



# **WORLD SKULL BASE E-LEARNING MATERIAL**

## **Audiology**

# Audiology

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**Audiology** (from Latin *audīre*, "to hear"; and from Greek *-λογία*, *-logia*) is the branch of science that studies hearing, balance, and related disorders. Its practitioners, who treat those with hearing loss and proactively prevent related damage are audiologists. Employing various testing strategies (e.g. hearing tests, otoacoustic emission measurements, videonystagmography, and electrophysiologic tests), audiology aims to determine whether someone can hear within the normal range, and if not, which portions of hearing (high, middle, or low frequencies) are affected and to what degree. If an audiologist determines that a hearing loss or vestibular abnormality is present he or she will provide recommendations to a patient as to what options (e.g. hearing aid, cochlear implants, surgery, appropriate medical referrals) may be of assistance.

In addition to testing hearing, audiologists can also work with a wide range of clientele in rehabilitation (cochlear implants and/or hearing aids), pediatric populations and assessment of the vestibular system.

## Audiologist

An **audiologist** is a health-care professional specializing in identifying, diagnosing, treating and monitoring disorders of the auditory and vestibular system portions of the ear. Audiologists are trained to diagnose, manage and/or treat hearing or balance problems. They dispense hearing aids and recommend and map cochlear implants. They counsel families through a new diagnosis of hearing loss in infants, and help teach coping and compensation skills to late-deafened adults. They also help design and implement personal and industrial hearing safety programs, newborn hearing screening programs, school hearing screening programs, and provide special fitting ear plugs and other hearing protection devices to help prevent hearing loss. In addition, many audiologists work as auditory scientists in a research capacity.

Audiologists have training in anatomy and physiology, hearing aids, cochlear implants, electrophysiology, acoustics, psychophysics, neurology, counseling and sign language. An Audiologist usually graduates with one of the following qualifications (MSc(Audiology), Au.D., STI, PhD, or ScD), depending the program, and country attended.

## History

The use of the terms "Audiology" and "Audiologist" in publications has been traced back only as far as 1946. The original creator of the term remains unknown, but Berger<sup>[1]</sup> identified possible originators as Mayer BA Schier, Willard B Hargrave, Stanley Nowak, Norman Canfield, or Raymond Carhart. In a biographical profile by Robert Galambos, Hallowell Davis is credited with coining the term in the 1940s, saying the then-prevalent term "auricular training" sounded like a method of teaching people how to wiggle their ears.<sup>[2]</sup>

The first US university course for audiologists was offered by Carhart at Northwestern University, in 1946.<sup>[3]</sup> Audiology was born of hearing aid dispensers to address the hearing damage from World War II veterans.

## Requirements

### Australia

In Australia Audiologists must hold a Masters in Audiology, alternatively Bachelor's degree from overseas certified by the VETASSESS. As per the law of the land currently to practise as an Audiologist one doesn't need to be a member of any professional body. But to dispense hearing aids to eligible pensioners and eligible war veterans one must have 2 years clinical experience and be registered with an approved body such as Audiology Australia<sup>[4]</sup> (ASA) or the Australian College of Audiology<sup>[5]</sup> (ACAud). In Australia, by general definition an 'Audiologist' - is a University graduate with postgraduate qualifications in Audiology or equivalent training. Audiologists have broad responsibilities and expertise in all non-medical areas of hearing services including complex hearing assessment and

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rehabilitation of hearing impairment (which includes hearing aid prescription, fitting and management). An 'Audiometrist' - has completed a TAFE Certificate Course in hearing aid audiometry and/or received in-house training from the hearing aid industry.

