

the operation of NMR instrumentation and the interpretation of organic compound NMR spectroscopic results. Prerequisite: CHEM 336 and CHEM 339 or equivalent, or consent of instructor. Student must have at least junior standing to register for this course.

CHEM 440- Thermodynamics Credits: 4.00

The study of chemical systems from thermodynamics, equilibrium and phase rule perspectives. Prerequisite: CHEM 206 and MATH 253 or consent of instructor. Student must have at least junior standing to register for this course.

CHEM 441- Quantum Mechanics Credits: 4.00

Introduction to classical waves. Development of the formalism of quantum mechanics. Study of important quantum mechanical models including the harmonic oscillator and the hydrogen atom. Prerequisite: PHYS 223, CHEM 206 and MATH 253 or consent of instructor. Student must have at least junior standing to register for this course.

CHEM 442- Chemical Dynamics Credits: 4.00

Kinetic theory of gases, chemical kinetics in the gas phase and solution phase, reaction mechanisms, symmetry elements, and other physical chemistry topics. Prerequisite: CHEM 206 and MATH 253 or consent of instructor. Student must have at least junior standing to register for this course.

CHEM 443- Thermodynamics Lab Credits: 1.00

Selected experiments to exemplify topics in thermodynamics. Prerequisite: CHEM 440 or concurrent. Student must have at least junior standing to register for this course.

CHEM 444- Quantum Mechanics Lab Credits: 1.00

Selected experiments to exemplify topics in quantum

mechanics. Prerequisite: CHEM 441 or concurrent enrollment. Student must have at least junior standing to register for this course.

CHEM 445- Chemical Dynamics Lab Credits: 1.00

Selected experiments to exemplify topics in chemical dynamics. Prerequisite: CHEM 442 or concurrent enrollment. Student must have at least junior standing to register for this course.

CHEM 450- Structural Biochemistry Credits: 4.00

The structures and functions of the major classes of biologically important molecules, and the study of enzyme kinetics and catalysis. Prerequisite: CHEM 336 or equivalent, or consent of instructor. Student must have at least junior standing to register for this course.

CHEM 451- Metabolic Biochemistry Credits: 4.00

Exploration of metabolic pathways in living organisms from a chemical perspective. Specific topics, discussed at the molecular level, are selected from, but not limited to the following: Anabolic and catabolic pathways, electron transport, proton pumping, ATP production and biosignaling. Prerequisite: CHEM 450 Structural Biochemistry. Student must have at least junior standing to register for this course.

CHEM 454- Biochemistry Lab Credits: 2.00

Introduction of standard biochemical laboratory techniques and their application to solving biochemical and biochemically-related problems. Prerequisite: CHEM 450 or equivalent or consent of instructor. Student must have at least junior standing to register for this course.

Eastern Oregon University

Computer Science/ Multimedia Studies

PROGRAM OBJECTIVES

Students in the Computer Science/Multimedia Studies program prepare for a future in software development and the use of computer technology to solve complex problems. An initial core of classes introduces students to general principles of programming and multimedia development. Upon completion of the core students choose either a concentration in computer science, scientific and statistical computing, or multimedia studies.

Students in the computer science concentration will learn to design and develop software systems for industrial, scientific, and commercial applications. They will acquire an

understanding of computer operating systems, programming, data structures and algorithms, and systems analysis. Graduates will be prepared to work in the private or public sectors as programmers, analysts, or software engineers, or to proceed to advanced study.

The Statistical and scientific computing concentration focuses on applications development for chemistry, physics, biology and biochemistry along with newer disciplines such as geographic information systems, bioinformatics, genomics and business intelligence systems. Students in the SSC concentration are encouraged to minor in Mathematics.

Students completing a degree in the multimedia studies concentration will be prepared to design and develop interactive multimedia products for use in education, industry, or the non-profit sector. These graduates will be able to design and assemble CD, DVD, or Web delivered titles, and will be prepared to work in publishing, training support, or many other areas.

