informação Quantitativo)</i>
Turma	A definir
Professor (es)	Mário S. Alvim
Público	(x) alunos de graduação (x) alunos de pós-graduação

Pré-requisites: Knowledge of discrete mathematics (sets, functions, basic proof techniques) and of discrete probability (joint, marginal and conditional probabilities, expected value, Bayes theorem).

Language: This course will be taught in English.

Syllabus: Review of discrete probability and of Bayesian inference. Models of uncertainty, and measures of information. Definition and fundamental properties of concrete and abstract information channels, information flow, and robustness of information-flow assessments. Applications of quantitative information flow.

More information: <https://homepages.dcc.ufmg.br/~msalvim/courses/qif/qif-ad-2026-2.pdf>

Program

Lecture	Topic
01	Introduction: An overview of Quantitative Information Flow
02	Introduction to QIF
03	Modeling secrets
04	On g-vulnerability
05	On g-vulnerability
06	Channels
07	Channels
08	Posterior vulnerability and leakage
09	Posterior vulnerability and leakage
10	Posterior vulnerability and leakage
11	Spare class / Review
12	First exam
13	Robustness / Capacity
14	Capacity
15	Composition of channels
16	Composition of channels / Instructions about the seminar
17	Refinement
18	Refinement
19	Discussion about the seminar
20	The Dalenius perspective
21	The Dalenius perspective

22	Axiomatics
23	Applications: The Crowds Protocol
24	Applications: The Crowds Protocol
25	Spare class / Review
26	Second exam
27	Seminars
28	Seminars
29	Seminars
30	Make-up Exam

Bibliography

The Science of Quantitative Information Flow.

Mário. S. Alvim, Konstantinos Chatzikokolakis, Annabelle McIver, Carroll Morgan, Catuscia Palamidessi, Geoffrey Smith.
Springer International Publishing (2020).

Supporting material

Moodle (slides and supporting material)

Grading

1	First Exam	25 marks
2	Second Exam	25 marks
3	Seminar	25 marks
4	Problem Sets	25 marks