covered in the areas of intelligence, adaptive behaviors, behavior management measures, personality, and psychopathology. The end goal of the course is competence in administering a complete battery of tests and writing a professional report on the results.

PSYC 689 (3) Standards and Ethics
Details the principles and standards put forth by the APA to guide the profession of psychology. The course is oriented towards those going into either a career in therapy (i.e., clinical, counseling, or school psychology) or industrial/organizational psychology.

PSYC 691 (2) Clinical Practicum I
Students are placed in clinical settings under the supervision of a licensed psychologist. Placements vary among hospitals, private clinics, and county mental health agencies. Clinical Practicum I covers the first 150 clock hours of the 300 hours needed to fulfill the practicum requirement.
Prerequisite: admitted to clinical master's program OR permission of Director of Clinical Training

PSYC 692 (2) Clinical Practicum II
Extension of Practicum I. Students complete the second 150 hours of the 300 hours of supervised practice.
Prerequisite: admitted to clinical master's program, OR permission of Director of Clinical Training

PSYC 694 (1-2) Alternate Plan Paper
Individualized student paper based on an extensive review of literature in some area of psychology.

PSYC 695 (2) Research in Industrial/Organizational Psychology I
Developing research proposals/projects, ethic committee review, implementing consulting projects, data collection, report writing, presentation to professional societies, and submitting funding requests.
Prerequisite: consent

PSYC 696 (3) Research Clinical Psychology I
Students participate on laboratory teams with clinical faculty. Teams develop research proposals and write ethics committee proposals. Projects include clinical field studies, survey studies, and single subject intervention. Students are expected to present findings at meetings of professional associations.
Prerequisite: permission of instructors, Director of Clinical Training, and admission to clinical program

PSYC 697 (2) Research in Industrial/Organizational Psychology II
Continuation of Research in Industrial/Organizational Psychology I.
Prerequisite: consent

PSYC 698 (3) Research in Clinical Psychology II
Continuation of Research in Clinical Psychology I.
Prerequisite: Permission of instructors, Director of Clinical Training, and admission to clinical program

PSYC 699 (3-6) Thesis
Individualized student research paper which involves a literature review and original research.

COMMUNICATION DISORDERS MS

College of Allied Health & Nursing
Department of Speech, Hearing, and Rehabilitation Services
103 Armstrong Hall • 507-389-1414

Chair: Bruce Poburka, Ph.D.
Graduate Coordinator: Patricia Hargrove, Ph.D.

Cynthia Busch, Ph.D.; Patrica Hargrove, Ph.D.; Judith Kuster, MS; Bonnie Lund, Ph.D.; Carol Myhre, MS; Wayne S. Quirk, Ph.D.; Rene Shellum, MS

Communication Disorders is a discipline in human services offering graduates rewarding careers in speech and language pathology. A Master of Science program is available for students who have an undergraduate major in communication disorders or its equivalent. Employment opportunities are commonly available in schools, hospitals, rehabilitation centers, and private practice. The thesis or the alternate plan programs, when combined with students' undergraduate preparation, lead to the academic and practicum requirements for the Certificate of Clinical Competence (CCC) in Speech Pathology issued by the American Speech, Language and Hearing Association (ASHA). Effective January 1, 1994, all graduate work applied toward the CCC must have been initiated and completed at a program accredited by the Council on Academic Accreditation (CAA) of ASHA. The Graduate Program in Communication Disorders is accredited by CAA.

Program Purpose. It is the purpose of the Master of Science Program in Communication Disorders to provide a high quality of student preparation leading to careers in human services for persons with communication disorders and to promote scientific investigation in the normal and abnormal development and use of speech, language and hearing.

Admission. Applications for admission are competitive and must be received by February 1 for admission for the following fall semester. If a vacancy occurs during the academic year, mid-year admission is possible. Approximately ten new admissions are accepted each year. To take graduate level courses, applicants must have been admitted by the College of Graduate Studies and Research. Competitive applicants should have attained (1) a Graduate Record Examination (GRE) score of at least 1200 (2) a grade point average (GPA) of 3.00 or better on a 4.0 scale in 40 undergraduate credits in the basic sciences coursework, as required by the ASHA to meet Standard II, A of the Standards for the Certificate of Clinical Competence, and (3) a minimum of 6 semester credits of coursework appropriate to Standard II, B, professional coursework. Applicants who have not attained the above GPA (3.00) may be admitted provisionally on the basis of their performance on the GRE (contact department for specific requirements and prior experience). Three statements of recommendation are also required as well as submission of a writing sample in the form of a letter of intent.

Financial Assistance. A limited number of graduate assistantships in Communication Disorders are available. Application can be obtained from the department or from the College of Graduate Studies and Research and should be filed by February 1 for the following academic year or until positions are filled.

Graduate study in Communication Disorders is fundamentally different than undergraduate work, as graduate students are expected to demonstrate superior academic performance. To be recommended by the faculty for graduation, each student's Plan of Study is reviewed individually for deficiencies.