LEARNING OUTCOMES

All program graduates will:

- understand the process of software design and development;
 1. be able to develop functional specifications for a product;
 2. be able to design the interface for the product, taking into account the characteristics of the material and anticipated users;
 3. choose the appropriate development environment for the product;
 4. select the appropriate data representations and algorithms to provide optimal performance;
 5. create a robust, efficient, maintainable final product; and
 6. develop complete documentation for the finished package.
 - understand how to integrate revisions into existing software packages
 - understand how to communicate effectively with user populations and other software developers to collaboratively develop new packages. In addition to the three core outcomes listed above, graduates in the computer science and SSC concentration will:
 - demonstrate proficiency in several programming languages, including procedural and object-oriented languages;
 - demonstrate understanding of computer operating systems and how to develop programs that work at the system level;
 - analyze situations and develop appropriate solutions, even if the solutions do not require the use of a computer.
- In addition to the core outcomes, graduates in the multimedia studies track will:
- demonstrate proficiency in the use of one or more authoring tools for the development of interactive software for stand-alone or web use;
 - demonstrate general understanding of how various media (still images, video, and audio) are represented and manipulated in digital environments; and
 - demonstrate ability to appropriately integrate various digital media into an interactive product.

MEANS OF ASSESSMENT

The outcomes for each class will be clearly stated on the syllabus. Assessments for courses will address both the conceptual and applied aspects of the class. Means of assessment include projects, quizzes and exams. The objectives for projects and other assigned work tie directly into course outcomes.

In addition to course-level assessment, the program provides for assessment of the students' abilities to integrate concepts from the entire spectrum of coursework. Each student is required to develop a capstone project prior to graduation. The precise nature of the capstones vary according to specific student interests, but generally include the complete design documents for a software product and the finished product itself.

REQUIREMENTS FOR THE BACHELOR OF SCIENCE & BACHELOR OF ARTS IN COMPUTER SCIENCE / MULTIMEDIA STUDIES

(Foreign language proficiency is a requirement for the B.A. degree.)

In addition to General Education requirements, B.S. and B.A. degree candidates for Computer Science/Multimedia Studies should complete a total of 71-81 credit hours. A grade of "C-" or better is required for each course. A minimum overall GPA of 2.00 for all courses is required for completion of the degree.

Required core courses for CS or MM concentration (for B.A. and B.S.) (27-37 Credits)

- CS 121** Introduction to Software Development (1)
- CS 161** Foundations of CS I (4)
- CS 162** Foundations of CS II (4)
- CS 260** Data Structures (4)
- CS 370** User Interface Design (3)
- MM 225** Introduction to Multimedia Development (3)
- MM 252** Intro Web Authoring (3)
- MM 315** Multimedia Design (3)
- CS 401** or **MM 401** Capstone (1-6)
- CS 407** or **MM 407** Seminar (1-6)

Computer Science concentration requires the following courses in addition to the core (25 credits)

- CS 221** C/C++ Programming (4)
- CS 248** Unix Programming (3)
- CS 311** Operating Sys (3)
- CS 318** Algorithm Analysis (4)
- CS 335** Networking and Network Administration (4)
- CS 344** Systems Analysis (3)
- CS 360** Object-Oriented Programming With C++ (4)
- CS 430** Database Management Systems (3)

The Computer Science concentration requires the following related area requirements (16 credits)

- MATH 231** Discrete Math (4)
- MATH 251** Calculus I (4)
- MATH 252** Calculus II (4)
- MATH 341** Linear Algebra (4)

Elective courses for the Computer Science track (choose from below) (4 credits)

- CS 301** Assembly Language Programming (4)
- CS 310** Special Topics (1-5)
- CS 314** Computer Architecture (4)
- CS 321** Computing Theory (3)
- CS 327** Compiler Design (3)
- CS 380** Software Engineering (4)
- CS 381** Programming Languages (4)
- CS 409** Practicum (1-12)
- CS 410** Special Topics (1-5)
- CS 427** Numerical Computation (3)
- CS 428** Web Architecture and Programming (4)
- CS 440** Artificial Intelligence (4)

The Statistical and Scientific Computing concentration requires the following courses in addition to the core (13 credits):

- CS 221** C/C++ Programming (4)
- CS 248** Unix Programming (3)
- CS 427** Numerical Computation (3)
- CS 430** Database Mgmt System (3)

The Scientific and Statistical Computing concentration requires the following related area courses (33 credits hours):

- MATH 231** Discrete Mathematics (4)
- MATH 251, 252, 253** Calculus I, II, III (12)
- MATH 341** Linear Algebra (4)
- STAT 327** Statistics & Exp. Design (5)
- MATH 361** Probability and Statistics (4)
- MATH 462** Applied Regression Analysis (4)

Note: Students in the SSC concentration are encouraged to complete a Math minor by adding MATH 382 Structure of Number Systems.