The Audiological Society of Australia (ASA) trading as Audiology Australia <sup>[4]</sup> via The Code of Ethics and the Practice Standards, governs the professional practice of audiology for members of the ASA. To meet these high standards Members undertake professional development to enable them to maintain appropriate skills and learning in their areas of professional practice. The purpose of the Continuing Professional Development Program is to provide a structure that enables members to formally document the ways in which they manage and extend their professional skills and knowledge. The ASA Continuing Professional Development (CPD) program provides recognition and encouragement for the continuing participation of ASA members in high quality professional development. The CPD program enable members of ASA to demonstrate to external stakeholders (clients, employers, government, the community and other professional groups) their commitment to the highest standards of professional competence for Audiologists. The CPD program is focused on maintaining a high quality practice of audiology and is tied to the Certificate of Clinical Practice (CCP). Members of the ASA who are not engaged in clinical practice are not required to formally document their CPD and will not be issued with a Certificate of Clinical Practice. ACAud Members are required to demonstrate their professional competence and are assessed against ACAud's Professional Competency Standards. Recognised Competencies are shown on a Member's Certificate of Competency that is prominently displayed in the Member's clinic and renewed annually.

There are 5 Universities in Australia that offer graduate programmes (via course work and/or research degrees) in Audiology for local and overseas students. All programmes offered are recognised as eligible for membership of the Society - Audiology Australia <sup>[4]</sup> and the International Society of Audiology <sup>[6]</sup> (ISA).

- University of Western Australia <sup>[7]</sup>
- University of Melbourne <sup>[8]</sup>
- Flinders University <sup>[9]</sup>
- Macquarie University <sup>[10]</sup>
- University of Queensland <sup>[11]</sup>

## Canada

In Canada, a Masters of Science (M.Sc.) is the minimum requirement to practice Audiology in the country. The profession is regulated in certain provinces: New Brunswick, Quebec, Ontario, Manitoba, Saskatchewan, Alberta and British Columbia, where it is illegal to practice without being registered as a full member in the appropriate provincial regulatory body. <sup>[12]</sup>

There are currently five universities in Canada which offer graduate programs in Audiology. Entry requirements typically include specific prerequisite course work in undergraduate studies or an additional preparatory year prior to entry into the program:

- University of British Columbia (BC)
  - Université de Montréal (QC) - French instruction
  - University of Western Ontario (ON)
  - University of Ottawa (ON) - French instruction
  - Dalhousie University (NS)
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## India

The second Audiology & Speech Language Therapy program was started in 1966 at T.N.Medical College and BYL Nair Ch.Hospital in Mumbai. In the same year, Government of India established the All India Institute of Speech and Hearing, which has become the country's leading Institute in the field of communication disorders. There are currently 20 Universities in India which provide Speech Pathology and Audiology programs. These programs are accredited by Rehabilitation council of India.

To practice audiology, professionals need to have either Bachelors/Masters degree in Audiology and be registered with Indian Speech and Hearing Association (ISHA) or the Rehabilitation Council of India (RCI). There are around 100 private clinics in India providing speech and hearing services.

An internationally recognized degree, unique multilingual/multicultural background, excellent communication in English has increased the global demand of Indian Audiologists considering the shortage of these graduates especially in western countries. However in recent times, the profession has been plagued by introduction of short term diploma programs which has resulted in dilution of services particularly in hearing aid dispensing and there have been mass protests by speech and hearing fraternity to stop such courses and curb malpractices. {[http://articles.timesofindia.indiatimes.com/2012-03-13/mysore/31159074\\_1\\_rci-short-term-courses-speech-and-hearing](http://articles.timesofindia.indiatimes.com/2012-03-13/mysore/31159074_1_rci-short-term-courses-speech-and-hearing)}

## Malaysia

There are only 3 Malaysian educational institutions offering degrees in Audiology:

- University Kebangsaan Malaysia
- University Science Malaysia
- International Islamic University Malaysia <sup>[13]</sup>

## United Kingdom

There are currently three routes to becoming a Registered Audiologist:

- BSc in Audiology
- MSc in Audiology
- Fast track conversion Diploma for those with a BSc in other relevant science subject, available at Southampton, Manchester, UCL, London and Edinburgh

There are 7 United Kingdom educational institutions offering degrees in Audiology:

- De Montfort University
- University of Manchester
- University of Leeds
- Aston University
- Queen Margaret University
- University of Southampton
- Swansea University

