COMPUTER SCIENCE
(COMPSCI)

COMPSCI 101 Introduction to PC Application Software
3 cr. Undergraduate.
Introduction to software applications of the personal computer, including
word processing, desktop publishing, spreadsheets, and databases.
Prerequisites: none.
Course Rules: Not open to CompSci students for cr.
Last Taught: Fall 2017, Fall 2016, Fall 2015, Fall 2014.
Current Offerings: http://uwm.edu/schedule

COMPSCI 111 Introduction to Unix
1 cr. Undergraduate.
Introduction to basic user skills for Unix operating systems. File system
structure and access control. Basic user commands. Text editing. Internet utilities.
Prerequisites: none.
Last Taught: Fall 2010, Fall 2009, Spring 2009, Fall 2008.
Current Offerings: http://uwm.edu/schedule

COMPSCI 112 Introduction to the Internet and the World Wide Web
3 cr. Undergraduate.
Survey of the technologies that enable common Internet applications and
their security/privacy issues. Topics include HTTP, TCP/IP, DNS, email
protocols, search engines, encryption, digital signatures and malware.
Prerequisites: none.
Last Taught: Fall 2012, Fall 2011, Fall 2009, Spring 2009.
Current Offerings: http://uwm.edu/schedule

COMPSCI 113 Introduction to Web Document Production
3 cr. Undergraduate.
An introduction to the computer languages used in World Wide Web
documents. Design principles; techniques for form processing and
inclusion of multimedia content.
Prerequisites: none.
Last Taught: Spring 2018, Fall 2014, Fall 2013, Spring 2013.
Current Offerings: http://uwm.edu/schedule

COMPSCI 132 Introduction to Computers and Programming
3 cr. Undergraduate.
How computers work; communicating with computers; introductory
programming in a high-level language; elementary problem solving.
Prerequisites: Level 30 on Math Placement Test or Math 105(C).
Current Offerings: http://uwm.edu/schedule

COMPSCI 140 Introduction to the Computer Science Laboratories
1 cr. Undergraduate.
Survey of the programming tools available in the Computer Science
laboratory environment.
Prerequisites: CompSci 201(C)
Current Offerings: http://uwm.edu/schedule

COMPSCI 150 Survey of Computer Science
3 cr. Undergraduate.
A survey of computer science. Topics include data storage and
manipulation, operating systems and networks, algorithms and
data structures, programming languages, artificial intelligence, and
computability.
Prerequisites: none.
Course Rules: Counts as repeat of CompSci 299 with similar topic.
General Education Requirements: NS
Current Offerings: http://uwm.edu/schedule

COMPSCI 151 Introduction to Scientific Programming in Fortran
3 cr. Undergraduate.
Design and implementation of computer programs in fortran; stress will
be placed on applications to different fields of science and engineering.
Prerequisites: Math 231(C) or 226(C).
Current Offerings: http://uwm.edu/schedule

COMPSCI 160 Introduction to Computer Game Design and Programming
3 cr. Undergraduate.
An overview of computer game history; design concepts and
considerations; implementation using a modern software development
platform, such as GameMaker.
Prerequisites: none.
Current Offerings: http://uwm.edu/schedule

COMPSCI 202 Introductory Programming Using Python
3 cr. Undergraduate.
Programming in Python. Basic control structures including recursion.
Basic and library data types. Problem solving with objects. Writing
classes. Basic software development skills.
Prerequisites: Counts as repeat of CompSci 290 with similar topic. Pre-
req: Level 30 on Math Placement Test, or a grade of C or better in Math
105 or 108.
Current Offerings: http://uwm.edu/schedule

COMPSCI 240 Introduction to Engineering Programming
3 cr. Undergraduate.
Problem solving with structured programming techniques using an
engineering oriented programming language, such as MATLAB, including
control structures, functions, arrays and matrices.
Prerequisites: Math Placement Level 40 or Math 116(P).
Current Offerings: http://uwm.edu/schedule

COMPSCI 241 C Programming for Embedded Systems
3 cr. Undergraduate.
Problem solving with structured programming techniques, using the C
programming language; Topics include using Arrays & Pointers; Memory
Management; Unions, Structures; Files & Low Level IO; Process’s & Inter-
process Communication.
Prerequisites: C or better in CompSci 240(P)
Last Taught: Spring 2018.
Current Offerings: http://uwm.edu/schedule
COMPSCI 250 Introductory Computer Programming
3 cr. Undergraduate.
Problem solving with structured programming techniques using an object-oriented programming language, including control structures, functions, arrays, vectors, and pre-defined objects.
Prerequisites: Math Placement level 30.
Current Offerings: http://uwm.edu/schedule

COMPSCI 251 Intermediate Computer Programming
3 cr. Undergraduate.
Problem solving with objects. Writing classes. Use of standard data structures. Basic software development skills including text analysis tools, debugging, and configuration management.
Prerequisites: Math Placement Level 40 or Math 116(P) or Math 211(P); C or better in CompSci 250(201)(P).
Current Offerings: http://uwm.edu/schedule