The Multimedia concentration requires the following courses in addition to the core (9 credits):

- MM 319** Multimedia Programming (3)
- MM 327** Introduction to Computer Graphics Applications (3)
- MM 350** Multimedia Theory (3)

Multimedia concentration requires the following related area requirements (16 hours)

- ART 120** Design (4)
- ART 227** Graphics (4)
- MATH 112** Pre calculus (4)
- MATH 231** Discrete Math (4)

Elective courses required for the Multimedia concentration (choose from below) (21 credits) (May include a maximum of 15 cr. hours selected from CS electives list)

- ENG 195** Introduction to Film (4)
- MM 310** Selected Topics (1-5)
- MM 352** Intermediate Web Authoring (3)
- MM 360** 3-D Graphics & Animation (3)
- MM 364** Digital Video Production (3)
- MM 366** Video Post-Production (3)
- MM 409** Practicum (1-12)
- MM 410** Selected Topics (1-5)
- MM 419** Advanced Multimedia Programming (3)
- MM 420** Multimedia Simulation (3)

- MM 452** Advanced Web Authoring (3)
- WR 243** Screen Writing Fundamentals (4)
- WR 330** The Electronic Word (3)

TYPICAL FOUR YEAR CURRICULA FOR COMPUTER SCIENCE AND MULTIMEDIA STUDIES CONCENTRATIONS

CS Concentration Option One: Student places into MATH 251

TYPICAL FIRST YEAR CURRICULUM

Fall

- CS 121** Introduction to Software Development
- CS 161** Foundations of CS I
- MATH 251** Calculus I
- General Education (3–6 credits)

Winter

- CS 162** Foundations of CS II
- MATH 252** Calculus II
- General Education (4–7 credits)

Spring

- CS 260** Data Structures
- MATH 231** Discrete Math
- MM 225** Intro. MM Develop.
- General Education (3–6 credits)

TYPICAL SECOND YEAR CURRICULUM

Fall

- CS 221** C/C++ Programming
- MATH 341** Linear Algebra
- MM 252** Intro Web Authoring
- General Education (3–6 credits)

Winter

- CS 248 UNIX** Programming
- General Education (6–8 credits)

Spring

- CS 335** Networking
- General Education (9–12 credits)

TYPICAL THIRD YEAR CURRICULUM

Fall

- CS 318** Algorithm Analysis
- CS 344** Systems Analysis
- MM 315** Multimedia Design
- General Education (6 credits)
- Electives (3–6 credits)

Winter

- CS 360** Object Oriented Prog.
- General Education (6 credits)
- Electives (3–6 credits)

Spring

- CS 311** Operating Systems
- CS 430** Database Mgmt
- CS 370** Interface Design
- General Education (6 credits)
- Electives (3–6 credits)

TYPICAL FOURTH YEAR CURRICULUM**Fall**

General Education (6 credits)
Electives (3–6 Credits)

Winter

CS/MM 407 Seminar
General Education (3–6 credits)
Electives (3–6 credits)

Spring

CS 401 Capstone
General Education (3–6 credits)
Electives (6–9 credits)

CS Concentration Option Two: Student places into MATH 111

TYPICAL FIRST YEAR CURRICULUM**Fall**

CS 121 Introduction to Software Development
General Education (7–10 credits)

Winter

CS 161 Foundations of CS I
MATH 111 Algebra
General Education (4–7 credits)

Spring

CS 162 Foundations of CS II
MATH 112 Precalculus
MM 225 Intro. MM Develop.
General Education (3-5 credits)

TYPICAL SECOND YEAR CURRICULUM**Fall**

CS 221 C/C++ Programming
CS 260 Data Structures
MATH 251 Calculus I
MM 252 Intro to Web Authoring
MM 315 Multimedia Design

Winter

CS 248 UNIX Programming
MATH 252 Calculus II
General Education (6-8 credits)

Spring

CS 335 Networking
MATH 231 Discrete Math
General Education (3-4 credits)

TYPICAL THIRD YEAR CURRICULUM**Fall**

CS 318 Algorithm Analysis
CS 344 Systems Analysis
MATH 261 Linear Algebra
General Education (6 credits)

Winter

CS 360 Object Oriented Prog.
General Education (6 credits)
Electives (3–6 credits)

Spring

CS 311 Operating Systems
CS 370 Interface Design
CS 430 Database Mgmt
General Education (6 credits)
Electives (3–6 credits)

TYPICAL FOURTH YEAR CURRICULUM

Is the same as for Option One (above)
Statistical and Scientific Computing Concentration