## United States

In the United States, audiologists are regulated by state licensure or registration in all 50 states and the District of Columbia. Starting in 2007, the Doctor of Audiology (Au.D.) became the entry level degree for clinical practice for some states, with most states expected to follow this requirement very soon, as there are no longer any professional programs in audiology which offer the master's degree. Minimum requirements for the Au.D. degree include a minimum of 75 semester hours of post-baccalaureate study, meeting prescribed competencies, passing a national exam offered by Praxis Series of the Educational Testing Service, and practicum experience that is equivalent to a minimum of 12 months of full-time, supervised experience. Most states have continuing education renewal

requirements that must be met to stay licensed. Audiologists can also earn a certificate from the American Speech-Language-Hearing Association <sup>[14]</sup> or seek board certification through the American Board of Audiology (ABA) <sup>[15]</sup>. Most states also require a Hearing Aid Dispenser License to enable the Audiologist to dispense hearing aids, though legislation is currently underway in many states which would not require this extra step. It would allow Audiologists to dispense under their Audiology license. Currently there are over 70 Au.D. programs in the United States:

**Distance Au.D. Programs:**

- A.T. Still University through Arizona School of Health Sciences
- University of Florida

**Residential Au.D. Programs:**

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| <ul style="list-style-type: none"> <li>• A.T. Still University through Arizona School of Health Sciences</li> <li>• Arizona State University</li> <li>• Auburn University (AL)</li> <li>• Ball State University (IN)</li> <li>• Bloomsburg University of Pennsylvania</li> <li>• Central Michigan University</li> <li>• East Carolina University</li> <li>• East Tennessee State University</li> <li>• Gallaudet University (DC)</li> <li>• Idaho State University</li> <li>• Illinois State University</li> <li>• Indiana University</li> <li>• James Madison University(VA)</li> <li>• Lamar University (TX)</li> <li>• Long Island Au.D. Consortium (NY)</li> <li>• Louisiana State University at New Orleans</li> <li>• Louisiana Tech University</li> <li>• Miami University (OH)</li> <li>• Missouri State University</li> <li>• Montclair State University</li> <li>• Northeast Ohio Au.D. Consortium</li> <li>• Northeastern University</li> <li>• Northern Illinois University</li> <li>• Northwestern University</li> <li>• Nova Southeastern University (FL)</li> <li>• Ohio State University</li> <li>• Ohio University</li> <li>• Purdue University &amp; Indiana University School of Medicine (IN)</li> <li>• Rush University (IL)</li> <li>• Salus University (formerly Pennsylvania College of Optometry)</li> <li>• San Diego State University/University of California San Diego(CA)</li> <li>• Syracuse University</li> <li>• Texas Tech University</li> <li>• CUNY Graduate Center (NY)</li> <li>• Towson University (MD)</li> <li>• University at Buffalo (NY)</li> <li>• University of Arizona</li> </ul> | <ul style="list-style-type: none"> <li>• University of Connecticut</li> <li>• University of Florida</li> <li>• University of Illinois</li> <li>• University of Iowa</li> <li>• University of Kansas</li> <li>• University of Louisville (KY)</li> <li>• University of Maryland, College Park</li> <li>• University of Massachusetts - Amherst</li> <li>• University of Memphis (TN)</li> <li>• University of Minnesota</li> <li>• University of Nebraska-Lincoln</li> <li>• University of North Carolina at Chapel Hill</li> <li>• University of North Texas</li> <li>• University of Northern Colorado</li> <li>• University of Oklahoma</li> <li>• University of Pittsburgh (PA)</li> <li>• University of Puerto Rico, Medical Sciences Campus</li> <li>• University of South Alabama</li> <li>• University of South Dakota</li> <li>• University of South Florida</li> <li>• University of Southern Mississippi</li> <li>• University of Tennessee</li> <li>• University of Texas at Austin</li> <li>• University of Texas at Dallas</li> <li>• University of Utah</li> <li>• University of Washington - (WA)</li> <li>• University of Wisconsin–Madison</li> <li>• Utah State University</li> <li>• Vanderbilt University (TN)</li> <li>• Washington University (MO)</li> <li>• Wayne State University (MI)</li> <li>• West Virginia University (WV)</li> <li>• Western Michigan University</li> <li>• Wichita State University (KS)</li> </ul> |
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- University of Arkansas at Little Rock & University of Arkansas for Medical Sciences Consortium
- University of Cincinnati (OH)
- University of Colorado - Boulder (CO)

In the past, audiologists have typically held a master's degree and the appropriate healthcare license. However, in the 1990s the profession began to transition to a doctoral level as a minimal requirement. In the United States, starting in 2007, audiologists were required to receive a doctoral degree (Au.D. or Ph.D.) in audiology from an accredited university graduate or professional program before practicing. All states require licensing, and audiologists may also carry national board certification from the American Board of Audiology or a certificate of clinical competence in audiology (CCC-A) from the American Speech-Language-Hearing Association.