Since ASHA allows both graduate and undergraduate credits to be applied to certification in speech, graduate students must complete the residual course credits between their undergraduate credits and the total ASHA requirements, as well as the University minimums for theses or alternate plan paper options. Similarly, they must meet the ASHA standard for clock hours of clinical practicum and at least 250 of these hours must be earned at the graduate level. At least 50 percent of students' academic credits must be at the 600 level, excluding the thesis and APP credits. With its emphasis on competency in becoming a speech clinician, students must have experienced clinical supervision by at least two different faculty supervisors. Internship 698 is also required of all graduate students to improve their clinical competencies.

Students graduate on faculty recommendation. Students should be aware the 50 clock hours of supervised practicum is required in a minimum of three different clinical settings. More than one internship may be necessary to meet this requirement, depending upon the student's undergraduate preparation.

Honesty Policy. As members of Minnesota State University, Mankato community, students assume the responsibility to meet the academic obligations in a fair and honest manner. This responsibility includes avoiding such activities as cheating, plagiarism or collusion. Please refer to the University policy on academic honesty for definitions of terms and explanations.

COMMUNICATION DISORDERS MS
(Thesis Plan - 51 credits)
(Alternate Plan Paper - 52 credits)

Required Core (45-46 credits)

CDIS	518	Seminar: Stuttering (2)
CDIS	555	Supervising Paraprofessionals (Lab-Usually taken with 540) (1)
CDIS	540	Organization and Management of Clinical Pro.(2)
CDIS	577	Instrumentation & Technology in CDIS (3)
CDIS	588	Multicultural Issues (3)
CDIS	613	Naturalistic Eval. Children (3)
CDIS	614	Language Therapy and Children (3)
CDIS	615	Sem: Speech Sound Disorders (2)
CDIS	616	Seminar: Voice Problems (2)
CDIS	621	Motor Speech Disorders (3)
CDIS	675	Seminar: Selected Topics (2)
CDIS	695-01	Clinical Practicum SLP (2)
CDIS	695-02	Clinical Practicum SLP (2)
CDIS	522	Clinical Practicum Aud (2)
CDIS	698	Internship (1-12) May take more than one internship.

Other Electives to complete minimum

Required Research (3 credits)
CDIS 610

Required Thesis or Alternate Plan Paper
CDIS 694 Alternate Plan Paper (2)
CDIS 699 Thesis (3)

COURSE DESCRIPTIONS

CDIS 502 (2) Child Language Disorders
Types and characteristics of language disorders in children.
Prerequisite: admission to major or concurrent enrollment in CDIS 503, consent of instructor, special education majors F

CDIS 503 (1) Child Language Disorders Lab
Lab associated with CDIS 4/502. Practice in applying course content to the language of children.
Prerequisite: admission to major, or concurrent enrollment in CDIS 502, consent of instructor, special education majors F

CDIS 505 (3) Beginning Sign Language
The first in a sequence of courses which aim at the development of skills in the use of American Sign Language as a form of communication with persons who are hearing impaired or deaf.
F,S

CDIS 506 (3) Intermediate Sign Language
The second in a sequence of courses which aim at the development of skills in the use of American Sign Language as a form of communication with persons who are hearing impaired or deaf.
Prerequisite: CDIS 4/505 F,S

CDIS 507 (3) Advanced Sign Language
The third in a sequence of courses which aim at the development of skills in the use of American Sign Language as a form of communication with persons who are hearing impaired or deaf.
Prerequisite: CDIS 4/506 F,S

CDIS 510 (3) Neurological Bases of Speech

CDIS 516 (3) Voice & Resonance Disorders
Description, etiology, assessment, and management of voice and resonance disorders.
Prerequisite: admission to major or consent of instructor F

CDIS 517 (3) Stuttering
Description, etiology, assessment, and management of fluency disorders.
Prerequisite: admission to major, consent of instructor S

CDIS 518 (2) Seminar: Stuttering
Advances in basic research and practices.
Prerequisite: CDIS 417 F

CDIS 520 (3) Seminar: Advanced Audiology
Seminar in audition and advanced audiologist concepts for the speech/language pathologist.
Prerequisite: admission to major, consent of instruction F

CDIS 521 (3) Aural Rehabilitation
Habilitative audiology and the instruction of the hearing-impaired, including hearing aids, speech reading, and auditory training.
Prerequisite: admission to major or consent of instructor Variable

CDIS 522 (2) Clinic Practicum: Audiology
Clinical practice with hearing-handicapped children and adults.
Prerequisite: admission to major; CDIS 301, 421; GPA 2.8 in major F,S

CDIS 523 (2) Educational Audiology
Management of hearing impaired children in school settings.
Prerequisite: admission to major or consent of instructor Variable

CDIS 524 (1) Overview of Dysphagia

CDIS 526 (1) Advanced Diagnosis and Treatment of Dysphagia

CDIS 531 (1) Orientation Lab
Supervised observation of the diagnostic and remedial management of speech and language disorders.
Prerequisite: admission to major plus concurrent enrollment in 4/534 S