TYPICAL FIRST YEAR CURRICULUM**Fall**

CS 121 Introduction to Software Development
CS 161 Foundations of CS I
MATH 251 Calculus I
General Education (6 credits)

Winter

CS 162 Foundations of CS II
MATH 252 Calculus II
General Education (7 credits)

Spring

CS 260 Data Structures
MATH 231 Discrete Math
MATH 253 Calculus III
General Education (4 credits)

TYPICAL SECOND YEAR CURRICULUM**Fall**

CS 221 C/C++ Programming
MM 252 Intro Web Authoring
MATH 341 Linear Algebra
MM 225 Intro to Multimedia Develop
General Education (2 credits)

Winter

CS 248 Unix Programming
Electives (4-6 credits)
General Education (6-8 credits)

Spring

STAT 327 Stat & Exp Design
Elective (4-5 credits)
General Education (6-7 credits)

TYPICAL THIRD YEAR CURRICULUM**Fall**

MM 315 Multimedia Design
Electives (6 credits)
General Education (6 credits)

Winter

Electives (7-8) credits
General Education (7-8 credits)

Spring

CS 430 Database Management
Electives (6 credits)
General Education (6 credits)

TYPICAL FOURTH YEAR CURRICULUM

Fall

MATH 361 Probability & Statistics
Electives (5–6 credits)
General Education (5-6 credits)

Winter

MATH 462 Applied Regression
CS 407 Seminar
Electives (9 credits)

Spring

CS 401 Capstone
Electives (9-14 credits)

MM CONCENTRATION

TYPICAL FIRST YEAR CURRICULUM

Fall

CS 121 Introduction to Software Development
MM 225 Introduction to MM Develop
MATH 111 Algebra
General Education (3–6 credits)

Winter

CS 161 Foundations of CS I
MATH 112 Precalculus
General Education (3-6 credits)

Spring

CS 162 Foundations of CS II
MATH 231 Discrete Math
General Education (4-6 credits)

TYPICAL SECOND YEAR CURRICULUM

Fall

MM 252 Intro Web Authoring
MM 315 Multimedia Design
General Education (5-8 credits)

Winter

ART 120 Design
ART 227 Graphics
Electives (3–6)
MM 319 MM Programming
General Education (6-8 credits)

Spring

CS 260 Data Structures
Elective (3 credits)
General Education (3-5 credits)

TYPICAL THIRD YEAR CURRICULUM

Fall

Electives (3-6 credits)
General Education (6-12 credits)

Winter

MM 327 Introduction to Computer Graphics
MM 350 Multimedia Theory
Electives (3–6) credits
General Education (6-9 credits)

Spring

CS 370 Interface Design
Electives (6-9 credits)
General Education (6-9 credits)

TYPICAL FOURTH YEAR CURRICULUM

Fall

MM Electives (3–6 credits)
General Education (6-8 credits)

Winter

CS/MM 407 Seminar
MM Electives (3–6 credits)
General Education (3–6 credits)

Spring

MM 401 Capstone
General Education (3–6 credits)
Electives (6–9 credits)

MINOR IN COMPUTER SCIENCE

The Computer Science minor is intended for student who seek a basic understanding of software engineering and systems analysis. It includes the required introductory courses in the foundations of CS and data structures, operating systems, user interface design and the theory of object oriented programming. Students also have the opportunity to select one or two electives in upper division CS courses of interest.

1. A minimum of 31 graded credits as follows:

CS 161 Fndtns of Computer Science I (4)
CS 162 Fndtns of Computer Science II (4)
CS 221 C/C++ Programming (4)
CS 260 Data Structures (4)
CS 311 Operating Systmes (3)
CS 360 Object-Oriented Programming (4)
CS 370 Interface Design (3)
Upper Division CS Electives (5)

2. A minimum grade of "C-" required for each course with a cumulative average GPA of 2.00 or more for all courses required for the minor.

3. A minimum of 10 hours required the minor must be completed at Eastern Oregon University.

4. Students may earn only one of the three minors offered by the CS/MM program. Students may not earn a minor in their concentration. Students completing one of the CS/MM concentrations must have faculty approval before pursuing a minor in one of the other concentrations, and must still earn a minimum of thirty credits in addition to the credits applied toward the concentration.

MINOR IN MULTIMEDIA STUDIES

The Multimedia Studies minor provides student with knowledge and skills to augment educational, business, or entertainment practice with interactive multimedia. Students complete a limited core of courses introducing fundamental concepts and then add electives to provide additional skills in web development, videography, computer graphics, or digital audio.

