COMPUTER SCIENCE (COMP)

COMP 7210 Research Methodologies 3 cr
This course explores the research process in general and the resources for research in computer science. Traditional research approaches and use of emerging technology will be discussed. Attendance at department seminars and classes is required.

COMP 7570 Advanced Topics in Computer Science 1 3 cr
Topics of current research interest in areas of computer science, available on an occasional basis, subject to the interests and availability of faculty.
PR/CR: A minimum grade of C is required unless otherwise indicated.
Prerequisite: written consent of instructor.

COMP 7600 Graduate Workterm I 0 cr
Work assignment in business, industry, or government for students registered in the Computer Science Graduate Cooperative Option. Requires submission of a written report covering the work completed during the four-month professional assignment. Graded Pass/Fail.

COMP 7720 Advanced Topics in Algorithms 3 cr
Topics of current research interest in advanced algorithms. Possible topics include string matching, data compression, computational geometry, probabilistic algorithms; subject to the interests and availability of faculty.
PR/CR: A minimum grade of C is required unless otherwise indicated.
Prerequisites: COMP 3170 or equivalent or written consent of instructor.

COMP 7750 Advanced Topics in Computation Theory 3 cr
Topics of current research interest in computation and complexity theory. Possible topics include decidability and complexity theoretic issues in parallel computation, cryptography, graph theory, or number theory, subject to the interests and availability of faculty.
PR/CR: A minimum grade of C is required unless otherwise indicated.
Prerequisite: written consent of instructor.

COMP 7770 Coding Theory 3 cr
Algebraic background of coding theory. Possible topics include theory of linear codes; Hamming, Golay, Reed-Miller, Macdonald, and Hadamard codes; structure of finite fields; application to cyclic and Bose Chaudhuri codes; and decoding algorithms and error-correcting bounds.
PR/CR: A minimum grade of C is required unless otherwise indicated.
Prerequisite: written consent of instructor.

COMP 7780 Queuing Theory and Performance Evaluation 3 cr
Theory and application of queuing systems applied to problems of computer systems performance. Possible topics include investigation of deterministic and stochastic models of single and multiple queuing systems using analytical, numerical, and simulation techniques; performance evaluation methods for computer systems and communications networks.
PR/CR: A minimum grade of C is required unless otherwise indicated.
Prerequisites: written consent of instructor.

COMP 7800 Graduate Workterm II 0 cr
Work assignment in business, industry, or government for students registered in the Computer Science Graduate Cooperative Option. Requires submission of a written report covering the work completed during the four-month professional assignment. Graded Pass/Fail.
PR/CR: A minimum grade of C is required unless otherwise indicated.
Prerequisite: COMP 7600.

COMP 7810 Computer Networks 3 cr
A selection of current research topics in computer networks, including advanced network architectures, protocols, and systems.
PR/CR: A minimum grade of C is required unless otherwise indicated.
Prerequisite: written consent of instructor.

COMP 7850 Advances in Parallel Computing 3 cr
This course introduces advanced research topics in parallel architectures, parallel programing, parallelizing compilers, runtime systems, and parallel I/O.
PR/CR: A minimum grade of C is required unless otherwise indicated.
Prerequisite: written consent of instructor.

COMP 7860 Advanced Topics in Computer Systems 3 cr
Topics of current research interest in database and operating systems. Possible topics include: operating systems, parallel systems, real-time systems, networks, and database systems; subject to the interests and availability of faculty.
PR/CR: A minimum grade of C is required unless otherwise indicated.
Prerequisite: written consent of instructor.

COMP 7890 Advanced Topics in Languages and Software 3 cr
Topics of current research interest in software engineering. Possible topics include requirement analysis, software architecture, software evolution, and software verification and validation.
PR/CR: A minimum grade of C is required unless otherwise indicated.
Prerequisite: written consent of instructor.

COMP 7900 Graduate Workterm III 0 cr
Work assignment in business, industry, or government for students registered in the Computer Science Graduate Cooperative Option. Requires submission of a written report covering the work completed during the four-month professional assignment. Graded Pass/ Fail.
PR/CR: A minimum grade of C is required unless otherwise indicated.
Prerequisite: COMP 7800.

COMP 7910 Advanced Graphics 3 cr
Advanced topics in computer graphics. Possible topics include advanced lighting models and radiosity, ray tracing, computational photography, graphics architectures, procedural graphics, model and mesh processing, splines and curves, and advanced rendering techniques.
PR/CR: A minimum grade of C is required unless otherwise indicated.
Prerequisites: written consent of instructor.

COMP 7920 Advanced Topics in Graphics and Human Interfaces 3 cr
Topics of interest in advanced Human-Computer Interaction (HCI). Possible topics include quantitative and qualitative evaluations, crowdsourcing methods and applications, personal informatics, persuasive technologies, technologies for special populations, and information visualization. COMP 4020 is recommended.
PR/CR: A minimum grade of C is required unless otherwise indicated.
Prerequisite: written consent of instructor.

COMP 7922 Computational Geometry 3 cr
The design and analysis of efficient algorithms for geometric problems. Possible topics include convex hull algorithms; Voronoi diagrams and Delaunay triangulations; point location; range searching; geometric data structures; geometric intersection algorithms; guarding and visibility graphs; geometric packing, covering, and partitioning; geometric duality; arrangements of lines and circles; unit disc graphs and proximity graphs.
PR/CR: A minimum grade of C is required unless otherwise indicated.
Prerequisites: written consent of instructor.

