
Remedial procedures and intervention programs for language impaired children. S
Pre: CDIS 402

615 (2) Seminar: Speech Sound Disorders

Advances in basic research and practices as they pertain to speech sound problems. S
Pre: CDIS 438

616 (2) Seminar: Voice Problems

Advances in basic research and practice related to voice and resonance problems. S
Pre: CDIS 416

621 (3) Motor Speech Disorders

Apraxia and dysarthria of speech and dysphagia. Causes, assessment and management. S
Pre: CDIS 410

675 (2) Seminar: Selected Topics in Communication Disorders

Course content varies among speech disorders topics with each offering. Variable

677 (1-6) Individual Study

Advanced individual study in a specific area. All terms

694 (1-2) Alternate Plan Paper

All terms

695 (2) Clinical Practicum in Communication Disorders

Supervised delivery of clinical services.
Pre: admission to grad program and 25 hours of observation

698 (1-12) Internship

Pre: CDIS 692 and a minimum of 25 clinical hours. All terms

699 (3) Thesis

All terms

COMMUNITY HEALTH MS

*College of Allied Health and Nursing
Health Science Department
213 Highland North • 507-389-1527*

See **HEALTH SCIENCE**

COMPUTER SCIENCE MS

*College of Science, Engineering & Technology
Computer Science Department
273 Wissink Building • 507-389-2968*

Chair: Colin Wightman, Ph.D.

Gregg Asher, Ph.D., Cyrus Azarbod, Ph.D., David Haglin, Ph.D., Dean Kelly, Ph.D., Ann Quade, Ph.D., Richard Roiger, Ph.D., Hamed Sallam, Ph.D., Julio Sanchez, Ph.D., Susan Schilling, MA, James Slack,

Ph.D., Mahbubur Rahman Syed, Ph.D., Leon Tietz, Ph.D., Christophe Veltsos, Ph.D., Michael Wells, Ph.D.

The Master of Science degree in Computer Science program of study prepares the student for a career as a computer professional, yet offers enough flexibility to allow a student to design a course of study suitable for preparation for doctoral work in computer science. The program is designed to offer graduate level educational opportunities with an applied science perspective. It addresses the preservice as well as occupational and career advancement needs of baccalaureate prepared computer scientists. The program objectives are:

1. To address the needs of Minnesota's public and private enterprises by providing opportunities within the state of Minnesota for graduate study in applied computer science.

2. To provide a graduate degree program for practicing computer scientists who have clearly defined academic needs related to professional advancement and/or specialization.

3. To offer a graduate program for baccalaureate students who want to continue their education and gain specialized knowledge and skills in computer science. To expand the functional role of the Computer and Information Sciences Department in service to the Mankato area and the state of Minnesota.

4. These objectives are met by a curriculum with core studies in software and knowledge engineering and research methods. The core studies provide the foundation upon which students develop an academic program appropriate to their interests, culminating in a research experience.

Admission. In addition to meeting the general admission requirements of the College of Graduate Studies, successful applicants must meet the following requirements for admission:

1. The Graduate Record Examination (GRE) is required (contact department for specific requirements).

2. Applicants must have an undergraduate degree in computer science, computer information systems, management information systems or a related field. Students with other backgrounds will be granted provisional admission and required to complete undergraduate courses in core areas of computer science.

Financial Assistance. Teaching, Lab Project and Research Assistantships requiring professional computer knowledge are available in the CIS Department and various administrative offices. Deadlines are March 1 for fall and October 1 for spring.

COMPUTER SCIENCE MS
(Thesis Plan - 30 cr)

(Alternate Plan Paper - 34 cr)

Required Core (13 cr)

- COMS 600 Research Methods (3)
- COMS 602 Research Seminar (1)
- COMS 631 Knowledge-Based Systems (3)
- COMS 640 Advanced Database Systems (3)
- COMS 680 Software Engineering Project (3)

Required 600 level Computer Science

Electives (6 cr)

Choose at least 6 credits from the following

- COMS 601 Research Topics (3)
- COMS 610 Algorithm Analysis (3)
- COMS 611 Theory of Computation (3)
- COMS 630 Advanced Artificial Intelligence (3)
- COMS 641 Distributed Database Systems (3)

Required Computer Science Electives (4-12 cr)

Choose any 5/600 level elective courses from the CIS Department.

The following courses cannot be used as electives:

- COMS 591, 691.

Required Non-departmental Electives (3-6 cr)

Choose any 5/600 non-departmental elective courses selected in consultation with an advisor

Required Thesis or Alternate Plan Paper

- COMS 699* Thesis (3-6)
- COMS 694* Alternate Plan Paper (1-2)

*Before registering for COMS 694 or COMS 699, the student must satisfy the comprehensive examination requirement and must have successfully completed the core courses.