1. A minimum of 31 graded credits as follows:
CS 161 Fndtns of Computer Science (4)
MM 125 Fndtns of Digital Media (3)
MM 225 Intro Multimedia Development (3)
MM 252 Intro Web Authoring (3)
MM 315 Multimedia Design (3)
 Upper Division CS/MM Electives (15)

2. A minimum grade of "C-" required for each course with a cumulative average GPA of 2.00 or more for all courses required for the minor.

3. A minimum of 10 hours required for the minor must be completed at Eastern Oregon University.

4. Students may earn only one of the three minors offered by the CS/MM program. Students may not earn a minor in their concentration. Students completing one of the CS/MM concentrations must have faculty approval before pursuing a minor in one of the other concentrations, and must still earn a minimum of thirty credits in addition to the credits applied toward the concentration.

MINOR IN STATISTICAL AND SCIENTIFIC COMPUTING

The Statistical and Scientific Computing minor provides students with grounding in applications development for chemistry, physics, biology and biochemistry, along with newer disciplines such as geographic information systems, bioinformatics, genomics and business intelligence systems. In addition to the core courses in Foundations of Computer Science and Data Structures, the minor requires one year (three terms) of C/C++ programming courses along with database management and the student's choice of one or more elective upper division classes in CS.

1. A minimum of 31 graded credits as follows:
CS 161 Fndtns of Computer Science I (4)
CS 162 Fndtns of Computer Science II (4)
CS 221 C/C++ Programming (4)
CS 260 Data Structures (4)
CS 360 Object-Oriented Programming (4)
CS 427 Statistical & Scientific Computing (3)
CS 430 Database (3)
 Upper Division CS Electives (5)

2. A minimum grade of "C-" required for each course with a cumulative average GPA of 2.00 or more for all courses required for the minor.

3. A minimum of 10 hours required for the minor must be completed at Eastern Oregon University.

4. Students may earn only one of the three minors offered by the CS/MM program. Students may not earn a minor in their concentration. Students completing one of the CS/MM concentrations must have faculty approval before pursuing a minor in one of the other concentrations, and must still earn a minimum of thirty credits in addition to the credits applied toward the concentration.

COMPUTER SCIENCE/MULTIMEDIA COURSE DESCRIPTIONS

CS 110 - Selected Topics Credits: 1.00 TO 6.00

An in-depth presentation of a topic of interest to both students and faculty. Topics will vary from year to year depending on the interests and availability of faculty. Prerequisites: May be required for some topics.

CS 121 - Intro Software Development Credits: 1.00

This survey course introduces computer software, the process of its development, and its uses in contemporary society. Topics include data representation, basic computer architecture, and categories of software including multimedia products, end-user applications, process-control, and scientific computing.

CS 140 - Microcomputer Syst Credits: 3.00

Emphasis is placed on the technical details of the microcomputer system as a whole in order to produce sophisticated users. This course focuses on microcomputer operating systems, their structures and relations to the microcomputer architecture, a technical understanding of information flow through the microcomputer and its hardware interfaces. This course also introduces the Internet, networking, and communications protocols such as TCP/IP.

CS 161 - Foundations Of CS I Credits: 4.00

Includes structured programming, computer organization, social and ethical issues in computer science. Prerequisite: MATH 111.

CS 162 - Foundations Of CS II Credits: 4.00

Includes structured programming, computer organization, social and ethical issues in computer science. Prerequisites: CS 161, MATH 111.

CS 209 - Field Placement Credits: 1.00 TO 15.00

CS 210 - Selected Topics Credits: 1.00 TO 6.00

An in-depth presentation of a topic of interest to both students and faculty. Topics will vary from year to year depending on the interests and availability of faculty. Prerequisites: May be required for some topics

CS 221 - C/C++ Programming Credits: 4.00

An introduction to the basics of programming as used in C and C++, including selection statements, loops, arrays, string handling, pointers, registers and functions. Practical exercises will require the construction, compilation, debugging, and execution of complete programs that implement given algorithms to solve simple problems. The emphasis in this course will be on the common features of C and C++; however memory allocation and the use of pointers will be discussed in the context of the ANSI C implementation. Prerequisite: CS 162; and CS 260 (may be taken concurrently).

CS 248 - Unix Programming Credits: 3.00

The essentials of UNIX tool programming will be covered with the use of high-level programming languages, utilities, and toolkits. Topics include UNIX shells and essential utilities and network security issues, and high-level networking and protocol basics. Provides students with an opportunity to

team the tools and programming languages that will help them make the best use of UNIX. Prerequisite: CS 221.