COMPSCI 290 Introductory Topics in Computer Science:
1-3 cr. Undergraduate.
Lectures on new introductory material in computer science. Variable-content course.
Prerequisites: specific courses dependent on topic.
Course Rules: May be retaken to max of 6 cr w/chg in topic.
Current Offerings: http://uwm.edu/schedule

COMPSCI 315 Introduction to Computer Organization and Assembly Language Programming
3 cr. Undergraduate.
Introduction to number systems, arithmetic and Boolean operations. Digital computer organization. A specific computer system, assembly and machine language programming.
Prerequisites: Math Placement Level 40 or Math 116(P) or Math 211(P); CompSci 250(201)(P).
Current Offerings: http://uwm.edu/schedule

COMPSCI 317 Discrete Information Structures
3 cr. Undergraduate.
Introductory discussion of logic, proof techniques, sets, functions, relations, combinatorics, probability, and graphs.
Prerequisites: Math Placement Level 40; grade of C or better in CompSci 250(P).
Current Offerings: http://uwm.edu/schedule

COMPSCI 318 Topics in Discrete Mathematics
3 cr. Undergraduate.
Number theory topics related to cryptography; discrete structures including graphs, partial orders, Latin squares and block designs; advanced counting techniques.
Prerequisites: a grade of C or better in CompSci 317(P) or Math 341(P).
Course Rules: Jointly offered with & count as repeat of Math 318.
Current Offerings: http://uwm.edu/schedule

COMPSCI 337 System Programming
3 cr. Undergraduate.
Introduction to the application programmer interface for a modern operating system. Overview of mechanisms for object oriented programming and memory management
Prerequisites: C or better in CompSci 251(P)
Current Offerings: http://uwm.edu/schedule

COMPSCI 351 Data Structures and Algorithms
3 cr. Undergraduate.
Programming in a structured, high-level, object-oriented language. Implementation of data structures and algorithms and their application.
Prerequisites: Math Placement Level 40 or Math 116(P) or 211(P); C or better in CompSci 251(P).
Last Taught: Spring 2018, Fall 2017, Spring 2017, Fall 2016.
Current Offerings: http://uwm.edu/schedule

COMPSCI 361 Introduction to Software Engineering
3 cr. Undergraduate.
Introduction to core topics of software engineering including requirements analysis, object-oriented design, testing, and project management. Overview of ethical and social issues in computing.
Prerequisites: C or better in CompSci 351(P), satisfaction of GER English Composition competency req.
Last Taught: Spring 2018, Fall 2017, Spring 2017, Fall 2016.
Current Offerings: http://uwm.edu/schedule

COMPSCI 395 Social, Professional, and Ethical Issues
3 cr. Undergraduate.
The social, professional and ethical issues that arise in the context of professional computing.
Prerequisites: soph st or cons instr.
Last Taught: Spring 2018, Fall 2017, Spring 2017, Fall 2016.
Current Offerings: http://uwm.edu/schedule

COMPSCI 417 Introduction to the Theory of Computation
3 cr. Undergraduate/Graduate.
Introduction to formal languages, grammars and automata. Finite state automata, pushdown automata, turing machines. Regular, context-free recursive and recursively enumerable languages. Decidability.
Prerequisites: jr st; grade of C or better in CompSci 317(P) or grade of C or better in Math 341(P).
Last Taught: Spring 2018, Fall 2017.
Current Offerings: http://uwm.edu/schedule

COMPSCI 417G Introduction to the Theory of Computation
3 cr. Undergraduate/Graduate.
Introduction to formal languages, grammars and automata. Finite state automata, pushdown automata, turing machines. Regular, context-free recursive and recursively enumerable languages. Decidability.
Prerequisites: jr st; grade of C or better in CompSci 317(P) or grade of C or better in Math 341(P).
Last Taught: Spring 2018, Fall 2017.
Current Offerings: http://uwm.edu/schedule
COMPSCI 422 Introduction to Artificial Intelligence
3 cr. Undergraduate/Graduate.
Introduction to core techniques and broad survey of AI. Topics include: Lisp, heuristic search, knowledge representation, planning, vision, learning.
Prerequisites: jr st; C or better in CompSci 317(217)(P) & CompSci 351(252)(P).
Current Offerings: http://uwm.edu/schedule

COMPSCI 423 Introduction to Natural Language Processing
3 cr. Undergraduate/Graduate.
Introduction to natural language processing programs and an overview of the field. Topics include syntactic frameworks, parsing, semantics, interpretation, and applications.
Prerequisites: jr st; C or better in CompSci 351(P).
Last Taught: Fall 2017, Fall 2015, Fall 2013, Spring 2012.
Current Offerings: http://uwm.edu/schedule

COMPSCI 425 Introduction to Data Mining
3 cr. Undergraduate/Graduate.
Algorithms for uncovering useful information from data. Topics include data exploration, association rules, clustering, supervised learning, and mining structured data (e.g., sequences or graphs)
Prerequisites: jr st; CompSci 251(P), Math 221(P) or Math 232(P)
Course Rules: Counts as repeat of CompSci 657 with same topic.
Current Offerings: http://uwm.edu/schedule

