

BHARATHIAR UNIVERSITY : COIMBATORE – 641 046**DIPLOMA IN Audio Technology and Recording Arts****Eligibility for admission:**

Candidates for admission to the Diploma in Audio technology and Recording Arts course shall be required to have passed the Higher Secondary examinations (Academic or Vocational) conducted by the Government of Tamilnadu or any other examination accepted as equivalent thereto by the syndicate.

Duration of the course:

The course shall extend over a period of 12 months comprising of 2 semesters.
The medium of instruction and examinations shall be in English.

Passing minimum:

a) A candidate shall be declared to have passed in a paper if he or she obtains not less than 40% of marks in that paper.

b) A candidate failing to secure the minimum marks prescribed shall be required to reappear for the examination in that paper and obtain not less than the minimum marks required for passing the paper.

Classification of successful candidates

a) Successful candidates passing the examinations by securing not less than 60% of total marks in all subjects shall be declared to have passed in First class.

b) Successful candidates passing the examinations by securing not less than 50% of total marks in all subjects shall be declared to have passed in second class

c) All other successful candidates shall be declared to have passed the examinations in Third class

SCHEME OF EXAMINATIONS**Semester 1**

TITLE OF THE PAPER	EXAM DURATION	TOTAL MARKS
1. Fundamentals of Audio Technology	3 hrs	100
2. Audio Mathematics	3 hrs	100
3. Recorder & Mixer	3hrs	100
4. Audio Production	3 hrs	100
5. Analog Mixer & Hi8 Recorder [Practical Examination]	1 hrs	100
Total		500

Semester 2

TITLE OF THE PAPER	EXAM DURATION	TOTAL MARKS
1. Music Production	3 hrs	100
2. Digital Audio	3 hrs	100
3. Studio Acoustics and Media Management	3hrs	100
4. Digital Audio Workstation	3 hrs	100
5. Protocols & Digital Mixer [Practical Examination]	1 hrs	100
Total		500

marks**SEMESTER I****Paper 1 : Fundamentals of Audio Technology****Unit 1**

- Propagation of Sound , Characteristics Sound , Wave to signal ,Phase ,timber , harmonics

Unit 2

- Anatomy of Human Ear , Perception of Sound , Binaural perception of sound , Fletcher Munson Curve .

Unit 3

- Electrical Principles , Components –Resistors , Capacitor , Inductor , Series & Parallel Connections , using - Voltmeter , Ammeter, Multi meter .

Unit 4

- Audio Cables ,Audio connectors – XLR, Phono , Stereo , RCA, MIDI etc

Unit 5

- Basics of Soldering - Soldering tools , Accessories , Soldering Audio Cables

Reference

- 1) Modern Recording Techniques 6th edition by David Miles Hubber,
- 2) Principles of soldering By Giles Humpston, David M. Jacobson
- 3) Master Hand Book of Acoustics 4th edition by Alton Everest

SEMESTER I

Paper 2 : Audio Mathematics

Unit 1

- Introduction to Bel , Decibel , Logarithmic and Anti Log Calculations

Unit 2

- Nature of the human ears perception of loudness, Fletcher Munson Curve, Boundary effect, Inverse square law ,Doppler shift

Unit 3

- Decibels –applications (electrical/acoustic) , Power calculations & rules Voltage calculations & rules between power and voltage, Adding sounds together – Correlated and Uncorrelated,

Unit 4

- Measurement -SPL meters , weighting networks, dB with electrical references – dBm, dBu, dBV , dBsil , dBswl ,dBspl etc

Unit5

- Dynamic range , Headroom , Signal to noise ratio, Levels , gain , Volume

Reference

- 1) Decibels Explained by Kishore Banan,
- 2) Modern Recording Techniques 6th edition by David Miles Hubber,
- 3) Master Hand Book of Acoustics 4th edition by Alton Everest

SEMESTER I

Paper 3 : Recorder and Mixer

Unit1

- Anatomy of Analog Tape Recorders , Play Head , Record Head , Erase Head

Unit2

- Magnetic Tape , Hysteresis , Maintenance , Line up – Azimuth ,zenith , Wrap Backup and storage

Unit3

- DAT recorders , DASH recorders , MDM recorders Storage ,Magnetic storage

Unit 4

- Anatomy of Sound Mixer , Routing , Mix A and MIX B , Aux, Effects , Inserts .

Unit5

- Metering , Monitoring, Signal Flow , output and Head phone Mix , Stage Monitoring Equalization .