COMP 7924 Graph Drawing 3 cr
The design and analysis of efficient algorithms for drawing a given graph in the plane subject to given constraints and optimization criteria. Possible topics include drawing rooted trees, planarity testing, drawing planar graphs, straight-line drawings, point-set embeddings, visibility graphs, and contact graph representations.
PR/CR: A minimum grade of C is required unless otherwise indicated.
Prerequisite: written consent of instructor.

COMP 7926 Computational Finance 3 cr
Application of Computer Science to the field of Computational Finance. Possible topics include an overview of equity, fixed income, derivative markets; stochastic calculus, Black-Scholes model; volatility, risk and value-at-risk; binomial tree, Monte-Carlo, finite-difference, and other numerical methods, complex financial instruments such as swaps, collateral debt obligations; derivatives mishaps.
PR/CR: A minimum grade of C is required unless otherwise indicated.
Prerequisite: written consent of instructor.

COMP 7928 Probabilistic Graphical Models 3 cr
Probabilistic graphical models and their applications in advanced machine learning. Possible topics include directed model (Bayesian networks), undirected models 9Markov random fields), inference, and learning in various application domains, e.g., computer vision, natural language processing, bioinformatics, and speech processing.
PR/CR: A minimum grade of C is required unless otherwise indicated.
Prerequisite: written consent of instructor.

COMP 7932 Advanced Intelligent Interactive Systems 3 cr
Topics of interest at the intersection of Human-Computer Interaction (HCI) and applied Artificial Intelligence (AI). Possible topics include recommender systems, information extraction and summarization, intelligent learning environments, usability concerns, evaluation, and reasoning under uncertainty.
PR/CR: A minimum grade of C is required unless otherwise indicated.
Prerequisites: written consent of instructor.

COMP 7934 Topics in Bioinformatics 3 cr
Topics of interest in Bioinformatics. Possible topics include genome assembly, protein structure prediction and sequence feature prediction.
PR/CR: A minimum grade of C is required unless otherwise indicated.
Prerequisite: written consent of instructor.

COMP 7936 Advanced Human- Robot Interaction 3 cr
A survey of fundamentals and current topics in Human-Robot Interaction, including tele-operation, collocated work, and social human-robot interaction. Students will read a range of research publications on Human-Robot Interaction, and develop an original research project relating to interaction with robots.
PR/CR: A minimum grade of C is required unless otherwise indicated.
Prerequisite: written consent of instructor.

COMP 7938 Software Testing and Quality Assurance 3 cr
Fundamental techniques and state-of-the-art research in software quality assurance. The primary focus is on software testing techniques, but other quality assurance approaches are also discussed, such as static analysis, code review, defect prediction, and fault localization.
PR/CR: A minimum grade of C is required unless otherwise indicated.
Prerequisite: written consent of instructor.

COMP 7942 Real-Time Embedded Systems 3 cr
Topics of interest in embedded systems, especially systems for real-time control and sensing. Extensions to distributed embedded systems are also discussed. Possible topics include scheduling, schedulability, servo motors, constraints in embedded systems, advanced real-time scheduling, control theory, distributed systems, and related programming languages.
PR/CR: A minimum grade of C is required unless otherwise indicated.
Prerequisite: written consent of instructor.

COMP 7944 Advanced Data Mining 3 cr
Topics of interest in data mining, include advanced data mining concepts and their applications.
PR/CR: A minimum grade of C is required unless otherwise indicated.
Prerequisite: written consent of instructor.

COMP 7946 Wireless Sensor Networks 3 cr
Topics of interest in wireless sensor networks, including architectures, protocols, and applications. Case studies of previous work and open areas of research will also be discussed.
PR/CR: A minimum grade of C is required unless otherwise indicated.
Prerequisite: written consent of instructor.

COMP 7948 Combinatorial Optimization 3 cr
Classical and current techniques in combinatorial optimization. Topics include linear and integer programming, matching algorithms, graph algorithms, networks and flows, and matroids.
PR/CR: A minimum grade of C is required unless otherwise indicated.
Prerequisite: written consent of instructor.

COMP 7950 Advanced Topics in Artificial Intelligence 3 cr
Topics of current research interest in artificial intelligence chosen from such areas as: expert systems, knowledge representation, intelligent systems, planning systems, multi-agent systems, symbolic logic, knowledge engineering, and automated reasoning; subject to the interests and availability of faculty.
PR/CR: A minimum grade of C is required unless otherwise indicated.
Prerequisites: COMP 3190 or equivalent or written consent of instructor.

COMP 7952 Grid and Cloud Computing 3 cr
Distributed computing systems; commercial grid services; working with real grid networks; applications on grid networks; virtualization and cloud computing; grid and cloud architecture and execution models; MapReduce; resource management (brokering, allocation, scheduling); quality of service guarantee; pricing cloud resources; economic and finance models; case studies.
PR/CR: A minimum grade of C is required unless otherwise indicated.
Prerequisite: written consent of instructor.

COMP 7960 Image Processing 3 cr
A detailed study of methods used in image processing. Major topics include image transformations, image enhancement, feature extraction, image analysis, and filtering.
PR/CR: A minimum grade of C is required unless otherwise indicated.
Prerequisite: written consent of instructor.