

**KRISHNA INSTITUTE OF MEDICAL SCIENCES
“DEEMED TO BE UNIVERSITY”, KARAD**

Diploma in Hearing and Ear Mould Technology

(Program Code- 1805) (Course Code- 1805-11)

Syllabus / course content:

**SUGGESTED HOURS ALLOCATED FOR THEORY AND PRACTICALS
THEORY PAPERS:**

Hearing Aids: 5.5 hrs / week for 40 weeks - 220 hrs
Earmoulds : 5.5 hrs / week for 40 weeks - 220 hrs
Total - 440 hrs

PRACTICALS:

25 hours /week for 40 weeks - 1000 hrs 4

Externship, if applicable: CAN BE WORKED UP

- Teaching-learning methods :
- Assessment pattern: Periodic assessment in the department.
Credit based University Examination
- Syllbus Details :

PAPER I: HEARING AID

Objectives:

At the end of the training the student is expected to realise the following:

1. To identify, describe and tell the purpose(s) of each component used in hearing aids and assistive devices in Indian market, and its market value.
2. To undertake repair of all types of hearing aids and assistive devices.
3. To procure hearing aid repair kit and hearing aid assessment gadgets
4. To undertake minor repairs of audiometer

Unit 1:

i) Introduction to Electricity -Basic electronics circuits — Circuit elements R,C,L -series and parallel circuits using RC, RL, RLC, Circuits — Circuit theorems — Principles of magnetism — Mutual Inductance — Transformer theory & magnetic coupled circuits.

ii) Introduction to AC & DC electrical circuits — Electrical resonance & brief introduction to transient circuits.

iii) Introduction to electrical machinery — transformers — DC motors — AC motors etc., brief introduction to electrical power distributions.

iv) Electrical devices — different types of switches — relays — circuit breakers - fuses grounding — wires and cables used.

Unit 2:

i) Introduction to electronics — Atomic structure formation of bonds and bond theory — conductors — semi-conductors and insulators — semiconductors material science formation of semi-conductor junction

ii). Introduction to electronic components — PN junction diodes Led — zener diode negative resistance diodes, etc.

iii) Transistors - junction transistors - field effect transistors - unijunction transistors etc., - SCR & thyristors etc., Discussion of IC technology. 5

Unit 3:

i) Amplifiers: Introduction — classification — transistor used as an amplifier in CC, CE, CB configuration - small signal and large signal amplifiers-wide band amplifiers — power amplifiers — pushpull amplifiers, complementary & symmetry amplifier coupled amplifiers (RC coupled, transformer coupled, direct coupled amplifiers) feed back amplifiers (series and shunt voltage feedback amplifier; series and shunt current feed back amplifiers) discuss AGC circuits — characteristics of amplifiers - frequency response - input and output impedance, voltage gain, current gain, power gain, fidelity of the amplifier — and other characteristics — operational amplifiers.

ii) Filters - power filters - transmission line filters — classification of TL filters based on frequency characteristics - type of components used - active & passive filters discussion about different types of active filters equalizer

Unit 4:

i) Oscillators theory of oscillations - sinewave oscillators - Wein bridge oscillator -RC phase shift oscillators - Hartlecolpits, Crystal oscillators, etc.,

ii) Modulation & demodulation - necessity for modulation - different types of modulation — theory of amplitude modulation — frequency modulation and demodulations.

Unit 5:

Digital electronics - introduction - characteristics of digital signal -electronic gates — combination of gates — counters (up-down counter, ring counter, decade counter etc.) shift registers - Different types of flip -flops, Multivibrators (Monostable, Astable, and Bistable) semiconductor memories like RASM, ROM EPROM, EEPROM etc -Buffer - analog to Digital to analog converters - Digital display devices like LED, LCD, etc.

Unit 6:

Introduction to hearing aids - familiarization with different components used in the hearing aids - type of hearing aids - body level - behind the ear - in the canal - etc., introduction to digital hearing aids - trouble shooting of different types of hearing aids - Electro Acoustical measurement of hearing aids - Discussion of hearing aid standards used in different types of hearing aids like Bodylevel, BTE, etc. 6

Unit 7:

Assistive. Listening Devices - working principles - brief discussion about different types of ALDs - like visual telephone bell indicator, Vibralarm, induction loop system, group hearing aids etc., Discussion of different type of measuring and analyzing equipment - trouble shooting of ALDs.

Unit 8: Brief introduction to computers and its applications

16.2 PAPER II- EARMOULDS**Objectives:**

At the end of the training the student is expected to learn

1.
 - (i) Preliminary examination of the ear, injuries/ allergies
 - (ii) Impression taking - Institution based - Community/ Home Based
 - (iii) Elasking - Institution based - Community / home based - Making plaster cast (iv) Scooping
 - (v) Packing and curing - Institution based - Community / home based
 - (vi) Processing - Trimming
 - Drilling
 - Making sound bore
 - Smoothing
 - Polishing
 - Ring fixing with metal and plastic rings
 - Dispensing
 - Trouble shooting and repair
2. To perform Electro acoustic analysis of hearing aid
3. To interpret Electro acoustic analysis of hearing aid
4. To organize and administer a hearing aid repair and ear mould lab. 7

Unit 1: Properties of earmold materials: - Earmould — definition - Earmoulds and its role
- Type - physical modification - Custom & standard - Procedure to make Earmoulds -
Acoustic modification of Earmoulds - Vents, dampers, horns - Care and maintenance —
Counselling - Trouble shooting & repair of Earmoulds - Acrylic technology in India / Abroad
- Heat - cure, cold — cure - Earmoulds for body level hearing aid, tubing, connectors for
BTE. - Softmould earplugs for swimmers and for protection against, noise/infection

Unit 2 –

Definition of sound, its transmission with reference to hearing, hearing aids and Earmoulds.
- Essential anatomy and physiology of the external ear, middle ear and inner ear.

Unit 3

Hearing - How we hear, importance of hearing, hearing Evaluation, Audiogram, speech
discrimination, hearing and vacation, audiometer and its uses.

Unit 4

Hearing impairment:

- What is hearing impairment
- Types and causes of hearing impairment (Prenatal, Perinatal and Postnatal)
- Management of persons with hearing impairment
- Medical / surgical treatment
- Audiological rehabilitation. 8

Log book: TO BE MAINTAINED DURING PRACTICAL TRAINING

Text books: -----

Reference books:

- 1) Alpiner&McCarthy. (1987) “Rehabilitative Audiology - Children and Adults” Baltimore:
Williams & Wilkins
- 2) Chapter in V.D Larsen et al. Ed (1974) “Contributing Hearing ~d Performance by
Earmould Design” in Auditory and Hearing Prosthetic Research NY: Grune Stratton
- 3) Pollack. M.C (1980) Amplification for the hearing impaired.
- 4) NY: Grune and Stratton Robert E. Sandlin (Ed.) (1995) “Hand Book of Hearing Aid
Amplification : Theoretical & Technical Consideration”. Vol I, Williams & Wilkins,
Baltimore
- 5) Samuel E. Lybarger. (1978) Chapter on Earmoulds in Jack Katz (Ed.) Handbook of
clinical and audiology, 2 Ed. Williams & Wilkins, Baltimore.
- 6) Schow, R.L. & Nerbonne, M.A (Ed.) (1989). “Introduction to Aural Rehabilitation”. 2
July Ed. Allyn & Bacon. 9