Reference

- 1) Decibels by Kishore Banan,
- 2) Modern Recording Techniques 6th edition by David Miles Hubber,
- 3) Practical Recording Techniques
- 4) Recording Engineers Hand Book by Bobby ownsinski

SEMESTER I

Paper 4 : Audio Production

Unit 1

- History of Microphones , Construction and working of Dynamic, Ribbon , Condenser and Piezzo Microphones , Operational Hints ,

Unit 2

- Characteristics of Microphones – sensitivity , Impedance , THD , Overload etc
Mic accessories , classic Microphones.

Unit 3

- Miking Techniques – Mono Miking , Stereo Miking – Coincident , Near Coincident Ms, Xy Dummy Head ,3:1 rule , Miking Individual instruments – Drum Kit , Acoustic Guitar , Piano , Vocals ,Chorus etc

Unit4

- Types of Loud Speakers – Moving Coil , Electrostatic , Horn Loaded Drivers ,
Loud Speaker cabinets – Open , Infinity ,Tuned Port , Characteristics of Loud speaker

Unit 5

- Loud Speaker Connections - series connection , parallel connection and series parallel connections of speakers , impedance matching , cross over and types .
Loudspeaker positioning , Peak , Rms , Program Power , Continues Power .

Reference

- 1) Guide to Microphones by Loren Alldrin
- 2) The microphone Book by john Eargle
- 3) Recording Engineers Hand Book by Bobby ownsinski
- 4) Loudspeakers: For Music Recording And Reproduction
By Philip Newell, Philip Richard Newell, Keith Holland

SEMESTER II

Paper 1 : Music Production

Unit 1

- MIDI Theory , Basics Musical instrument Digital interface , MIDI messages Synthesizer, Sequencer ,Sampler ,Controllers

Unit 2

- MIDI Messages Program Message , Note Message , Control Message ,System Exclusive Message ,Binary codes for MIDI Message

Unit 3

- History of Western music – Middle age Music , Renaissance ,Baroque, Romantic and Classical age , History of Indian Music , Introduction to few thalam and ragams ,

Unit 4

- Introduction to score sheet , notations ,Rests, Clef – Treble , Bass , Soprano , Alto and Tenor Clef , Forming Major and Minor Triads

Unit5

- Forming Chords – Major ,minor , Seventh , Augumented and diminished , Time signature –Simple , Compound and Complex ,Key signatures , Scales – Major , Minor , Harmonic , Chromatic Scales , Chord Progression ,introduction to Composition , Musical Terms .

REFERENCE BOOKS

- 1) MIDI Basics by David Brooke Wetzel .
- 2) Practical Music Theory by D.C alfine
- 3) Theory of Music Grade 1 , 2 – Trinity

SEMESTER II

Paper 2 : Digital Audio

Unit 1

- Introduction to digital audio , Comparison between Digital and Analog audio
Analog to conversion techniques – sample rate , bit depth , sample and hold circuit
Quantization

Unit 2

- Quantization Error , Errors , Error corrections , AD Conversion Circuits , DA conversion
Circuits , Numbering Systems – Decimal , Binary , Octal , Hexa Decimal
Binary arithmetic ,

Unit 3

- Disc recording , Digital recorders – CD , DVD Audio , video , Blue Ray etc , Digital
formats , Latency , Clocking , Digital Noise

Unit 4

- Digital Signal Processing – Spectrum Processing – Parametric , Semi Parametric
Shelving and Graphic Equalizers , Effects Processing , Reverberation – Room ,
Chamber , plate etc , Delay – Musical delay , Delay calculations , Delay Towers

Unit 5

- Inserts – Dynamic Processing , Compressor – Attack time , release time , Threshold ,
Peak , RMS , Side chaining , Ducking , De -easing , Limiting , Expander , Gating and
Parameters

REFERENCE BOOKS

- 1) Basic electrical and electronic by R. muthusubramanian ,
- 2) A course in Electrical and electronic measurements by A.K Sawhney
- 3) Modern Recording Techniques 6th edition by David Miles Hubber
- 4) Digital audio Technology 4th edition – Jan Maes and Marc

SEMESTER II

Paper 3 : Studio Acoustics and Media Management

Unit 1

- Evolution of recording studios , Types of recording Studios – Commercial , Project , Home , Portable recording studios , Multimedia and Post production studios

Unit 2

- Media Management , Artist co- ordination , Studio Maintenance – Staff and session management ,Forming Musical band , Revenue sharing & internet audio , Copy rights and Royalty

Unit 3

- Recording Studio Construction- Sound Proofing , Construction of studio walls , Floor , ceiling , HVAC , Transmission loss and calculations ,Studio Doors and Window

