**Doctoral Education in Clinical Audiology**

**The AuD Degree**

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**California State University (CSU) Doctoral Programs in Clinical Audiology (AuD)**

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**INTRODUCTION**

***Purpose and Brief Description of the Proposed Program***

The purpose of this clinical doctoral program is to prepare audiologists to be highly skilled, independent practitioners and leaders in the diagnosis and rehabilitation of patients with hearing loss and balance disorders. Clinical doctoral degree programs (AuD) are designed to prepare students with a strong background in the scientific basis of audiology, evidence-based practice, and clinical competencies.

***American Academy of Audiology Statement (1991)***

# The Professional Doctorate (AuD)

# Introduction

The American Academy of Audiology endorses the concept of the professional doctorate in audiology as the appropriate entry-level degree for the practice of audiology.1,2 The advanced level of training the professional doctorate mandates is necessary to ensure the provision of the highest standards of delivery of service to individuals with auditory and other related disorders and to their families. The professional doctorate establishes audiologists in a clearly defined and prominent role within the hearing health care delivery system and strengthens their position as autonomous practitioners and providers of audiological services.3

### Policy Statements

The specific purpose of the professional doctorate in audiology is to prepare highly skilled practitioners. Professional doctorate programs in audiology must significantly exceed the academic and training experiences provided by Master's level programs and provide at least four years training and education after the completion of accredited Baccalaureate work.3 Such programs must demonstrate sufficient depth and breadth to warrant the doctoral designation.4 An entirely different degree designation, the AuD (Doctor of Audiology), is necessary to describe this professional degree and to differentiate it from the research-oriented PhD.

### Guiding Principles

The focus of an academic doctorate (PhD) is on research culminating in the dissertation for the PhD; the focus of the professional doctorate in audiology (AuD) is on the development of clinical proficiency. The PhD is defined as the mark of highest achievement in preparation for creative scholarship and research, often in association with a career in teaching at a university or college.5 The professional doctorate (AuD) is, the highest university award given in a particular field in recognition of completion of academic preparation for professional practice and does not require a dissertation for its completion.5

The primary objective of the AuD program is to produce audiologists who are functionally competent in providing the wide array of diagnostic, remedial and other skills and services associated with the practice of audiology. Hence, there is major emphasis on the clinical learning experience. Although the professional doctorate in audiology (AuD) is not a research-oriented degree, it is imperative that student-practitioners be familiar with the scientific and research literature that undergirds audiology, have the knowledge and the skills requisite to evaluate and interpret the audiological related research literature, and be able to synthesize and apply pertinent research knowledge to the problems of clinical practice.5

Ideally, AuD degree programs should be organized and implemented within sponsoring institutions, such as colleges and universities, that will provide for an independent school and faculty and should be constituted similar in nature to the degree programs which grant doctorates in other professions, such as dentistry, medicine, optometry, veterinary medicine, etc. Traditional graduate programs are structured to grant academic doctorates rather than professional doctorates. Consequently, AuD programs should be administered whenever possible independent of existing graduate school programs.6 They should be practitioner and patient-service driven, i.e., the basic orientation of the training programs should be to facilitate the development of the highest level of audiological skills in the student-practitioner, with concomitant emphasis on delivery of superior audiological services to the patient.

Considerable responsibility falls upon the clinical and academic faculty. It must be large and diverse enough to represent to the student-practitioners the leading edge of hearing care skills and services. Didactic instruction should focus on direct application of audiological sciences to hearing care needs.4 The faculty and the sponsoring institution will have the ultimate responsibility to evaluate formally the student-practitioner's progress and to assess the student-practitioner's mastery of the program's content, pursuant to the awarding of the AuD degree.

The Academy is fully aware the implementation of the professional doctorate in audiology (AuD) contains significant challenges and departures in audiological education, and will foster and seek cooperative effort between itself and degree granting institutions to develop programs jointly acceptable to the Academy and related professional organizations.