CS 260 - Data Structures Credits: 4.00

An introduction to various implementations of commonly used data structures and their applications. Topics include lists, stacks, queues, trees and hash tables. Prerequisite: CS 162.

CS 301 - Assembly Lang Programming Credits: 4.00

Introduction to machine organization, machine structure, data representation, digital logic, and assembly language programming. Prerequisite: CS 260. Student must have at least sophomore standing to register for this course.

CS 301L - Assembly Lang L Credits: .00**CS 310 - Selected Topics Credits: 1.00 TO 5.00**

An in-depth presentation of a topic of interest to both students and faculty. Topics will vary from year to year depending on the interests and availability of faculty. Prerequisite: May be required for some topics. Student must have at least sophomore standing to register for this course.

CS 311 - Operating Systems Credits: 3.00

The principles and problems involved in the development of a computer operating system. Overview of the development of operating systems, sequential and con-current processes, cooperation, communication and mutual exclusion, synchronization constructs: monitors, conditional critical regions, semaphores; deadlocks, resource allocation, scheduling policies, storage management. Prerequisite: CS 248. Student must have at least sophomore standing to register for this course.

CS 314 - Computer Architecture Credits: 4.00

Hardware systems, computer architectures, and their interrelationships in advanced microcomputer systems. Parallel architectures, virtual memory architectures, and memory management strategies are discussed. Data representation, memory organization, input-output processing, stack computers, parallel computers, pipeline architecture, and microprogramming. Prerequisite: CS 301. Student must have at least sophomore standing to register for this course.

CS 318 - Algorithm Analysis Credits: 4.00

The analysis of variety of algorithms that arise frequently in computer applications. Basic principles and techniques for analyzing and improving algorithms in areas such as List Searches, Sorting, Pattern Recognition, Polynomial and Matrix Computations. Prerequisite: MATH 231 and CS 260. Student must have at least sophomore standing to register for this course.

CS 321 - Computing Theory Credits: 3.00

Includes automata, complexity, Turing machines, unsolvable problems. Prerequisite: CS 318. Student must have at least sophomore standing to register for this course.

CS 327 - Compiler Design Credits: 3.00

The design and implementation of compiler and run-time systems for high-level languages, and the interaction among language design, compiler design, and run-time organization.

Prerequisite: CS 321. Student must have at least sophomore standing to register for this course.

CS 335 - Networking/Network Admin Credits: 4.00

An introductory examination of the Open System Interconnection Reference Model (OSI). Topics covered include network architecture, data flow control, transmission control, path control, recovery, and routing techniques. Prerequisite: CS 311. Student must have at least sophomore standing to register for this course.

CS 344 - Systems Analysis & Design Credits: 3.00

Introduction to fundamental concepts of object-oriented software development. Covers requirements determination and specification and systems design using the Unified Modeling Language (UML). Emphasis is placed on methods of iterative and incremental software development. Prerequisite: CS 260. Student must have at least sophomore standing to register for this course.

CS 360 - Object-Orient Prog With C++ Credits: 4.00

A study of object oriented programming with C++. Beginning and intermediate concepts are covered including classes, objects, member functions, overloading, inheritance, polymorphism, templates, and virtual functions. Prerequisite: CS 221, 260. Student must have at least sophomore standing to register for this course.

CS 370 - User Interface Design Credits: 3.00

Introduces principles of human-computer interface design and methodologies of implementation, evaluation, and research in human-computer interaction. Topics include user psychology, dialog styles, error handling and reporting, system response time, user documentation and help systems, and "intelligent" interfaces. Discusses techniques for the implementation and testing of human-computer interfaces. Prerequisite: MM 252 and MM 315 (concurrently). Student must have at least sophomore standing to register for this course.

CS 380 - Software Engineering Credits: 4.00

Emphasis is on the specification, organization, implementation, testing, and documentation of software. Inherent problems, challenges, tools, and methods of a large software project. Presents methods and tools used in the various stages of software production. This course should prepare students for the problems they will encounter as software professionals. Prerequisite: CS 344. Student must have at least sophomore standing to register for this course.

CS 381 - Programming Languages Credits: 4.00

Concepts of high-level programming languages. Syntax and semantics of several existing languages. Compilers, interpreters and formal syntax specification. Prerequisite: CS 360. Student must have at least sophomore standing to register for this course.