COMPSCI 431 Programming Languages Concepts
3 cr. Undergraduate/Graduate.
Examination of abstract features of languages. Study of syntactic and semantic models; design and programming in procedural, object-oriented, functional and logical languages. Implementation methods.
Prerequisites: jr st; grade of C or better in CompSci 351(252)(P).
Last Taught: Spring 2018, Fall 2017.
Current Offerings: http://uwm.edu/schedule

COMPSCI 431G Programming Languages Concepts
3 cr. Undergraduate/Graduate.
Examination of abstract features of languages. Study of syntactic and semantic models; design and programming in procedural, object-oriented, functional and logical languages. Implementation methods.
Prerequisites: jr st; grade of C or better in CompSci 351(252)(P).
Last Taught: Spring 2018, Fall 2017.
Current Offerings: http://uwm.edu/schedule

COMPSCI 444 Introduction to Text Retrieval and Its Applications in Biomedicine
3 cr. Undergraduate/Graduate.
Introduction to text retrieval, text classification and their biomedical applications; topics include: indexing, query processing, and document retrieval methods.
Prerequisites: jr st; CompSci 351(P) or HCA 442(P).
Course Rules: Jointly offered with & counts as repeat of HCA 444, CompSci 744, & HCA 744.
Last Taught: Spring 2015, Spring 2013, Fall 2010, Fall 2007.
Current Offerings: http://uwm.edu/schedule

COMPSCI 445 Introduction to Text Retrieval
3 cr. Undergraduate/Graduate.
Examination of abstract features of languages. Study of syntactic and semantic models; design and programming in procedural, object-oriented, functional and logical languages. Implementation methods.
Prerequisites: jr st; grade of C or better in CompSci 351(252)(P).
Current Offerings: http://uwm.edu/schedule

COMPSCI 458 Computer Architecture
3 cr. Undergraduate/Graduate.
Processor organization and design; memory organization; microprogramming and control unit design; I-O organization; case studies of selected machine architectures.
Prerequisites: jr st; ElecEng 354(P), C or better in CompSci 315(P) or ElecEng 367(P).
Course Rules: Jointly offered with & counts as repeat of ElecEng 458.
Current Offerings: http://uwm.edu/schedule

COMPSCI 458G Computer Architecture
3 cr. Undergraduate/Graduate.
Processor organization and design; memory organization; microprogramming and control unit design; I-O organization; case studies of selected machine architectures.
Prerequisites: jr st; ElecEng 354(P), C or better in CompSci 315(P) or ElecEng 367(P).
Course Rules: Jointly offered with & counts as repeat of ElecEng 458.
Current Offerings: http://uwm.edu/schedule

COMPSCI 459G Fundamentals of Computer Graphics
3 cr. Undergraduate/Graduate.
Scan-line algorithms, object representation, homogeneous coordinates, geometric transformations, viewing curves, illumination models, interactive input methods, texture mapping.
Prerequisites: jr st; Math 232(P), CompSci 251(P).
Last Taught: Fall 2017, Fall 2016.
Current Offerings: http://uwm.edu/schedule

COMPSCI 469 Introduction to Computer Security
3 cr. Undergraduate/Graduate.
Privacy and authenticity of data and programs, communication, operating systems, network and database security, computer viruses, cryptography, private and public key cryptosystems, protocols.
Prerequisites: jr st; C or better in both CompSci 317(217)(P) & 251(P).
Last Taught: Spring 2018, Fall 2017.
Current Offerings: http://uwm.edu/schedule

COMPSCI 469G Introduction to Computer Security
3 cr. Undergraduate/Graduate.
Privacy and authenticity of data and programs, communication, operating systems, network and database security, computer viruses, cryptography, private and public key cryptosystems, protocols.
Prerequisites: jr st; C or better in both CompSci 317(217)(P) & 251(P).
Last Taught: Spring 2018, Fall 2017.
Current Offerings: http://uwm.edu/schedule
COMPSCI 481 Server-side Internet Programming
3 cr. Undergraduate/Graduate.
Introduces students to the concept of server-side programming and web
applications development. Topics include dynamic web site development,
session management, security, and relational databases.
Prerequisites: jr st; one of CompSci 113 (P), InfoSt 320 (P), or Art 324 (P);
C or better in CompSci 202(P) or CompSt 702(P)
Last Taught: Spring 2018, Fall 2016.
Current Offerings: http://uwm.edu/schedule

COMPSCI 481G Server-side Internet Programming
3 cr. Undergraduate/Graduate.
Introduces students to the concept of server-side programming and web
applications development. Topics include dynamic web site development,
session management, security, and relational databases.
Prerequisites: jr st; one of CompSci 113 (P), InfoSt 320 (P), or Art 324 (P);
C or better in CompSci 202(P) or CompSt 702(P)
Last Taught: Spring 2018, Fall 2016.
Current Offerings: http://uwm.edu/schedule