Audiologists are autonomous practitioners and do not need physician orders or supervision. However, many audiologists work in doctor's office and hospitals. The median salary for an audiologist in the United States is approximately \$65,500 in 2008 according to the Bureau of Labor Statistics. Audiologists who earn over \$98,880 (top ten percentile) per annum typically have their own private practice.

## References

- [3] Raymond Carhart (1912-1975) Papers, 1938-1975. Northwestern University Archives, Evanston, Illinois. [http://www.library.northwestern.edu/archives/findingaids/raymond\\_carhart.pdf](http://www.library.northwestern.edu/archives/findingaids/raymond_carhart.pdf) Accessed 2006-07-31.
- [4] <http://www.audiology.asn.au/>
- [5] <http://www.acaud.org/>
- [6] <http://www.isa-audiology.org/>
- [7] <http://www.biomedchem.uwa.edu.au/courses/postgraduate/coursework/mclinaudiol>
- [8] <http://www.medoto.unimelb.edu.au>
- [9] <http://www.flinders.edu.au/courses/rules/postgrad/maud.cfm>
- [10] <http://www.ling.mq.edu.au/centres/audiology/index.htm>
- [11] <http://www.shrs.uq.edu.au/index.html?page=105758>
- [13] <http://www.iiium.edu.my>
- [14] <http://www.asha.org/>
- [15] <http://www.americanboardofaudiology.org/>

## External links

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| <ul style="list-style-type: none"> <li>• Academy of Doctors of Audiology (<a href="http://www.audiologist.org">http://www.audiologist.org</a>)</li> <li>• American Academy of Audiology (<a href="http://www.audiology.org">http://www.audiology.org</a>)</li> <li>• Audiology Online (<a href="http://www.audiologyonline.com">http://www.audiologyonline.com</a>) News, information and online continuing education for Audiology.</li> <li>• Audiology Resources (<a href="http://www.worldaudiology.com">http://www.worldaudiology.com</a>) - Useful resources for audiology professionals and students, including a specialist discussion forum.</li> <li>• British Academy of Audiology (<a href="http://www.baaudiology.org">http://www.baaudiology.org</a>)</li> <li>• Canadian Academy of Audiology (<a href="http://www.canadianaudiology.ca">http://www.canadianaudiology.ca</a>)</li> <li>• House Ear Institute (<a href="http://www.hei.org">http://www.hei.org</a>)</li> </ul> | <ul style="list-style-type: none"> <li>• Ida Institute (<a href="http://www.idainstitute.com/">http://www.idainstitute.com/</a>) Resource for tools for hearing healthcare professionals and online networking/collaboration among members of the audiology community.</li> <li>• Let Them Hear Foundation (<a href="http://www.letthemhear.org/default.php">http://www.letthemhear.org/default.php</a>)</li> <li>• National Institute on Deafness and Other Communication Disorders (NIDCD) (<a href="http://www.nidcd.nih.gov">http://www.nidcd.nih.gov</a>)</li> <li>• Audiology.Net, Audiology Information for the Masses (<a href="http://www.audiologynet.com">http://www.audiologynet.com</a>)</li> <li>• National Student Speech Language and Hearing Association (<a href="http://www.nsslha.org">http://www.nsslha.org</a>)</li> <li>• Sound Seekers (<a href="http://www.sound-seekers.org.uk">http://www.sound-seekers.org.uk</a>) - The Commonwealth Society for the Deaf, delivering audiology services in the developing world.</li> </ul> |
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| <ul style="list-style-type: none"><li>• How to become an Audiologist (<a href="http://targetstudy.com/professions/audiologist.html">http://targetstudy.com/professions/audiologist.html</a>)</li></ul> |  |
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# Article Sources and Contributors

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