Comprehensive Examination Requirement

The comprehensive examination will contain questions from the computer science core except for COMS 602. The comprehensive examination will be waived if the student obtains a 3.5 GPA in the core courses or achieves 60% or better on the subject GRE in computer science.

COURSE DESCRIPTIONS

500 (4) Computers in Society

Confronts participants with complex social and ethical issues associated with computers. Through thoughtful questions, informative readings, and the analysis of dichotomous viewpoints, course participants will gain insight into the complexity of the technology-related issues discussed as well as the lack of simplistic solutions to the problems.

510 (4) Abstract Machines and Grammars

Study of a variety of computational models including finite state machines, regular expressions, context-free grammars, and Turing machines. For each model, we develop, study and apply techniques for determining those languages which are computable using a particular model, as well as properties of those

languages.

Pre: MATH 375

511 (4) Parallel and Distributed Processing

Practical parallel programming experiences. Parallel programming languages, parallel algorithm design and analysis, parallel architectures.

Pre: COMS 210

512 (4) Graphics

Concepts and algorithms used in computer graphics, including polygonal and curved images in both 2 and 3 dimensions, representation of solid objects, and color and illumination models.

Pre: COMS 210, MATH 247

520 (4) Computer Organization II

Advanced topics in computer architecture including a major emphasis on measuring and improving computer performance. Topics include advances in pipelining and analysis and optimization of storage systems and networks, multiprocessor challenges and trends.

Pre: COMS 320

530 (4) Artificial Intelligence

Artificial intelligence problem solving techniques including predicate logic and the resolution principle. Artificial intelligence programming languages, machine learning, neural network models and object oriented methods are discussed.

Pre: COMS 230

532 (4) Robotics

Current practice and future directions in robotics including robot anatomy, kinematics, sensors, sensor interfacing and fusion, mobile robotics, real-time programming, vision and image processing algorithms, subsumption architecture.

Pre: COMS 260 or 320, MATH 247

540 (4) Database Management Systems II

Extensive coverage of query processing and optimization; concurrence control and recovery and security and integrity in centralized/distributed environments. Team-oriented projects in heterogeneous client server environment.

Pre: COMS 340

550 (4) Operations Research II

A second course in operations research for majors and non-majors. Topics include computer simulation, game theory, stochastic processes, queuing theory, Markov processes, and reliability. Simulation topics include Monte Carlo methods, discrete and continuous simulations, simulation languages and packages.

Pre: COMS 350 and either STAT 352 or 354

560 (4) Operating Systems

This course covers basic operating systems concepts including processes, interprocess communication, interprocess synchronization, deadlock, memory allocation, segmentation, paging, resource allocation,

scheduling, performance evaluation, file systems, storage, devices, protection, security, privacy and distributed systems.

Pre: COMS 320

562 (4) Data Communications and Networks I

An introduction to the foundations of computer networking. The course encompasses telecommunications, local area networks, wide area networks, and wireless communications. Topics covered include the OSI model, TCP/IP, network topologies and associated hardware, error detection and correction, protocols and security.

Pre: COMS 112

563 (4) Data Communications and Networks II

This course concentrates on providing system administration and client/server development experience. It uses the client/server networking lab to provide exposure to Netware, Windows NT and UNIX network operating systems as well as client/server applications development.

Pre: COMS 562

570 (4) Compiler Construction

Principles and techniques of compiler construction. Development of efficient parsers and scanners; manual and automatic approaches. Optimization techniques and code generation.

Pre: COMS 370

580 (4) Software Engineering

The software life cycle from specification and design phases through construction and maintenance. Object-oriented design and analysis techniques. Software testing, reliability assessment. Software modularity, portability, reusability. Project management.

Pre: COMS 280 and 340

581 (4) Rapid Application Development

In-depth understanding of low and high CASE tools and rapid application development. CASE tools will range from traditional software development life cycle to object-oriented client/server environments. Extensive team-oriented applications will be developed using tools such as SYNON, OBSYDIAN, Power Builder, and MS-SQL server.

Pre: COMS 280

591 (1-6) In-Service in Computer Science

This course is designed to meet the needs of kindergarten through twelfth grade practicing teaching majors who wish to enhance their technology-related skills and knowledge. Both lab and lecture activities are used to provide participants guided experiences with current applications of technology.

Pre: consent

592 (3) Computers in the Classroom

Using both a lecture and lab format, this course

provides students with a foundation for developing computer-delivered instruction within the classroom by examining the hardware and software which are part of emerging technologies, and the research issues associated with the developing effective instruction using the computer.

593 (3) Computer-Based Instructional Systems

This course provides participants with opportunities to develop, implement, and assess formative and summative evaluation instruments; identify researchable issues in computer-delivered instruction; develop computer-delivered instruction using a sophisticated authoring tool.

595 (1) Seminar in Computer Science

Through reading, small group discussion and presentations, explores topics not normally covered in the curriculum.