### The Clinical Training Program

The AuD educational process assumes development of broadly based clinical rotations based on substantive academic achievement. The preparation of the complete practitioner rests upon three essential foundations:

* Mastery of the audiological knowledge base (See Appendix)
* Extensive clinical experience and rotations
* Role modeling based on exposure to experienced, practicing clinicians

It is recommended that the student receive between 2500 and 3000 hours of clinical experience with an extensive variety of cases and preceptors. Student-practitioners should be exposed extensively to diverse and challenging clinical populations. Appropriate clinical training environments should include but not be limited to:

* Audiology/Medical practices
* Autonomous private practices in audiology
* Community clinics
* Hospitals
* Industrial settings
* Local education agencies
* Schools for the hearing-impaired
* University or college clinics

At least four separate rotations from the above list are recommended as a minimum as the student progresses through the program of study. The process of clinical experience should evolve in scope and complexity from limited clinical exposure with close supervision during the first years, to fourth year independent status. Whereas the first two years of the program are heavily weighted towards didactic classes and program are heavily weighted towards didactic classes and laboratory coursework, emphasis during the second two years shifts to clinical learning experiences.4 The proportion of clinical learning experiences as compared to academic instruction during the professional doctorate (AuD) program is depicted below.

### Appendix

The intent of this section is to specify general areas of study which are considered essential to the knowledge base of the audiologist-practitioner.7 It is understood that the exact specification of curriculum ad emphasis is the responsibility and properly the domain of the educational institution that offers the AuD degree. As in most professional degrees, a basic science core is essential. This core can be provided by basic science faculty from other departments and schools within the degree granting institution. The following general areas of study are recommended.
Basic science areas include:

* Physics of sound, acoustics, psychoacoustics
* Research methods and statistics
* Speech science and perception
* Computer science
* Electronics, instrumentation and calibration
* Gross anatomy, neuroanatomy and neurophysiology
* Anatomy and physiology of hearing
* Diseases and pathologies of the ear and nervous system
* Related medical diagnosis and treatment
* Embryology and genetics
* Clinical pharmacology
* Epidemiology
* Radiographic techniques and imaging

General areas of professional instruction include:

1. Audiologic assessment

* Case history/interview techniques
* Physiologic measurements
* Electrophysiologic measurements
* Behavioral tests of auditory function
* Communication measurement scales

2. Medical considerations

* Audiologic manifestations of ear disease
* Clinical diagnosis and evaluation of auditory pathology
* Clinical decision analysis

3. Clinical decision process/counseling

* Counseling strategies and techniques
* Referral procedures and case management
* Interprofessional relationships and responsibilities
* Personal and interpersonal dynamics

4. Professional issues

* Ethical/legal/quality improvement issues
* Fiscal intermediaries/government agencies
* Practice management/healthcare marketing
* Forensic audiology

5. Conservation of hearing and prevention of hearing loss

* Public and consumer education
* Hearing conservation models
* Identification and screening models
* Federal/state regulations
* Worker's compensation issues

6. Special populations

* Pediatric audiology
* Geriatric audiology
* Difficult to test, including developmental disabilities

7. Audiologic habilitation and rehabilitation

* Normative developmental models
* Auditory training
* Visual communication, including speech reading
* Manual communication systems and skills
* Speech and language of the deaf and hard of hearing
* Educational management

8. Management of amplification

* Physical and electroacoustic characteristics of amplifying devices
* Methods of evaluation
* Rehabilitative procedures
* Dispensing
* Assistive devices
* Implantable devices

9. Vestibular evaluation

* Techniques and procedures
* Rehabilitative strategies

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***DOCTORAL EDUCATION IN AUDIOLOGY***

***I. Need for CSU Audiology Doctoral Programs***

The rationale for the clinical doctoral degree program in the CSU lies in the significant shortage of audiologists throughout California, which has created a crisis situation for consumers of hearing and balance healthcare, as well as for many audiology employers whose mandate it is to provide those services. Audiologists are the health care professionals who provide diagnostic and rehabilitative care for individuals of all ages who have hearing and balance disorders. As previously noted, California has a significant shortage of licensed audiologists. Presently, audiology licensees number approximately 1,600, which falls significantly short of the number needed to provide services for the ever-increasing number of Californians with hearing and balance disorders. In fact, the state licensing board issued 74 licenses in 2016, however, due to imported audiologists returning to their home states, as well as retirements, the net gain was only one licensee. Currently, 64% of licensed California audiologists are age 55 or older, and are at or nearing the age of retirement. Between 85-90% of licensing applicants are now coming from other states.

