Specialization Certificates

Philosophy & Computer Science (P&CS)

Student advising handout for planning a coherent profile in the program.

The specialization certificate is intended to help students communicate a coherent thematic profile within the P&CS program. To obtain a certificate, students must complete 30 ECTS in courses relevant to the chosen specialization, at least 25 of which must come from specialization or advanced modules, and write a thematically relevant Master's thesis. Thematically relevant independent studies may count toward the 30 ECTS requirement. Note that all certificate applications are subject to approval by the examination board.

The Certificates at a Glance

Certificate	Orientation Philosophy CS	Guiding Question
Policy & Regulation	 philosophy-oriented	How should algorithmic systems be governed? What are good policy recommendations for different stakeholders?
Ethics of New Technologies	 philosophy-oriented	How should we evaluate the benefits and risks of algorithmic systems?
Intelligent Systems	 philosophy-leaning	What makes algorithmic systems systems intelligent and agentive?
Algorithmic Fairness	 interdisciplinary bridge	How can algorithmic systems be designed and evaluated with respect to fairness and justice?
Human-Centered AI	 interdisciplinary bridge	How can algorithmic systems be designed and explained so that they support human agency, collaboration, and responsible oversight?
Human–Computer Interaction	 CS-leaning	How should algorithmic systems be designed to be as usable and effective for human users as possible?
Data Analysis & Data Processing	 CS-oriented	How can data be prepared, analysed, interpreted, visualised, and processed responsibly and effectively?
Machine Learning & Computation	 CS-oriented	How can computational and machine-learning methods be developed and applied?

Note. The lists below are suggestions based on recent courses in the program. They are not binding study plans as course offerings vary from term to term. Students may propose an individual combination of courses, subject to review by the examination board.

Philosophical Specializations

IS Intelligent Systems

Profile. For students who want to analyse algorithmic systems with regard to intelligence, agency, autonomy, reasoning, cognition, and their effects on human practices and forms of life.

Plausible courses.

- AI, Robots, Superintelligence: Philosophy in Fiction
- Minds & Machines
- Human–AI Collaboration
- Intelligent User Interfaces
- Seeing You, Knowing You: Emotional Expression and Social Cognition
- Machine Explainability
- AI Alignment

PR Policy & Regulation

Profile. For students who want to focus on the governance of artificial systems in political, legal, institutional, and societal contexts.

Plausible courses.

- Political Philosophy
- Critical Data Studies
- AI and the Future of Work
- Ethics under Uncertainty
- Epistemic Injustice
- Algorithmic Fairness: Computer Scientific and Philosophical Challenges
- Australian and European Perspective on AI Governance and Digital Ethics
- Ethical and Legal Issues in IT Security Research
- International Political Economy
- International Cooperation
- Political Polarization: Concepts, Measures, and Data
- The Misinformation Age

ENT Ethics of New Technologies

Profile. For students who want to investigate the moral assessment of algorithmic systems: responsibility, fairness, autonomy, and other kinds of moral impacts.

Plausible courses.

- Machine Ethics
- Ethics
- Ethics under Uncertainty
- AI and the Future of Work
- Critical Data Studies
- Epistemic Injustice
- Ethical and Legal Issues in IT Security Research
- Algorithmic Fairness: Computer Scientific and Philosophical Challenges
- AI Alignment
- Impact Entrepreneurship – Developing Social and Ecological Innovations

Interdisciplinary Specializations

AF Algorithmic Fairness

Profile. For students who want to understand the conceptual, normative, and technical challenges of fairness in algorithmic systems.

Plausible courses.

- Algorithmic fairness: Computer Scientific and Philosophical Challenges
- Fairness in AI
- Critical Data Studies
- Machine Explainability
- Causal Inference
- Epistemic Injustice
- Ethics under Uncertainty
- Machine Ethics
- Applied Artificial Intelligence

HAI Human-Centered AI

Profile. For students who want to focus on how AI systems can be designed, explained, visualized, evaluated, and governed so that they support human agency, collaboration, and responsible oversight.

Plausible courses.

- Human AI Collaboration
- Intelligent User Interfaces
- Information Visualization
- Machine Explainability
- AI Alignment
- Machine Ethics
- Applied Artificial Intelligence
- Seeing You, Knowing You: Emotional Expression and Social Cognition
- Minds & Machines

Computer Science Specializations

ML Machine Learning & Computation

Profile. For students who want a technically oriented profile centred on algorithmic thinking, mathematical foundations, machine learning, modelling, inference, and computational problem-solving.

Plausible courses.

- Graph Processing and Machine Learning
- Machine Learning Methods in Healthcare
- Introduction to Machine Learning
- Reinforcement Learning for Scientists & Engineers
- Applied Artificial Intelligence
- Causal Inference
- Event Processing
- Foundations of Data Management
- Programming, Data Analysis and Deep Learning in Python
- Coding & Data Science with Python for All
- Mathematical Foundations I
- Mathematical Foundations II
- Data Analysis in R

DA Data Analysis & Data Processing

Profile. For students who want to build competence in preparing, analysing, interpreting, visualising, and processing data across empirical, statistical, and computational contexts.

Plausible courses.

- Data Modelling and Knowledge Generation
- Data Analysis in R
- Causal Inference
- Information Visualization
- Introduction to Computer Assisted Text Analysis (African Studies and AI)
- Process Mining I
- Process Mining II
- Foundations of Data Management
- Research Project Data Mining in Marketing with R and Python
- Event Processing
- Programming, Data Analysis and Deep Learning in Python

HCI Human–Computer Interaction

Profile. For students who want to understand the design, implementation, evaluation, and social effects of interactive algorithmic systems.

Plausible courses.

- Intelligent User Interfaces
- Human–AI Collaboration
- Information Visualization
- Seeing You, Knowing You: Emotional Expression and Social Cognition
- Hands-on-Exploration with Wearables for Physical and Mental Health
- Machine Explainability