CDIS 534 (2) Orient to Clinical Practicum
Procedures and operation of the clinical program in communication disorders.
Prerequisite: admission to major plus concurrent enrollment in CDIS 4/531 S

CDIS 535 (3) Augmentative Communication

CDIS 538 (3) Speech Sound Disorders
Description, etiology, assessment, and management of speech sound problems.
Prerequisite: Admission to major or consent of instructor plus concurrent enrollment in CDIS 4/539 (Speech Sound Lab) F

CDIS 540 (2) Organization & Management of Clinical Speech Programs
Delivery of clinical services in schools, hospitals, rehabilitation centers, and other settings.
Prerequisite: concurrent enrollment in CDIS 555 Supervising Paraprofessionals F

CDIS 544 (3) Appraisal & Diagnosis
Tests, measures, procedures, and processes for the evaluation and diagnosis of speech and language.
Prerequisite: admission to major or consent of instructor S

CDIS 545 (1) Grand Rounds-Foundation
Observation of clinical case studies.
V

CDIS 546 (2) Grand Rounds-Presentation
Presentation of clinical case studies.
V

CDIS 555 (1) Supervising Paraprofessionals
Advances in basic practices of paraprofessionals.
Prerequisite: concurrent enrollment in CDIS 540 F

CDIS 569 (2-3) Hearing Disorders

CDIS 577 (3) Instrumentation & Technology in SHRS
Explains and demonstrates the use of instrumentation and technology in the acquisition of knowledge about the analysis of human communication disorders.
S

CDIS 610 (3) Research Comm Disorders
Exposure to research design of professional literature.
F

CDIS 611 (3) Craniofacial Anomalies

CDIS 612 (5) Child Language Assessment & Therapy

CDIS 613 (3) Naturalistic Eval Child
Non-standardized, informal assessment techniques of children's language disorders.
Prerequisite: CDIS 402 S

CDIS 614 (3) Language Therapy Children
Remedial procedures and intervention programs for language impaired children.
Prerequisite: CDIS 402 S

CDIS 615 (2) Sem: Speech Sound Disorder
Advances in basic research and practices as they pertain to speech sound problems.
Prerequisite: CDIS 438 S

CDIS 616 (2) Sem: Voice Problems
Advances in basic research and practice related to voice and resonance problems.
Prerequisite: CDIS 416 S

CDIS 619 (3) Adult Language Disorders

CDIS 621 (3) Motor Speech Disorders
Apraxia and dysarthia of speech and dysphagia. Causes, assessment, and management.
Prerequisite: CDIS 410 S

CDIS 675 (1-3) Sem: Selected Topics
Course content varies among speech disorders topics with each offering.
V

CDIS 677 (1-6) Individual Study
Advanced individual study in a specific area. All terms

CDIS 688 (3) Multicultural Issues in Speech, Hearing and Rehabilitation Services

CDIS 691 (1-6) Inservice

CDIS 694 (1-2) Alternate Plan Paper

CDIS 695 (2) Clinic Prac: Comm Disord
Supervised delivery of clinical services.
Prerequisite: admission to graduate program and 25 hours of observation

CDIS 698 (1-12) Internship
Prerequisite: CDIS 692 and a minimum of 25 clinical hours.

CDIS 699 (3) Thesis

COMMUNITY HEALTH MS

College of Allied Health and Nursing
Department of Health Science
213 Highland Center N • 507-389-1527

See **HEALTH SCIENCE**

COMPUTER SCIENCE MS

College of Science, Engineering & Technology
Department of Computer and Information Sciences
273 Wissink Hall • 507-389-2968

Chair: Colin Wightman, Ph.D.
Graduate Coordinator: Christophe Veltsos, 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 Department of Computer and Information Sciences 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 and Research, 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 credits)
(Alternate Plan Paper - 34 credits)

Required Core (13 credits)
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 credits)
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 credits)
Choose any 5/600 level elective courses from the Department of CIS.
The following courses cannot be used as electives: COMS 591, 691.

Required Non-departmental Electives (3-6 credits)
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

COMS 510 (4) Abstract Machines & 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. Prerequisite: MATH 375

COMS 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. Prerequisite: COMS 210, MATH 247

COMS 520 (4) Advanced Computer Organization
Advanced topics in computer architecture, including a major emphasis on measuring and improving computer performance. Topics include advances in pipeling and analysis and optimization of storage systems and networks, multiprocessor challenges and trends. Prerequisite: COMS 320

COMS 530 (4) Artificial Intelligence
Artificil 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.
Prerequisite: COMS 230

COMS 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, and subsumption architecture.
Prerequisite: COMS 260 or 320, MATH 247

COMS 540 (4) Database Management Systems II
Extensive coverage of query processing and optimization; also concurrence control and recovery and security and integrity in centralized/distributed environments. Team-oriented projects in heterogeneous client server environment.
Prerequisite: COMS 340

COMS 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 contiuous simulations, and simulation languages and packages.
Prerequisite: COMS 350 and either STAT 352 or 354

COMS 560 (4) Operating Systems
This course covers 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, and privacy and distributed systems.
Prerequisite: COMS 320