COMPSCI 511 Symbolic Logic
3 cr. Undergraduate/Graduate.
First-order predicate calculus; formal properties of theoretical systems;
chief results of modern mathematical logic; advanced topics such as
completeness and computability.
Prerequisites: jr st & either Philos 212(P) or 6 cr Math at the 300-level or
above; or grad st.
Course Rules: CompSci 511, Math 511, & Philos 511 are jointly offered &
count as repeat of each other.
Last Taught: Spring 2017, Fall 2015, Fall 1989, Fall 1988.
Current Offerings: http://uwm.edu/schedule

COMPSCI 522 Computer Game Design
3 cr. Undergraduate/Graduate.
Design of rules, environments, rewards, and punishments, Game metrics,
Including artificial intelligence in games, Puzzle generation, Automatic
design, Humanness test, Influence maps, Diversity, Unpredictability.
Prerequisites: jr st; grade of C or better in CompSci 317(P).
Course Rules: Counts as repeat of CompSci 657 with similar topic.
Current Offerings: http://uwm.edu/schedule

COMPSCI 530 Computer Networks Laboratory
3 cr. Undergraduate/Graduate.
Experimentation with Wired and Wireless Computer Networks Design.
Data Link and MAC Protocols, LANs, WANs, Routing, Transport Layer
Prerequisites: jr st; CompSci 520(P).
Last Taught: Spring 2017, Spring 2016, Fall 2015, Spring 2015.
Current Offerings: http://uwm.edu/schedule

COMPSCI 535G Algorithm Design and Analysis
3 cr. Undergraduate/Graduate.
Introduction to abstract data structures, analysis of time and space
requirements of numerical and non-numerical algorithms methods for
data manipulation.
Prerequisites: jr st; Math 211(P), 213(P), 221(P) or 231(P); C or better in
both CompSci 317(P) & 351(P).
Last Taught: Spring 2018, Fall 2017.
Current Offerings: http://uwm.edu/schedule

COMPSCI 536 Software Engineering
3 cr. Undergraduate/Graduate.
Software engineering, the software life cycle, qualities of software;
design, specification and verification of software, programming
environments and tools, object oriented programming.
Prerequisites: jr st; grade of C or better in CompSci 251(P).
Last Taught: Spring 2012, Fall 2011, Summer 2011, Spring 2011.
Current Offerings: http://uwm.edu/schedule

COMPSCI 537 Introduction to Operating Systems
3 cr. Undergraduate/Graduate.
Process management including process creation, switching,
multithreading, scheduling, communication and concurrency control;
memory management including paging, segmentation and virtual
memory; systems programming.
Prerequisites: jr st; CompSci 458(C) or ElecEng 458(C); CompSci 337(P).
Current Offerings: http://uwm.edu/schedule
COMPSCI 537G Introduction to Operating Systems  
3 cr. Undergraduate/Graduate.  
Process management including process creation, switching, multitasking, scheduling, communication and concurrency control; memory management including paging, segmentation and virtual memory; systems programming.  
Prerequisites: jr st; CompSci 458(C) or ElecEng 458(C); CompSci 337(P).  
Current Offerings: http://uwm.edu/schedule

COMPSCI 545 FPGA Embedded CPUs & Firmware Development  
3 cr. Undergraduate/Graduate.  
Use of modern embedded system central processor units (CPUs) with integrated field-programmable gate arrays (FPGAs). Design and implementation of firmware for these devices.  
Prerequisites: jr st; ElecEng 367(P) & 457(P).  
Course Rules: Jointly offered with & counts as repeat of ElecEng 545.  
Last Taught: Fall 2014.  
Current Offerings: http://uwm.edu/schedule

COMPSCI 547 User-Centered Interaction Design  
3 cr. Undergraduate/Graduate.  
Introduction of human-computer interaction theories and design processes. Emphasis is on applied user experience (UX) design.  
Prerequisites: sr st.  
Course Rules: Jointly offered with & counts as repeat of InfoSt 547.  
Current Offerings: http://uwm.edu/schedule

COMPSCI 552 Advanced Object-Oriented Programming  
3 cr. Undergraduate/Graduate.  
An advanced course in object-oriented programming. Abstraction; single and multiple inheritance; dynamic binding of functions; polymorphic types and operators; survey of object-oriented techniques.  
Prerequisites: jr st; C or better in both CompSci 351(P) & 361(P).  
Last Taught: Fall 2016, Fall 2014.  
Current Offerings: http://uwm.edu/schedule

COMPSCI 552G Advanced Object-Oriented Programming  
3 cr. Undergraduate/Graduate.  
An advanced course in object-oriented programming. Abstraction; single and multiple inheritance; dynamic binding of functions; polymorphic types and operators; survey of object-oriented techniques.  
Prerequisites: jr st; C or better in both CompSci 351(P) & 361(P).  
Last Taught: Fall 2016, Fall 2014.  
Current Offerings: http://uwm.edu/schedule

COMPSCI 557 Introduction to Database Systems  
3 cr. Undergraduate/Graduate.  
Prerequisites: jr st; CompSci 315(215)(P) & 251(P) or equiv.  
Last Taught: Spring 2018, Fall 2017.  
Current Offerings: http://uwm.edu/schedule