The state’s Newborn Hearing Screening Program typically identifies approximately 900-1200 infants per year with hearing loss who need advanced diagnostic care and treatment. In addition, we have a rapidly growing aging population with identified hearing disabilities in need of audiology services. There are approximately five million Californians 65 years of age or older. Nearly 25% of those 65-74 years of age and 50% of those older than 75 years have disabling hearing loss, with the population of people over 65 expected to double by 2030. CSU AuD programs will begin to address this considerable workforce shortage.

The CSU system has always taken the lead in audiology education. In the past, training occurred on a number of CSU campuses at the Master’s degree level, with the first accredited program, under the title Communicative Disorders Program, opening at San Francisco State University in 1964. At its height, the CSU system had seven Master of Science degree programs in Audiology. With newer and more complex diagnostic tools, and more sophisticated treatment options being developed in the early 1990’s and continuing to advance, national standards required a doctoral level degree to increase the breadth of audiology training. California became one of many states to change its licensing requirements, as of 2008, to require audiology applicants to hold a doctoral degree from an approved institution, and the Master’s degree was no longer offered. Many CSU campuses maintain Communicative Disorders undergraduate degree programs, and the faculty, facility, and equipment infrastructure still exists to build AuD programs at the appropriate campuses now that the authority to offer these programs has been granted via the legislative process.

The Veteran’s Administration (VA) noted in 2012 that visits to VA audiology clinics has increased to over 1.6 million (36%) since 2009. Due to the shortage of audiologists, veterans are waiting up to a year to be seen for diagnostic evaluations and hearing aid fittings. Children’s hospitals have also been affected, with fewer hospitals and audiologists able to treat patients in a timely and convenient manner. Due to the limited number of audiologists available, hearing loss patients are often required to travel for many hours to receive needed services.

The National Institutes on Deafness and Other Communicative Disorders (2011) notes, “the older population will burgeon between the years 2010 and 2030 when the “baby boom’ generation reaches 65.” In 2009, people over 65 years represented 12% of the population; by 2030, they will represent 19.3%. The population of individuals over 65 years is expected to double between 2008 and 2030 to a projected 72.1 million (Administration on Aging, 2011). The National Institute on Aging also has estimated that by 2020, the need for audiologists to serve the older population will increase by 50%.

Despite the reform in health care delivery and managed care, it is estimated that the demand for audiologists has and will increase over the next ten years. The population will continue to age and scientific knowledge and technology will continue to advance. As people life longer, it is expected that more individuals will need assistance from audiologists to maximize their communicative skills, and thus the quality of life. Directed learning and participation in novel activities that require learning can also diminish the negative neural effects of aging. Research also validates a strong positive relationship between rehabilitation and recovery from hearing and balance impairments, and confirms the advantage of early education, prevention and promotion of health and wellness.

Employment opportunities for audiologists are expected to grow faster than the average for all occupations according to the [US Bureau of Labor and Statistics](http://www.bls.gov/), 2006. The anticipated need for audiological services is driven by changing demographics both in the United States and the world.

***II. Change in Degree Requirement: Changing Forces in Audiology Education***

The impetus for the change in degree requirement from a master's to a doctoral degree stemmed from the need to revise curricula to reflect the expansion of the knowledge base, competency, and clinical skill of audiologists nationwide. The proposed coursework will prepare audiologists to meet the clinical demands of a continually-growing number of individuals with hearing loss and balance disorders with an increased, research supported, level of knowledge of ear disease, its evaluation and rehabilitation. The target student population that would be seeking this degree would include those individuals who have obtained the highest academic achievement levels, and who hold an interest in an allied health field. Any individual, regardless of upper division major, would be appropriate, if enrollment requirements have been met.

