

Computer Science

CS 5090 - Special Topics in Computer Science

Special topics in computer science offered on occasion based on student and faculty demand and interest.

Credits: variable to 4.0; May be repeated

Semesters Offered: Fall, Spring, Summer

Restrictions: Permission of department required

CS 5091 - Graduate Seminar in Computer Science

From time to time, depending on student demand, a seminar will be offered on advanced topics in current computer science research.

Credits: variable to 3.0; May be repeated; Graded Pass/Fail Only

Semesters Offered: On Demand

Restrictions: Permission of department required; Must be enrolled in one of the following Level(s): Graduate

CS 5131 - Compiler Optimization

This course emphasizes the design and implementation of low- and high-level compiler optimizations. Topics include control- and data-flow analysis, traditional compiler optimization, global register allocation, instruction scheduling, dependence analysis, memory-reuse analysis and loop transformations.

Credits: 3.0

Lec-Rec-Lab: (0-3-0)

Semesters Offered: Fall, Spring

Pre-Requisite(s): CS 4131

CS 5311 - Advanced Topics in Computation Theory

Advanced formal models and logics for computation such as Turing machines, abstract state machines, B method, pi-calculus, circuit model, and parallel models. Advanced topics on time and space complexity, approximation algorithms for NP-complete problems.

Credits: 3.0

Lec-Rec-Lab: (0-3-0)

Semesters Offered: On Demand

Pre-Requisite(s): CS 4311

CS 5321 - Advanced Algorithms

Design and analysis of advanced algorithms. Topics include algorithms for complex data structures, probabilistic analysis, amortized analysis, approximation algorithms, and NP-completeness. Design and analysis of algorithms for string-matching and computational geometry are also covered.

Credits: 3.0

Lec-Rec-Lab: (0-3-0)

Semesters Offered: Fall

Pre-Requisite(s): CS 4321

CS 5331 - Parallel Algorithms

Advanced topics in the design, analysis, and performance evaluation of parallel algorithms. Topics include advanced techniques for algorithm analysis, memory models, run time systems, parallel architectures, and program design, particularly emphasizing the interactions of these factors.

Credits: 3.0

Lec-Rec-Lab: (0-3-0)

Semesters Offered: Spring

Pre-Requisite(s): CS 4431 and CS 4331

CS 5411 - Advanced Operating Systems

Advanced concepts in operating systems. Topics include real-time and multiprocessor scheduling, I/O, modern file systems, and performance analysis. Also requires a substantial implementation project.

Credits: 3.0

Lec-Rec-Lab: (0-3-0)

Semesters Offered: Spring

Pre-Requisite(s): CS 4411

CS 5431 - Advanced Computer Architecture

An in-depth study of various aspects of parallel processing, with an emphasis on parallel architectures. The course has an analytical focus and investigates models of various aspects of the design and analysis of parallel systems. Topics include simple uniprocessor/multiprocessor performance models, pipelining, instruction-level parallelism, and multiprocessor design issues.

Credits: 3.0

Lec-Rec-Lab: (0-3-0)

Semesters Offered: Spring

Pre-Requisite(s): CS 4431 or (EE 3173 and EE 3175)

CS 5441 - Distributed Systems

Covers time and order in distributed systems; mutual exclusion, agreement, elections, and atomic transactions; Distributed File Systems, Distributed Shared Memory, Distributed System Security; and issues in programming distributed systems. Uses selected case studies.

Credits: 3.0

Lec-Rec-Lab: (0-3-0)

Semesters Offered: Spring

Pre-Requisite(s): CS 4411

CS 5461 - Mobile Networks

Mobile network issues including routing and mobility management strategies in ad hoc networks, sensor networks, and personal area networks such as Bluetooth.

Credits: 3.0

Lec-Rec-Lab: (0-3-0)

Semesters Offered: Fall, Spring

Pre-Requisite(s): CS 4461

CS 5611 - Computer Graphics: Advanced Rendering and Animation

Topics include polygonal objects, parametric curves and surfaces, lighting models, shadows and textures, ray-tracing techniques, radiosity methods, volume rendering, and animation.