COMPSCI 557G Introduction to Database Systems  
3 cr. Undergraduate/Graduate.  
Prerequisites: jr st; CompSci 315(215)(P) & 251(P) or equiv.  
Last Taught: Spring 2018, Fall 2017.  
Current Offerings: http://uwm.edu/schedule

COMPSCI 581 Web Languages and Standards  
3 cr. Undergraduate.  
Introduction to languages and standards for Web applications, including markup, schema, style, transformation, and metadata languages. Document programming interfaces. Emphasis on programming language principles.  
Prerequisites: jr st; CompSci 431(P) & 417(R).  
Current Offerings: http://uwm.edu/schedule

COMPSCI 595 Capstone Project  
4 cr. Undergraduate.  
Students will integrate their knowledge of the undergraduate computer science curriculum by implementing a significant computer science team project.  
Prerequisites: sr st, CompSci 351 (P), CompSci 361 (P), and credit in at least 6 credits of 400 or higher CompSci or ElecEng courses.  
Current Offerings: http://uwm.edu/schedule

COMPSCI 599 Senior Thesis  
3 cr. Undergraduate.  
Independent scholarly research in Computer Science supervised by a faculty member.  
Prerequisites: sr st & cons instr.  
Last Taught: Spring 2018, Summer 2014.  
Current Offerings: http://uwm.edu/schedule

COMPSCI 654 Introduction to Compilers  
3 cr. Undergraduate.  
Fundamentals of compiler construction for modern programming languages. Syntax analysis, table organization, storage administration, semantic routines and code generation.  
Prerequisites: jr st; CompSci 431(P), 655(C).  
Current Offerings: http://uwm.edu/schedule

COMPSCI 655 Compiler Implementation Laboratory  
3 cr. Undergraduate.  
Implementation of compiler phases: scanner, parser, semantic analysis; code generation and optimization.  
Prerequisites: Prereq. jr st, CompSci 431(P); 654(C) or 754(C).  
Current Offerings: http://uwm.edu/schedule

COMPSCI 657 Topics in Computer Science:  
1-4 cr. Undergraduate/Graduate.  
Lectures on recent advances in computer science. Specific credits and any additional prerequisites will be announced in Schedule of Classes whenever course is offered.  
Prerequisites: jr st.  
Course Rules: May be retaken w/chg in topic to 9 cr max.  
Last Taught: Spring 2018, Fall 2017, Spring 2017, Fall 2016.  
Current Offerings: http://uwm.edu/schedule
COMPSCI 658 Topics in Applied Computing:
1-4 cr. Undergraduate.
Lectures on recent advances in applied computing. Specific credits and any additional prerequisites will be announced in Schedule of Classes whenever course is offered.
Prerequisites: jr st.
Course Rules: May be retaken w/chg in topic.
Current Offerings: http://uwm.edu/schedule

COMPSCI 699 Independent Study
1-3 cr. Undergraduate/Graduate.
Prerequisites: jr st; cons instr.
Course Rules: May be retaken to max of 6 cr by undergraduates.
Current Offerings: http://uwm.edu/schedule

COMPSCI 700 CEAS Graduate Seminar
1-3 cr. Graduate.
Seminar in professional ethics, oral and written communication, contemporary social issues, career development, time management, and laboratory safety.
Prerequisites: grad st
Course Rules: Civ Eng 700, CompSci 700, ElecEng 700, Ind Eng 700, MatEng 700 & MechEng 700 are jointly offered and count as repeats of one another
Last Taught: Spring 2018, Fall 2017, Spring 2017, Fall 2016.
Current Offerings: http://uwm.edu/schedule

COMPSCI 704 Analysis of Algorithms
3 cr. Graduate.
Introduction to concrete complexity theory and efficient algorithms. Fast data structure and graph algorithms, matrix multiplication, algebraic and numeric algorithms, reducibilities and np-completeness. Exponential and non-elementary lower bounds.
Prerequisites: grad st; CompSci 217(P) & 535(P).
Last Taught: Fall 2017, Fall 2016, Spring 2016, Fall 2015.
Current Offerings: http://uwm.edu/schedule

COMPSCI 708 Scientific Computing
3 cr. Graduate.
Fundamental algorithms and practical issues of scientific computing, including Monte Carlo simulations, data fitting, fast Fourier transform, optimization, numerical integration & differentiation, parallel computing, selected biomedical applications.
Prerequisites: grad st
Current Offerings: http://uwm.edu/schedule

COMPSCI 710 Artificial Intelligence
3 cr. Graduate.
AI programming, search techniques game playing, knowledge representation, knowledge acquisition, expert systems, selected topics from learning. Natural language understanding, vision and robotics.
Prerequisites: grad st; CompSci 252(P) & 535(P).
Course Rules: Not open to students who have cr in ElecEng 710, which is identical to CompSci 710.
Last Taught: Spring 2018, Spring 2016, Fall 2014, Fall 2012.
Current Offerings: http://uwm.edu/schedule