What was once a limited profession, in which audiologists tested pure tone thresholds and referred patients to hearing aid dispensers to be fitted with analog hearing aids, is now a profession with a large number of complex practice areas and options. The breadth of the profession of audiology has increased tremendously since its inception following WWII. Examples of the broadening scope of the field of audiology that has driven the present changes in audiology education include: developments in understanding the basic mechanisms of sound coding in the normal and pathological ear, the neurological underpinnings of the balance mechanism along with diagnosis and treatment of its pathologies, a mandated increase in newborn hearing screening in California, a greater understanding of the human genome as it applies to hearing and hearing loss, the aging auditory system, the increase in noise-induced hearing loss among children, teenagers, and adults, the development of digital amplification with Bluetooth applications, an increase in the use of intraoperative neural monitoring during a number of neurologically-based surgeries, industrial and educational audiology, and elements of private practice.

***III. Aims and Objectives***

The audiologist of the 21st century must be thoroughly knowledgeable in a growing number of aspects of clinical and rehabilitative audiology. Every aspect of the field demands much more sophisticated knowledge and training than at any other time in the history of the profession. Some of the more salient content domains include: clinical diagnosis of hearing loss, neurophysiological assessment, hearing aids, assistive listening devices, cochlear implants, vestibular assessment, ethics of hearing health care treatment, counseling, rehabilitation, and health care policy. The professional doctorate establishes audiologists in a clearly defined and prominent role within the hearing health care delivery system, and strengthens their position as autonomous practitioners and providers of audiological services. The educational objectives of this program are to increase the knowledge base of audiologists in order to better prepare them to competently meet the demands of increasingly complex diagnostic questions. In addition, audiologists must learn to use more, and more complex, equipment in the diagnosis and rehabilitation of hearing loss and balance disorders for patients of all ages, and to integrate critical research findings in this process.

AuD programs are designed to develop scholarly clinicians who are capable of integrating theoretical and practical information, in order to provide the most comprehensive diagnostic acumen and rehabilitative skill possible. Only the intensive training available at the doctoral level can meet this demand. These new clinicians will leave such programs with the requisite training to critically evaluate and utilize clinical information gained through research. In addition, these individuals will be prepared to duplicate the program to help meet the increasing national demand for audiologists by serving programs in other states or venues. This information will be used to build the appropriate rationales for choosing and implementing diagnostic and rehabilitative tools and strategies for any given patient. Such comprehensive training will enable audiologists to provide higher quality, objective, and more comprehensive services required by the complex needs of hearing loss and balance patients of all ages, as well as to the multicultural populations of California.

***IV. Masters vs. Doctoral Culture***

The goal of the CSU clinical doctoral programs in audiology is to educate and train highly skilled scholar-clinicians. In the previous audiology masters program, the curriculum was strictly designed to train entry-level clinicians. Due to the time constraints of the program, students were given only a cursory education in the research foundations of appropriate clinical decisions. Audiology doctoral programs are designed to change the educational model for audiologists to ensure that these professionals can function in a stand-alone capacity. Thus, built into every course will be extensive coverage of the scientific foundations of normal function, pathology, and clinical decision.

The CSU faculty can assure that this goal can be met by the caliber of the present faculty, the expertise of the projected faculty, and the extensive, evidence based outcome measure supported curriculum. The audiology doctoral programs and their faculty are uniquely qualified and fully-prepared to develop and implement programs that will provide a clinical doctoral-level education of the highest quality. The students will be expected to leave the program with comprehensive academic knowledge, the highest ethical standards, expert clinical skills, and the ability to function independently in this important health profession.

***PROPOSED CURRICULUM ELEMENTS AND PROGRAM STRUCTURE***

***I.* *Didactic and Clinical Experiences and Requirements***

The academic and practicum requirements of these programs are equivalent or exceed those of other AuD programs in California and nationally giving students the opportunity to evaluate complex clinical cases, and apply diagnostic techniques and therapeutic interventions that are driven by outcome measurements. During the three-four years of academic preparation, students will complete a series of adult practicum experiences in which they will apply the knowledge of fundamental techniques learned in diagnostic seminars. Clinical experiences will include: otoscopy, pure tone air and bone conduction audiometry, speech audiometry, immittance audiometry, acoustic reflex thresholds and decay, auditory processing disorders, evoked potentials, and otoacoustic emissions. Progressively more complex clinical issues will be discussed, observed, and clinically addressed as the students matriculate through each clinic.