Credits: 3.0

Lec-Rec-Lab: (0-3-0)

Semesters Offered: Spring

Pre-Requisite(s): CS 4611

CS 5621 - Computer Graphics: Geometric Modeling and Processing

Design concepts in geometric modeling. Topics include representation of shapes for solids and surfaces; shape modeling, including parametric curves and surfaces such as Bezier, B-spline, and NURBS curves and surfaces; implicit curves and surfaces; surface intersection, blending, and offsetting; applied computational geometry; and the design of robust geometric algorithms.

Credits: 3.0

Lec-Rec-Lab: (0-3-0)

Semesters Offered: On Demand

Pre-Requisite(s): CS 5611 and MA 2330

CS 5632 - Computer Graphics: Scientific and Data Visualization

Covers the fundamental concepts in the field of scientific, engineering, biomedical, and information visualization. Emphasizes the representation of scalar, vector, and tensor fields; data sampling and resampling; reconstruction using multivariate, multivalued finite elements, surfaces, volumes and functions on surfaces; and volumetric rendering techniques.

Credits: 3.0

Lec-Rec-Lab: (0-3-0)

Semesters Offered: On Demand

Pre-Requisite(s): (MA 2320 or MA 2321 or MA 2330) and CS 5611

CS 5711 - Advanced Software Engineering

This course surveys current research in software engineering. Topics include both the technical aspects of software development (e.g. requirements modeling/analysis, design, verification) and issues pertaining to software process and project management (e.g. measurement, risk analysis, team organization).

Credits: 3.0

Lec-Rec-Lab: (0-3-0)

Semesters Offered: Fall

Pre-Requisite(s): CS 4711 and CS 4712

CS 5811 - Advanced Artificial Intelligence

Course topics include current topics in artificial intelligence including agent-based systems, learning, planning, use of uncertainty in problem solving, reasoning, and belief systems.

Credits: 3.0

Lec-Rec-Lab: (0-3-0)

Semesters Offered: Fall

Pre-Requisite(s): CS 4811

CS 5990 - Master's Research in Computer Science

The study of an acceptable computer science problem and the preparation of a thesis

Credits: variable to 9.0; Repeatable to a Max of 99; Graded Pass/Fail Only

Semesters Offered: Fall, Spring, Summer

Restrictions: Permission of instructor required; Must be enrolled in one of the following Level(s):
Graduate

CS 5999 - Master's Reading and Research in Computer Science

Individual reading and research on current topics in computer science.

Credits: variable to 9.0; May be repeated

Semesters Offered: Fall, Spring, Summer

Restrictions: Permission of instructor required; Must be enrolled in one of the following Level(s):
Graduate

CS 6090 - Special Topics in Computer Science

Special topics in Computer Science offered on occasion based on student and faculty demand and interest.

Credits: variable to 4.0; May be repeated

Semesters Offered: Fall, Spring, Summer

Restrictions: Permission of department required

CS 6091 - Doctoral Seminar in Computer Science

Seminar covers advanced topics in current Computer Science research for doctoral degree candidates. Offered according to student demand.

Credits: variable to 3.0; May be repeated

Semesters Offered: On Demand

Restrictions: Permission of department required; Must be enrolled in one of the following Level(s):
Graduate

CS 6461 - Advanced Computer Networks

Students will perform a full cycle of typical research activities on selected advanced research topics in networking, including literature survey, problem formulation, giving assumptions, providing a solution, providing a plan of evaluation, and presentation of results.

Credits: 3.0

Lec-Rec-Lab: (0-3-0)

Semesters Offered: Fall

Pre-Requisite(s): CS 4461

CS 6990 - Doctoral Research in Computer Science

The study of an acceptable computer science problem and the preparation of a dissertation.

Credits: variable to 9.0; May be repeated; Graded Pass/Fail Only

Semesters Offered: Fall, Spring, Summer

Restrictions: Permission of instructor required; Must be enrolled in one of the following Level(s):
Graduate

CS 6999 - Doctoral Reading and Research in Computer Science

Individual reading and research on current topics in Computer Science for doctoral degree candidates.

Credits: variable to 9.0; May be repeated

Semesters Offered: Fall, Spring, Summer

Restrictions: Permission of instructor required; Must be enrolled in one of the following Level(s):
Graduate

Graduate Course Descriptions Effective Fall 2007

https://www.banweb.mtu.edu/pls/owa/stu_ctg_utils.p_online_all_courses_gr

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