COMPSCI 711 Introduction to Machine Learning
3 cr. Graduate.
Introduction to machine learning techniques and applications, including optimal classification, regression, support vector machines, boosting, deep learning, and clustering.
Prerequisites: grad st
Course Rules: ElecEng 711 & CompSci 711 are jointly offered; they count as repeats of one another.
Last Taught: Fall 2017, Spring 2016, Fall 2013, Spring 2011.
Current Offerings: http://uwm.edu/schedule

COMPSCI 712 Image Processing
3 cr. Graduate.
This course covers the materials required to process and enhance photographic images, remote sensor multispacial scanner data and others. Topics include transform techniques, recorders, discriminative function, and associated hardware.
Prerequisites: grad st
Last Taught: Fall 2017, Fall 2016, Fall 2015, Fall 2013.
Current Offerings: http://uwm.edu/schedule

COMPSCI 713 Computer Vision
3 cr. Graduate.
Fundamental issues and current research in computer vision. Topics in early or low-level vision, intermediate vision or perceptual organization, and high-level vision or object recognition.
Prerequisites: grad st; ElecEng 410(P) or cons instr.
Course Rules: Jointly offered w/ and counts as a repeat of ElecEng 713.
Last Taught: Fall 2005.
Current Offerings: http://uwm.edu/schedule

COMPSCI 714 Computational Geometry
3 cr. Graduate.
Special data structures and algorithmic techniques for representing and manipulating geometric objects, such as points, lines and polygons. Applications to vlsi design and robotics.
Prerequisites: grad st; CompSci 535(P).
Current Offerings: http://uwm.edu/schedule

COMPSCI 718 Advanced Computer Graphics: Modeling and Animation
3 cr. Graduate.
Advanced graphics topics on mesh processing, illumination models, ray-tracing, and volumetric data visualization; popular animation approaches such as keyframes, particles, fluids and rigid bodies.
Prerequisites: grad st
Current Offerings: http://uwm.edu/schedule

COMPSCI 720 Computational Models of Decision Making
3 cr. Graduate.
Theoretical foundations and practical problems of formulating and constructing computational models of decision making.
Prerequisites: basic course in Probability or Statistics.
Last Taught: Fall 2017, Fall 2016, Fall 2015, Fall 2014.
Current Offerings: http://uwm.edu/schedule
COMPSCI 722 Artificial Intelligence Planning Techniques
3 cr. Graduate.
Algorithms and representations for classical and more expressive planning, search control techniques, study and comparison of a variety of planners, applications of planning.
Prerequisites: grad st; Comp Sci 535(P).
Current Offerings: http://uwm.edu/schedule

COMPSCI 723 Natural Language Processing
3 cr. Graduate.
Principles and problems of natural language processing with emphasis on recent advances and open problems. Topics: lexicons, parsing, interpretation, discourse structure, generation, and collaborative interfaces.
Prerequisites: grad st; CompSci 422(P) or 710(P).
Course Rules: Not open to students with cr in CompSci 423.
Last Taught: Fall 2017, Fall 2015, Fall 2013, Spring 2012.
Current Offerings: http://uwm.edu/schedule

COMPSCI 724 Distributed Algorithms
3 cr. Graduate.
Identification of canonical problems in distributed computing, design and analysis of algorithms to solve these problems. Formal proof techniques and impossibility results.
Prerequisites: grad st; CompSci 517(P), 535(P), or 523(P).
Current Offerings: http://uwm.edu/schedule

COMPSCI 725 Robot Motion Planning
3 cr. Graduate.
Configuration space, C-obstacles, sampling-based algorithms, potential fields, coverage, hierarchical motion planning, human control, relaxation, moving or deformable obstacles, multirobot motion planning, metrics, outdoor planning.
Prerequisites: grad st
Current Offerings: http://uwm.edu/schedule

COMPSCI 729 Real-Time Operating Systems
3 cr. Graduate.
Fundamentals of real-time operating systems with emphasis on scheduling and resource management.
Prerequisites: grad st
Current Offerings: http://uwm.edu/schedule

COMPSCI 730 Advanced Computer Networks
3 cr. Graduate.
Network architecture, protocols, routing, congestion control, traffic management, ATM, optical networks, TCP/IP, LANs, WANs, QOS, wireless and mobile networks, mobility management, security, multimedia, network management.
Prerequisites: CompSci 520 (P).
Last Taught: Fall 2014, Fall 2010, Fall 2009, Fall 2008.
Current Offerings: http://uwm.edu/schedule

COMPSCI 732 Type Systems for Programming Languages
3 cr. Graduate.
Lambda calculus, simple types, record types, subtypes, polymorphic types, type reconstruction, universal types, bounded quantification, higher-order types.
Prerequisites: grad st; CompSci 431(P) & 654(P).
Last Taught: Fall 2016, Spring 2015, Spring 2014, Fall 2011.
Current Offerings: http://uwm.edu/schedule

COMPSCI 737 Software Project Management
3 cr. Graduate.
Concepts and techniques for management of large software projects. Life cycle models; team organization; cost estimation and budgeting; schedule and risk management; software metrics.
Prerequisites: grad st; CompSci 361(P) or equivalent
Current Offerings: http://uwm.edu/schedule