CS 390 - History Of Computing*AEH Credits: 2.00**Gen Ed Core-Aesthetics & Humanities**

Beginning with the introduction of symbolic notation and early attempts at mechanical computers, this course will trace the history and origins of modern computing until the present day. Prerequisite: An interest in the history of science and the

relationship of technology and society. Student must have at least sophomore standing to register for this course.

CS 401 - Capstone Credits: 1.00 TO 6.00

Prerequisite: Senior level or Consent of instructor. Student must have at least junior standing to register for this course.

CS 407 - Seminar Credits: 1.00 TO 6.00

Prerequisite: Junior or Senior standing. Student must have at least junior standing to register for this course.

CS 409 - Practicum Credits: 1.00 TO 12.00

Students gain practical experience in a professional or pre-professional setting. Prerequisites: Upper-division standing and consent of instructor. Student must have at least junior standing to register for this course.

CS 410 - Selected Topics Credits: 1.00 TO 5.00

An in-depth presentation of a topic of interest to both students and faculty. Topics will vary from year to year depending on the interests and availability of faculty. Prerequisites: May be required for some topics. Student must have at least junior standing to register for this course.

CS 427 - Numerical Computation Credits: 3.00

Introduction to numerical methods. Includes topics from elementary discussion of errors, polynomials, interpolation, quadrature, linear systems of equations, and solution of nonlinear equations. Prerequisite: MATH 261, CS 360. Student must have at least junior standing to register for this course.

CS 428 - Web Architecture/Programming Credits: 4.00

This course will cover some of the emerging technologies in the area of dynamic Web page development and Web server programming, including DHTML, XML, and Java Server Pages. Prerequisite: CS 430. Student must have at least junior standing to register for this course.

CS 430 - Database Mgmt System Credits: 3.00

Analysis, design, and implementation of data systems in relation to information transfer. Prerequisite: CS 318, CS 344. Student must have at least junior standing to register for this course.

CS 440 - Artificial Intelligence Credits: 4.00

Basic concepts of intelligent systems and artificial intelligence programming: representation, control, communication and perception, and neural networks. Prerequisite: MATH 261 and CS 318. Student must have at least junior standing to register for this course.

MULTIMEDIA STUDIES COURSE DESCRIPTIONS

MM 110 - Selected Topics Credits: 1.00 TO 5.00

Study of a principle or practice in computer-enhanced multimedia.

MM 121 - Intro Software Development Credits: 1.00

This survey course introduces computer software, the process of its development, and its uses in contemporary society. Topics include data representation, basic computer architecture, and categories of software including multimedia

products, end-user applications, process-control, and scientific computing. (Cross listed as CS 121.)

MM 125 - Fndtns Of Digital Media Credits: 3.00

Introduces the process of digitizing media such as images, audio, and video, and the use of software tools used to manipulate digital media.

MM 210 - Selected Topics Credits: 1.00 TO 5.00

Study of a principle or practice in computer-enhanced multimedia.

MM 225 - Intro Multimedia Development Credits: 3.00

Introduces students to the capabilities of interactive multimedia and its uses in education, industry and entertainment. Students review the roles of various types of software applications and experiment with authoring tools to create one or more small projects.

MM 252 - Intro Web Authoring Credits: 3.00

Topics covered in this course include history of the Internet, Internet protocols, and HTML. Students will apply this knowledge to create web pages using HTML and simple web-authoring tools. Emphasis in this class is how basic web pages work and how to design pages that are effective and efficient. Student must have at least sophomore standing to register for this course.

MM 262 - Intro To Digital Audio Credits: 3.00

This class introduces students to the history, theories, and technical aspects particular to the production of digital audio. Students will focus on critical examination of aural media and extend their expertise of gathering and editing audio content for use in multimedia applications.

MM 310 - Selected Topics Credits: 1.00 TO 5.00

Advanced study of a principle or practice in computer-enhanced multimedia. Student must have at least sophomore standing to register for this course.

MM 315 - Multimedia Design Credits: 3.00

Covers the design process for multimedia products, including the development life cycle and basic interface design issues. Each student will design a significant multimedia product and use a typical authoring environment to create a working prototype. Prerequisites: ART 129 and MM 225. Student must have at least sophomore standing to register for this course.

MM 319 - Multimedia Programming Credits: 3.00

Students learn to design databases and use authoring tools' built-in scripting languages to reduce the overhead for a multimedia product. Students will also apply the scripting language to accomplish other sophisticated effects. Prerequisites: CS 162, MM 315. Student must have at least sophomore standing to register for this course.