Unit 4

Behavior of Sound inside a Room , Room Mode – Axial , Tangential , Oblique mode calculations , Finding frequency clashes , Reverberation time for studios ,Critical Reflection points , Standing waves

Unit 5

Absorbers , sabines coefficient , Room ratios , Diffusers - Schroeder's Diffuser ,quadratic and Prime root diffusers calculations and installations

REFERENCE BOOKS

- 1) Modern Recording Techniques 6th edition by David Miles Hubber
- 2) Master Hand Book of Acoustics 4th edition by Alton Everest
- 3) Recording Studio Design By Philip Newell

SEMESTER II

Paper 4 : Digital Audio Workstaion

Unit 1

- Disk Recording , Introduction to System Files , Optimizing computers for recording , Latency and Audio Interface ,Disc Formatting and Fragmenting , Software updates Internet , Troubleshooting ,

Unit 2

- Digital audio workstations –Introduction to Protools , Cubase , Logic studio, Input and Output Routing .

Unit 3

- Audio Editing – Edit Tools , Edit Accuracy , Relative Grid , Absolute Grid , Shuffle and Spot Edit , Time Compression and Expansion , Elastic audio , MIDI Editing ,Beat Detection and Editing Techniques

Unit 4

- Setting up for recording , Types of Recording – Normal , Merge , Loop , Manual Punch , Auto Punch , Overdubbing , tracking , Headphone mix , Dry wet Mix , Comping , Retrospective recording , Markers , Region and play lists

Unit 5

- Monitoring , Time stamping , Balancing , Panning , inserts , sends , Introduction to Mixing and Mastering , Dithering , Automation – Touch , Latch , X over , Read ,write Groups , Audio Plug ins , Instrument Plug ins ,Bouncing and exporting ,Formats for multiple platforms .

REFERENCE BOOKS:

- 1) Pro Tools For Music Production: Recording, Editing And Mixing By Mike Collins
- 2) Logic Pro 9 and Logic Express By David Nahmani

Skill Demonstration /Practical's

Students will be assessed in each of the following areas

- Practical Skills including recording , Mixing , Editing and Handling Equipment
- Organizational , interpersonal and problem Solving Skills .

The internal assessor will devise tasks to be carried out in each of the following situations

Assignment *An exercise carried out in response to a brief with specific guidelines and usually of short duration.* Each assignment is based on a brief provided by the internal assessor. The brief includes specific guidelines for candidates. The assignment is carried out over a period of time specified by the internal assessor. Assignments may be specified as an oral presentation, case study, observations, or have a detailed title such as audition piece, health fitness plan or vocational area profile.

Project *A substantial individual or group response to a brief with guidelines, usually carried out over a period of time.*

Projects may involve:

Research – requiring individual/group investigation of a topic

Process – eg design, performance, production of an artefact/event

Projects will be based on a brief provided by the internal assessor or negotiated by the candidate with the internal assessor. The brief will include broad guidelines for the candidate. The work will be carried out over a specified period of time. Projects may be undertaken as a group or collaborative project, however the individual contribution of each candidate must be clearly identified .

Students will get hands on Training on the following Studio Equipment

Sound Mixers

- 1) Mackie 24 Channel 8 Bus Mixer
- 2) Yamaha 01v 96 Digital Console
- 3) Yamaha Live Console
- 4) Bheringer 8 Channel Portable Mixer

Controllers

- 1) Axiom 49 – M audio
- 2) Oxygen 49 – M audio
- 3) Mackie HUI

Monitors

- 1) Focal Twin
- 2) Genelac 8040
- 3) Yamaha Hs 80 ,Ns 10
- 4) Sonodyne Ak 100
- 5) Mackie Pa
- 6) M audio

Hardware /Interface

- 1) Alesis Compressor
- 2) Bheringer external Effects Unit
- 3) Tascam DA 88 DAT Recorder
- 4) Dbx 48 Channel Patch Bay
- 5) Focusrite
- 6) Mbox
- 7) DIGI 001,002,003
- 8) DIGI HD
- 9) Presonus AudioBOX

Microphones

- 1) AKG Preception
- 2) AKG D112
- 3) Sennheiser Drum Kit Microphones
- 4) Audio Technica AT 2020
- 5) Shure SM57, 58 , PG 58
- 6) Bheringer ecm9000

Software

- 1) Protools,
- 2) Logic Pro
- 3) Cubase
- 4) Reason

Each student will be allotted an independent I MAC DAW for them to practice and execute their projects .