COMPSCI 738 Program Analysis for Software Engineering
3 cr. Graduate.
Static techniques for determining run-time properties of a program: data-flow analysis, abstract interpretation.
Prerequisites: grad st.
Current Offerings: http://uwm.edu/schedule

COMPSCI 743 Intelligent User Interfaces
3 cr. Graduate.
Principles, methods, and current research in intelligent user interfaces including applications, architectures, knowledge representation, and evaluation.
Prerequisites: grad st.
Last Taught: Fall 2017, Fall 2015, Spring 2014, Fall 2012.
Current Offerings: http://uwm.edu/schedule

COMPSCI 744 Text Retrieval and Its Applications in Biomedicine
3 cr. Graduate.
Fundamental issues and current research in text retrieval, text classification and their biomedical applications; Programming and use of indexing, query processing, and document retrieval methods.
Prerequisites: grad st; COMPSCI 351(P) or HCA 442 (P)
Course Rules: Not open to students who have cr in HCA 744, COMPSCI 444, or HCA 444.
Last Taught: Spring 2015, Spring 2013, Fall 2010, Fall 2007.
Current Offerings: http://uwm.edu/schedule

COMPSCI 747 Principles & Practices of User Interface Design
3 cr. Graduate.
Principles and practices of user interface design for desktop, web, and mobile applications: interaction principles; UI design elements; user-centered design process and practices.
Prerequisites: grad st.
Current Offerings: http://uwm.edu/schedule
COMPSCI 754 Compiler Construction and Theory
3 cr. Graduate.
Fundamentals of compiler construction for modern programming languages. Syntax analysis, table organization, storage administration, semantic routines and code generation.
**Prerequisites:** grad st.
**Course Rules:** Not open to those who have cr in CompSci 654.
**Last Taught:** Spring 2018, Spring 2016, Spring 2015, Spring 2013.
**Current Offerings:** [http://uwm.edu/schedule](http://uwm.edu/schedule)

COMPSCI 755 Information and Coding Theory
3 cr. Graduate.
Information measures, entropy, source coding, channel's theorems, channel capacity, error correcting codes, linear codes, convolutional codes, arithmetic codes, encoding and decoding algorithms.
**Prerequisites:** grad st.
**Course Rules:** Not open to students who have cr in CompSci 654.
**Last Taught:** Fall 2017, Fall 2016, Fall 2015, Fall 2014.
**Current Offerings:** [http://uwm.edu/schedule](http://uwm.edu/schedule)

COMPSCI 757 Data Base Organization and File Structure
3 cr. Graduate.
Introduction to automatic information organization and retrieval. Dictionary construction and operation, statistical and syntactic operations, performance evaluation of retrieval systems, design of query languages, models of database systems, database security.
**Prerequisites:** grad st; CompSci 217(P) & 535(P).
**Course Rules:** Not open to students who have cr in ElecEng 758, which is identical to CompSci 758.
**Last Taught:** Spring 2014, Fall 2011, Spring 2010, Spring 2009.
**Current Offerings:** [http://uwm.edu/schedule](http://uwm.edu/schedule)

COMPSCI 758 Advanced Computer Architecture
3 cr. Graduate.
Advanced topics in computer architecture including pipeline processing, multiple and parallel processing systems, performance enhancement issues and VLSI computing structures.
**Prerequisites:** grad st; CompSci 458(NP) or ElecEng 458(NP).
**Course Rules:** Not open to students who have cr in ElecEng 758, which is identical to CompSci 758.
**Last Taught:** Fall 2013, Fall 1997, Fall 1995, Spring 1994.
**Current Offerings:** [http://uwm.edu/schedule](http://uwm.edu/schedule)

COMPSCI 759 Data Security
3 cr. Graduate.
Protection of data in computer and communication systems, cryptography, classical one key and public key cryptosystems, database protection, operating system security.
**Prerequisites:** grad st; CompSci 217(P) & 536(P).
**Course Rules:** Not open to students who have cr in ElecEng 760, which is the same as CompSci 760.
**Last Taught:** Fall 2017, Fall 2016, Fall 2014, Spring 2013.
**Current Offerings:** [http://uwm.edu/schedule](http://uwm.edu/schedule)

COMPSCI 760 Computer Systems Performance Evaluation
3 cr. Graduate.
Performance measurement and tools, workload characterization, markov models, queuing theory, simulation, benchmarks, data analysis, parallel systems performance analysis.
**Prerequisites:** grad st; CompSci 458(P) or ElecEng 458(P).
**Course Rules:** Not open to students who have cr in ElecEng 760, which is the same as CompSci 760.
**Last Taught:** Fall 2017, Fall 2016, Fall 2014, Spring 2013.
**Current Offerings:** [http://uwm.edu/schedule](http://uwm.edu/schedule)