MM 327 - Intro to Cmptr Graphics Applic Credits: 3.00

This course introduces basic principles important in using bitmap and vector graphics, including resolution, color depth, and file compression schemes. Students will use representative bitmap and vector graphics programs to complete projects that demonstrate the basic capabilities

of this type of software. Prerequisite: ART 227 or ART 129. Student must have at least sophomore standing to register for this course.

MM 350 - Multimedia Theory Credits: 3.00

Study of selected principles from various disciplines underlying multimedia creation, expression, communication, and argumentation. Prerequisite: MM 225 and Junior standing. Student must have at least junior standing to register for this course.

MM 352 - Intermed Web Authoring Credits: 3.00

This is an intermediate level course in web site development using current web authoring tools. Topics covered include web site planning, design concepts, use of authoring tool software, creation of interactive web elements, and web site organization. Emphasis will be placed on creating dynamic and interactive client-side web objects using the Dreamweaver authoring tool. Prerequisite: MM 252 or equivalent HTML knowledge. Student must have at least sophomore standing to register for this course.

MM 360 - 3-D Graphics & Animation Credits: 3.00

Introduces the use of three dimensional computer modeling tools for the creation of still and moving images. Topics include spline editing, virtual lighting and rendering. Prerequisite: MM 327 and Junior standing. Student must have at least sophomore standing to register for this course.

MM 362 - Digital Audio Production Credits: 3.00

This is a course in the principles and practices of modern digital audio recording and production. This course is designed to benefit students that have audio interests for musical, theatre, multimedia, film and other applications. Prerequisite: MM 262. Student must have at least sophomore standing to register for this course.

MM 364 - Digital Video Prod Credits: 3.00

Covers storyboarding, video production and assembly of video using digital editing tools. Topics include lighting and use of camera angles and movements. Students will create complete productions appropriate for use in multimedia products. Prerequisite: WR 243 or ENGL 195. Student must have at least sophomore standing to register for this course.

MM 366 - Video Post-Production Credits: 4.00

Covers the editing of video using digital video editing and special effects tools. Students will continue the series of MM 362 and 364 with the goal of making a 12 minute digital video. Prerequisite: MM 364. Student must have at least sophomore standing to register for this course.

MM 368 - 2D Digital Animation Credits: 3.00

This course introduces the principles, practice and theory of 2D animation design for interactive multimedia products. Student must have at least sophomore standing to register for this course.

MM 401 - Capstone Credits: 1.00 TO 6.00

Prerequisite: Senior level or Consent of instructor Student must have at least junior standing to register for this course.

MM 405 - Reading & Conference Credits: 1.00 TO 4.00

Opportunity for advanced students to design and complete a multimedia project. Prerequisite: Completion of 90 hours of coursework, consent of instructor, and a clear statement of a proposed project. Student must have at least junior standing to register for this course.

MM 407 - Seminar Credits: 1.00 TO 6.00

Student must have at least junior standing to register for this course.

MM 409 - Practicum Credits: 1.00 TO 12.00

Students gain practical experience in a professional or pre-professional setting. Prerequisite: Upper-division standing and Consent of instructor Student must have at least junior standing to register for this course.

MM 410 - Selected Topics Credits: 1.00 TO 5.00

Advanced study of a principle or practice in computer-enhanced multimedia. Student must have at least junior standing to register for this course.

MM 419 - Adv Multimedia Programming Credits: 3.00

This course expands student knowledge of the use of software design and the scripting tools that are built in to authoring environments for the development of sophisticated multimedia products for education, entertainment, and business. Prerequisite: MM 319 and Junior standing. Student must have at least junior standing to register for this course.

MM 420 - Multimedia Simulation Credits: 3.00

This course introduces the use of multimedia authoring tools to create simulations for education and entertainment. Students will examine various general approaches to simulating situations and virtual environments. Prerequisite: MM 319 and Junior standing. Student must have at least junior standing to register for this course.

MM 426 - Ind Proj In Multimedia Credits: 1.00 TO 4.00

Provides opportunity for the student to acquire additional depth and personal achievement in any multimedia area beyond what is supplied by usual course offerings. Student must have at least junior standing to register for this course.

MM 452 - Advanced Web Authoring Credits: 3.00

This course covers the use of advanced tools for web site production. Topics will include java applets, forms, common gateway interfaces, and other state-of-the-art methods. Precise content will vary as technology advances. Prerequisites: CS 162, MM 252 and Junior standing. Student must have at least junior standing to register for this course.