Communications Sciences and Disorders

The Department of Communication Sciences and Disorders (https://communication.northwestern.edu/programs/phd_communication_sciences_disorders/about.php) at Northwestern brings together researchers studying mechanisms and disorders of communication in an interdisciplinary setting. Research centers around basic and clinical aspects of speech, language, learning, hearing, and swallowing, but disciplines span physics, engineering, physiology, neuroscience, linguistics, biology, psychology, cognitive science, and education. Investigations range from the level of molecules to clinical trials.

The PhD program is designed to prepare the next generation of leaders in the field by providing coursework and in-depth research experience. Developing critical thinking, scientific writing, publishing, and grant-writing skills are major emphases throughout the program. Opportunities are available to develop skills through training in related areas such as statistics, programming, big data/data science, teaching, and clinical training in audiology (PhD-AuD). Students are prepared for careers in academia as well as industry, policy, and clinical practice.

Degrees Offered

- Communication Sciences and Disorders and Audiology PhD/AuD (https://catalogs.northwestern.edu/tgs/communication-sciences-disorders-audiology/communication-sciences-disorders-audiology-phd-aud)
- Communication Sciences and Disorders PhD (https://catalogs.northwestern.edu/tgs/communication-sciences-disorders/communication-sciences-disorders-phd)

Communication Sciences and Disorders Courses

CSD 302-0 Anatomy and Physiology of the Peripheral Hearing Mechanism (1 Unit)
Gross and fine structure; function of the peripheral auditory system. Prerequisites: junior standing or above, CSD 202-0, or consent of instructor.

CSD 306-0 Psychoacoustics (1 Unit)
Principles underlying perception of pitch, loudness, auditory space, auditory patterns, and speech. Psychophysical procedures for studying psychoacoustics and the impact of hearing impairment are considered.

CSD 310-0 Biological Foundations of Speech and Music (1 Unit)
Anatomy and physiology of the central auditory pathway, experience-related neural plasticity, right/left brain specialization, audiovisual integration, auditory learning and perception, and neural encoding of speech and music. Crosslisted with CSD 410-0 and SAI 502-0. Prerequisite: junior standing or consent of instructor.

CSD 334-0 Delivery Systems in Speech & Language Pathology (1 Unit)
Organization and administration of speech language pathology services in schools, health care agencies, and private practice.

CSD 369-0 Special Topics in Communication Sciences and Disorders (0.5-1 Unit)
Current scientific and professional problems in communication sciences and disorders. Topics vary by quarter.

CSD 376-0 Diagnostic & Remedial Approaches for Children With Learning Problems (1 Unit)
Introduction to the field of learning disabilities and its theoretical perspectives, assessment, and instruction principles, and to the process of clinical teaching. Emphasis on instruction, accommodation, service delivery, progress monitoring, and transition.

CSD 404-1 Experimental Design and Statistics in Communication Sciences and Disorders (1 Unit)

CSD 404-2 Experimental Design and Statistics in Communication Sciences and Disorders (1 Unit)

CSD 405-1 Instrumentation and Methods for Psychoacoustics (1 Unit)
Hands-on psychoacoustic instrumentation and methods, including required technical background. Students will complete at least one project using techniques learned in the course. Prerequisites: CSD 306-0 or equivalent, and computer programming.

CSD 405-2 Advanced Psychoacoustics (1 Unit)
Development of an in-depth understanding of auditory filtering and temporal resolution in normal and hearing-impaired listeners, comodulation masking release and pitch perception, all viewed through models of the peripheral auditory system. Prerequisites: CSD 302-0, CSD 306-0, and CSD 405-1 or equivalents.

CSD 410-0 Biological Foundations of Speech and Music (1 Unit)
Anatomy and physiology of the central auditory pathway, experience-related neural plasticity, right/left brain specialization, audiovisual integration, auditory learning and perception, and neural encoding of speech and music. Crosslisted with CSD 310-0 and SAI 502-0. Prerequisite: junior standing or consent of instructor.

CSD 412-0 Scientific Writing (1 Unit)
Principles of scientific writing for journals, dissertations, and grant proposals. Emphasis on mastering the structures for presenting concepts and data.

CSD 436-0 Working with Individuals with Cerebral Palsy (0.5 Unit)
An overview of cerebral palsy, including such topics as causes and types, symptomatology, typical and atypical motor development, associated disorders, speech and language and feeding characteristics of individuals with various types of cerebral palsy, and assessment and treatment.

CSD 444-0 Development and Disorders of Mathematics (1 Unit)
Theories and research on mathematical development and disorders. Identification, assessment, and remediation of disorders of mathematics and related areas.