COMPSCI 761 Software Testing and Verification
3 cr. Graduate.
Software testing techniques: test case generation, test oracles, regression testing, structural testing, test coverage, mutation testing, and model-based testing. Testing for object-oriented and distributed software. Security testing.
**Prerequisites:** grad st; CompSci 361(P) or equivalent
**Current Offerings:** [http://uwm.edu/schedule](http://uwm.edu/schedule)

COMPSCI 762 Fault-Tolerant Computing
3 cr. Graduate.
Faults in digital circuits, fault detection, fault location, system reconfiguration or repair, system recovery, design for testability, self-checking circuits, fault-tolerant interconnection networks, systems level fault-diagnosis, fault-tolerant software.
**Prerequisites:** grad st; ElecEng 354(P).
**Course Rules:** Not open to students with cr for ElecEng 762.
**Current Offerings:** [http://uwm.edu/schedule](http://uwm.edu/schedule)

COMPSCI 780 Multimedia Systems
3 cr. Graduate.
Survey of principles and applications of multimedia computer systems. Media fundamentals. Networking, architecture, software engineering, and user interface issues.
**Prerequisites:** CompSci 537(P).
**Course Rules:** Not open to students with cr for ElecEng 762.
**Last Taught:** Spring 2015, Spring 2010, Spring 2005, Fall 2001.
**Current Offerings:** [http://uwm.edu/schedule](http://uwm.edu/schedule)

COMPSCI 781 Knowledge Representation
3 cr. Graduate.
Study of the design and properties of formalisms for representing knowledge in computational systems. Topics include: first-order logic, nonmonotonic logic, uncertainty, time, space, beliefs, plans.
**Prerequisites:** grad st; CompSci 710(P).
**Last Taught:** Fall 2014, Spring 2011.
**Current Offerings:** [http://uwm.edu/schedule](http://uwm.edu/schedule)
COMPSCI 854 Advanced Compiler Techniques
3 cr. Graduate.
Details of compiler construction: syntax theory, attribute grammars, implementing advanced language features, optimization
Prerequisites: grad st; CompSci 654(P) or 754(P)
Last Taught: Fall 2015, Fall 2010.
Current Offerings: http://uwm.edu/schedule

COMPSCI 859 Advanced Cryptography and Security Protocols
3 cr. Graduate.
Elliptic curve cryptography, AES, cryptanalysis, secret sharing, zero knowledge proofs, provable security.
Prerequisites: grad st; CompSci 469(P) & CompSci 535(P), or CompSci 759(P)
Last Taught: Spring 2012, Fall 2008.
Current Offerings: http://uwm.edu/schedule

COMPSCI 870 Medical Informatics Seminar
1 cr. Graduate.
Presentations by medical informatics affiliated faculty and invited speakers. Graduate students may present their work or published research from recent medical informatics journals or conferences.
Prerequisites: grad st.
Course Rules: Meets once every two weeks for 100 minutes.
Last Taught: Spring 2018, Fall 2017, Spring 2017, Fall 2016.
Current Offerings: http://uwm.edu/schedule

COMPSCI 880 Bioengineering Seminar
1 cr. Graduate.
Presentations by bioengineering affiliated faculty, invited speakers, and graduate students.
Prerequisites: grad st
Course Rules: MechEng 880, ElecEng 880, CompSci 880, MatlEng 880, IndEng 880 & Civ Eng 880 are jointly offered and count as repeats of one another. May be repeated to 3 cr. max.
Last Taught: Spring 2015, Fall 2012.
Current Offerings: http://uwm.edu/schedule

COMPSCI 888 Candidate for Degree
0 cr. Graduate.
Available for graduate students who must meet minimum credit load requirement.
Prerequisites: grad st.
Course Rules: Fee for 1 cr assessed.
Last Taught: Summer 2017, Summer 2016, Spring 2016, Fall 2015.
Current Offerings: http://uwm.edu/schedule

COMPSCI 990 Masters Thesis
1-9 cr. Graduate.
Prerequisites: grad st; cons instr.
Current Offerings: http://uwm.edu/schedule

COMPSCI 995 Master’s Capstone Project
1-3 cr. Graduate.
Independent project supervised by student’s adviser
Prerequisites: grad st; cons instr & grad prog comm.
Last Taught: Spring 2018, Fall 2017, Spring 2017, Fall 2016.
Current Offerings: http://uwm.edu/schedule

COMPSCI 998 Doctoral Thesis
1-12 cr. Graduate.
Prerequisites: grad st; cons instr & grad prog committee.
Current Offerings: http://uwm.edu/schedule

COMPSCI 999 Advanced Independent Study
1-3 cr. Graduate.
Prerequisites: grad st; cons instr & grad prog comm.
Current Offerings: http://uwm.edu/schedule

COMPSCI 999 Doctoral Thesis
1-12 cr. Graduate.
Prerequisites: grad st; cons instr & grad prog committee.
Current Offerings: http://uwm.edu/schedule

COMPSCI 999 Master’s Capstone Project
1-3 cr. Graduate.
Independent project supervised by student’s adviser
Prerequisites: grad st; cons instr & grad prog comm.
Last Taught: Spring 2018, Fall 2017, Spring 2017, Fall 2016.
Current Offerings: http://uwm.edu/schedule