Annex (PhD) – List of Courses in Clusters
(Clusters revised in Semester 2, AY2025/26; applicable to current PhD CS students)

1. Algorithms and Theory

CS5215 Constraint Programming
CS5230 Computational Complexity
CS5234 Algorithms at Scale
CS5236 Advanced Automata Theory
CS5237 Computational Geometry and Applications
CS5238 Advanced Combinatorial Methods in Bioinformatics
CS5275 The Algorithm Designer's Toolkit (Aug 2024)
CS5330 Randomized Algorithms
CS5430 Foundations of Modern Cryptography
CS5461 Algorithmic Mechanism Design (Aug 2021)
CS6209 Topics in Cryptography
CS6234 Advanced Algorithms
CS6235 Advanced Topics in Theoretical Computer Science
CS6281 Topics in Computer Science: Inference Algorithms in Deep Generative Models (Jan 2026)
CS6282 Topics in Computer Science: AI meets Science - Science-Inspired AI and AI for Science (Jan 2026)
CS6283 Topics in Computer Science: Trustworthy Machine Learning (Aug 2020)
CS6283 Topics in Computer Science: Computational Social Science
CS6283 Topics in Computer Science: Logic in AI (Aug 2018)
CS6285 Topics in Computer Science: Bridging System and Deep Learning

2. Computer Systems: Architecture, Networking, Operating Systems, Parallel Computing, Security

CS5222 Advanced Computer Architecture
CS5223 Distributed Systems
CS5224 Cloud Computing
CS5229 Advanced Computer Networks
CS5231 Systems Security
CS5233 Simulation and Modelling Techniques
CS5239 Computer System Performance Analysis
CS5248 Systems Support for Continuous Media
CS5250 Advanced Operating Systems
CS5272 Embedded Software Design
CS5321 Network Security
CS5322 Database Security
CS5331 Web Security
CS5332 Biometric Authentication
CS5422 Wireless Networking
CS5425 Big Data Systems for Data Science
CS5430 Foundations of Modern Cryptography
CS5439 Software Security
CS5478 Intelligent Robots: Algorithms and Systems (Aug 2020)
CS6204 Advanced Topics in Networking
CS6209 Topics in Cryptography
CS6211 Analytical Performance Modelling for Computer Systems (Aug 2016)
CS6213 Topics in Distributed Computing
CS6219 Advanced Topics in Computer Systems (Aug 2021)
CS6230 Topics in Information Security
CS6231 Topics in System Security
CS6280 Topics in Computer Science: Datacentre Software Dynamics
CS6280 Topics in Computer Science: Systems Design for Next Gen Hardware (Aug 2020)
CS6280 Topics in Computer Science: Deep Learning with Language Applications (Aug 2024)
CS6282 Topics in Computer Science: Analytical Performance Modeling for Computer Systems

CS6284 Topics in Computer Science: Big Data Meets New Hardware
CS6284 Topics in Computer Science: Wireless Networks and Applications [Aug 2024]
CS6285 Topics in Computer Science: Bridging System and Deep Learning [Aug 2020]
CS6285 Topics in Computer Science: Wireless Networks and Applications

3. Knowledge Systems: Artificial Intelligence, Computational Biology, Database

CS5215 Constraint Programming
CS5228 Knowledge Discovery and Data Mining
CS5233 Simulation and Modelling Techniques
CS5238 Advanced Combinatorial Methods in Bioinformatics
CS5242 Neural Networks and Deep Learning
CS5246 Text Mining
CS5260 Neural Networks and Deep Learning II [Aug 2021]
CS5284 Graph Machine Learning [Aug 2024]
CS5339 Theory and Algorithms for Machine Learning
CS5340 Uncertainty Modelling in AI
CS5344 Big-Data Analytics Technology
CS5421 Database Applications Design and Tuning
CS5424 Distributed Databases
CS5425 Big Data Systems for Data Science
CS5446 AI Planning and Decision Making
CS5477 3D Computer Vision [Aug 2021]
CS5478 Intelligent Robots: Algorithms and Systems [Aug 2020]
CS5562 Trustworthy Machine Learning [Aug 2021]
CS6203 Advanced Topics in Database Systems
CS6207 Advanced Natural Language Processing
CS6208 Advanced Topics in Artificial Intelligence
CS6216 Advanced Topics in Machine Learning
CS6220 Advanced Topics in Data Mining
CS6222 Topics in Computational Biology
CS6244 Robot Motion Planning and Control
CS6281 Topics in Computer Science: User Generated Content Analyses using Automated Discourse Processing
CS6281 Topics in Computer Science: Human-Centric AI [Jan 2018]
CS6281 Topics in Computer Science: Inference Algorithms in Deep Generative Models [Jan 2026]
CS6282 Topics in Computer Science: AI meets Science - Science-Inspired AI and AI for Science [Jan 2026]
CS6283 Topics in Computer Science: Logic in AI
CS6283 Topics in Computer Science: Trustworthy Machine Learning [Aug 2020]
CS6285 Topics in Computer Science: Bridging System and Deep Learning [Aug 2020]
CS6284 Topics in Computer Science: Big Data Meets New Hardware

4. Media Technologies: Information Retrieval, HCI, Speech and Language, Graphics, Vision, Multimedia Applications

CS5237 Computational Geometry and Applications
CS5240 Theoretical Foundations in Multimedia
CS5241 Speech Processing
CS5242 Neural Networks and Deep Learning
CS5246 Text Mining
CS5248 Systems Support for Continuous Media
CS5332 Biometric Authentication
CS5346 Information Visualisation
CS5477 3D Computer Vision [Aug 2021]
CS6243 Computational Photography
CS5343 Advanced Computer Animation
CS6206 Advanced Topics in Human-Computer Interaction

CS6207 Advanced Natural Language Processing
CS6212 Topics in Media
CS6240 Multimedia Analysis
CS6241 Advanced Topics in Computer Graphics
CS6281 Topics in Computer Science: Immersive Videos [Aug 2021]

5. Programming Language and Software Engineering

CS5214 Design of Optimising Compilers
CS5215 Constraint Programming
CS5218 Principles of Program Analysis
CS5219 Automated Software Validation
CS5232 Formal Specification and Design Techniques
CS5272 Embedded Software Design
CS5439 Software Security
CS6202 Advanced Topics in Programming Languages
CS6215 Advanced Topics in Program Analysis
CS6217 Topics in Programming Languages & Software Engineering
CS6218 Principles of Programming Languages & Software Engineering
CS6223 Advanced Topics in Software Testing
CS6880 Advanced Topics in Software Engineering