Students may also complete a number of advanced, clinical rotations with very specific populations, using specialized equipment, and a complex set of diagnostic strategies including: basic diagnostics, hearing aids/implants, pediatric audiology, advanced electrophysiological testing, site of lesion testing, a full array of vestibular evaluations, tinnitus management procedures, aural rehabilitation, and hospital-based, newborn hearing screening. Students in these programs may also be placed in an auditory neuroscience laboratory where they will participate in an ongoing, basic science research project. Students also will be required to develop an original research doctoral project that is clinical in nature, with the guidance and direction of the faculty. The projects will emphasize evidence-based research in the clinical domain. Their work will be submitted as a poster presentation at a state or national audiology conference, and may ultimately be submitted for publication. The final year of the program will entail a culminating, full-time externship experience in which students will be allowed to perform with minimal supervision, applying the principles and practices learned in all previous seminars, clinics, and clinical rotations.

Students may complete a three or four year didactic and practicum program maintaining a 3.2 GPA and 80% performance scores on the qualifying and comprehensive examinations. The third or fourth externship year will be dedicated to a full-time clinical practicum experience, which may be a paid experience.

***II. Plan for Program Evaluation***

The academic program in audiology will be reviewed internally and externally on a regular basis. The review includes internal faculty, external faculty review, student feedback, evaluation of student performance, and review of faculty by outside reviewers. The Office of Academic Planning and Educational Effectiveness in collaboration with the Division of Graduate Studies provides regular periodic oversight of graduate programs within the CSU. These reviews occur approximately every six-seven years. They are comprehensive and complement the reviews for accreditation by WASC and the accrediting organizations.

In addition, there are regular performance reviews of deans, departmental chairs, and faculty for purposes of promotion and advancement. Students evaluate each course in terms of content, as well as faculty teaching effectiveness. These evaluations occur each quarter/semester of study. The results of these evaluations are tallied and shared with the individual faculty member. These student evaluations are also used for promotion and tenure.

An internal evaluation system will be implemented within the programs. Faculty who co-teach evaluate one another. Faculty members are also asked to evaluate their own courses every other year to determine if changes in content and organization are needed. The AuD program faculty will meet quarterly to review courses and discuss the need for content modification. Faculty also will set annual goals and objectives that address their teaching responsibilities that are reviewed with the program director.

The students will be evaluated by written tests, laboratory tests, demonstration of clinical skills, homework, oral and written presentations, grades, qualifying examinations and passing a summative examination. The students also will be asked to have their patients evaluate their performance. These evaluations are submitted as part of the full time clinical affiliations. The students will perform a self-evaluation and evaluate the preceptor on the clinical performance inventory. In addition to the quarterly evaluation by students, the students will be asked to evaluate the overall program at the completion of their studies and then one year after graduation. The demonstration of knowledge will be accomplished by passing the licensing examination. After that, employers are contacted and asked to evaluate the strengths and weaknesses of the new graduate in their first job. Students must pass the Praxis examination in Audiology for state licensure and seek voluntary certification by the American Board of Audiology and/or the American Speech-Language-Hearing Association.

***SUMMARY***

Clinical programs in audiology will meet the academic and clinical requirements mandated by the American Academy of Audiology (AAA) and the American Speech-Language Hearing Association (ASHA) at the doctoral level. This degree requirement recognizes the need to expand the knowledge base, competency, and clinical skill of audiologists in all professional settings. The required coursework prepares audiologists to meet the clinical demands of a continually growing number of individuals with hearing loss and balance disorders with an increased, research supported, level of knowledge of ear disease, its evaluation and rehabilitation. The educational objectives of this program are to provide the knowledge base required to better prepare audiologists to competently meet the demands of increasingly complex diagnostic questions. In addition, audiologists must learn to use more complex equipment in the diagnosis and rehabilitation of hearing loss and balance disorder patients of all ages. The audiology doctoral programs within the CSU are poised to offer the needed coursework, using state-of-the-art clinical facilities and the expertise of an experienced group of audiology faculty. Students who complete the three-four year AuD curriculum will be well-prepared to pass the national examination, as well as to fulfill the coursework and clinical clock hour requirements for licensure and national certification.