**CSD 448-0 Clinical Writing for CSD (0.5 Unit)**  
Written documentation in professional practice. Knowledge of strategies for improving the quality of treatment reports and diagnostic evaluations. Strategies will focus on selection and prioritization of content, organization, clarity and editing.  
Prerequisite: graduate standing.

**CSD 499-0 Independent Study (0.5-3 Units)**  
May be repeated for credit. Consent of instructor and department required.

**CSD 507-0 Neural Mechanisms of Language Processing (1 Unit)**  
Topics in brain-behavior relationships, emphasizing normal and abnormal speech and language.

**CSD 511-0 Translational Research in Communication Sciences and Disorders (1 Unit)**  
Seminar on how all aspects of communication-sensory processing, cognitive/language factors, and motor processes interact in normal and disordered functioning, and how research can address treatment outcomes.

**CSD 513-0 Seminar: Problems in Speech Science (1 Unit)**  
Issues in speech science. Open to doctoral students.

**CSD 514-0 Topics in Peripheral Auditory Neuroscience (1 Unit)**  
Problems in the biophysics and physiology of hearing.

**CSD 516-0 Seminar: Experimental and Theoretical Aspects of Audiology (1 Unit)**  
Open to graduate students pursuing the PhD degree.

**CSD 525-0 Seminar: Topics in Central Auditory Neuroscience (1 Unit)**  
Neurobiology underlying perception and learning of complex sounds such as speech and music.  
Prerequisites: CSD 302-0.

**CSD 544-0 Responsible Conduct of Research in Communication Sciences and Disorders (0 Unit)**  
Overview of the Responsible Conduct of Research, with topics including the responsible conduct of CSD research in key areas identified by the National Institutes of Health; expectations about conduct within the research enterprise; research misconduct; and the role of the CSD scientist beyond the lab, including the global implications of research.

**CSD 545-0 Seminar: Professional Development (1 Unit)**  
Professional issues in the field of communication sciences and disorders. Topics include ethics, grants and funding, peer reviews and publishing, postdoctoral experiences, interviewing, and tenure.

**CSD 546-0 Directed Teaching in Communication Sciences and Disorders (1 Unit)**  
Guided teaching experience. Preparation and delivery of class lectures, as well as observation of teaching methods, preparation of the course outline, selection of readings, and writing of exam questions.

**CSD 550-1 Research Foundations in Communication Sciences and Disorders (1 Unit)**  
An introduction to scientific thinking as applied to Communication Sciences and Disorders. Topics to be covered include the scientific method, hypotheses versus predictions, the purpose of data collection, previous evidence, and scientific argumentation.

**CSD 550-3 Research Foundations in Communication Sciences and Disorders (1 Unit)**  
Focus on how to convey scientific ideas and findings, building on scientific thinking and experimental design covered in previous courses. Emphasis is placed on how to communicate effectively across spoken, written, and visual formats, and to a variety of audiences. Iterative assignments on different types of communication (e.g., elevator speech, short research talk, abstract) throughout the quarter.

**CSD 551-0 Topics in Communication Sciences and Disorders (1 Unit)**  
Reading, reviewing, and critiquing published research in a specific topic area in communication sciences and disorders. Topics to be announced.

**CSD 552-1 Laboratory Experiences in Communication Sciences and Disorders (1 Unit)**  
Experience in laboratory research in communication sciences and disorders.  
Prerequisites: Faculty permission.

**CSD 552-2 Laboratory Experiences in Communication Sciences and Disorders (1 Unit)**  
Experience in laboratory research in communication sciences and disorders.  
Prerequisites: Faculty permission.

**CSD 552-3 Laboratory Experiences in Communication Sciences and Disorders (1 Unit)**  
Experience in laboratory research in communication sciences and disorders.  
Prerequisites: Faculty permission.

**CSD 553-0 Computational Modeling in Communication Sciences and Disorders (1 Unit)**  
Introduction to the use of computer programming and computational modeling to address problems in communication sciences and disorders.

**CSD 555-0 Topics in Communication Sciences and Disorders (1 Unit)**  
Essential concepts in designing and interpreting experiments in communication sciences and disorders. The range of methods commonly used in sub-disciplines of CSD (i.e., biology, psychology and clinical studies), with an eye to the strengths and weaknesses of each. Selection of papers of interest on a given topic, and critique of the research design.

**CSD 556-0 Seminar: Current Topics in Learning Disabilities (1 Unit)**  
Review of areas of current research. May be repeated for credit with change of topic.

**CSD 589-0 Advanced Study and Research in Differential Diagnosis of Learning Disabilities (1 Unit)**  
Individual research in differential diagnosis of language and learning disabilities in adults.

**CSD 590-0 Research (1-3 Units)**  
Independent investigation of selected problems pertaining to thesis or dissertation. May be repeated for credit.