Pre: consent

596 (1-4) Selected Topics in Computer Science

Special topics not covered in other courses. May be repeated for credit on each new topic.

Pre: consent

597 (1-6) Internship

This course is designed to provide students with an opportunity to utilize their training in a real-world business environment. Participants are placed and supervised in selected locations by the internship coordinator for a minimum period of one semester while working under the guidance and direction of a full-time staff member.

Pre: Completion of computer science core and consent

598 (1-2) Individual Study

Problems on an individual basis.

Pre: consent

600 (3) Research Methods

Research methodology in general, and in computer science. Data and research sources. Analysis of existing research. Preliminary planning and proposals. Conceptualization, design, and interpretation of research. Good reporting.

Pre: an elementary statistics course

601 (3) Research Topics

Special topics in computer science research not covered in other courses. May be repeated for credit on each new topic.

602 (1) Research Seminar

Students attend seminar presentations and present a research topic at one of the seminars.

Pre: consent

611 (3) Theory of Computation

Computation using Turing machines, logic, oracles, alternating Turing machines, and interactive proof systems. Various aspects of computational complexity including NP-completeness, Co-NP, P parallel-

complexity theory, their relationships, counting classes and the polynomial time hierarchy are discussed.

Pre: COMS 510

610 (3) Algorithm Analysis

Brings together fundamental methods in order to provide access to the best method(s) for algorithm usage and analysis.

Pre: COMS 510

630 (3) Advanced Artificial Intelligence Systems

This course is a continuation of Artificial Intelligence (COMS 530). Emphasis is placed on advanced topics and the major areas of current research within the field. Theoretical and practical issues involved with developing large-scale systems are covered.

Pre: 530

631 (3) Knowledge-Based Systems

The design of large scale knowledge-based systems. Emphasis on both theoretical and practical issues. Examination of alternative knowledge representation techniques and problem solving methods used to design knowledge-based systems.

Pre: COMS 530

640 (3) Advanced Database Systems

In-depth study of advanced topics such as object-oriented databases, intelligent database systems, parallel databases, database mining and warehousing, distributed database design and query processing, multi-database integration and interoperability, and multilevel secure systems.

Pre: 540

641 (3) Distributed Database Processing

Introduction to distributed database systems, resource allocation, homogeneous vs. heterogeneous databases, schema integration, distributed concurrency control and recovery, and other topics dealing with distributed database processing.

Pre: COMS 540

677 (1-4) Individual Study

Problems on an individual basis.

Pre: consent

680 (3) Software Engineering Project

Advanced software design, analysis, and development techniques under realistic time and budget constraints. Hands-on project management techniques. Emphasis of concepts through immersion in a team project of significant size.

Pre: COMS 580

690 (3) Statistical Inference Packages

Statistical package programs used in data collection, transformation, organization, summarization, interpretation and reporting. Statistical description and hypothesis testing with statistical inference. Interpreting outputs. Chi-square, correlation, regression, analysis of variance, nonparametrics, and

other designs. Accessing and using large files (U.S. Census data, National Health Survey, etc.)

Pre: a statistics course

691 (1-6) In-Service in Computer Science

A course designed to upgrade the qualifications of persons on-the-job.

Pre: consent

694 (1-2) Alternate Plan Paper

Preparation of a Master's Degree alternate plan paper under the direction of the student's graduate advisor.

Pre: consent

699 (3-6) Thesis

Preparation of a Master's Degree thesis under the direction of the student's graduate advisor.

Pre: consent

COUNSELING AND STUDENT PERSONNEL MS

College of Education

Counseling and Student Personnel Department

Armstrong Hall 107 • 507-389-2423

Chair: Diane Coursol, Ph.D.

Richard Auger, Ph.D., Anne Blackhurst, Ph.D., JoAnne Brandt, Ph.D., Jacqueline Lewis, Ph.D., Walter Roberts Jr., Ed.D., L.P.C., John Seymour, Ph.D.

The need for professional counselors in schools, colleges and social agencies is increasing. The professional counselor is a product of an intensive graduate program which specifically prepares students to take their place in this expanding occupation. The staff of this nationally accredited program are dedicated to offering three challenging specialization areas.

The Council for the Accreditation of Counseling and Related Educational Programs (CACREP), a specialized accrediting body recognized by the American Counseling Association and the Council on Postsecondary Accreditation (COPA), has conferred national accreditation to the following program areas in the Department of Counseling and Student Personnel: Professional Community Counseling, Professional School Counseling, and Student Affairs Practice in Higher Education.

The Counseling and Student Personnel Department prepares students at the graduate level through the following specialization areas: College Student Affairs, Professional Community Counseling and Professional School Counseling (K-12 and Elementary, Middle, and Secondary School licensure areas). The department also provides service courses for students from a variety of majors within the university for professional development, including an undergraduate course in Decision Making/Career Life. This course is specifically designed