



INSTITUTE OF HUMAN RESOURCES DEVELOPMENT

Prajo'e Towers, Vazhuthacaud, Thiruvananthapuram, Kerala, India. Pin695 014
<http://www.ihrd.ac.in>

POST GRADUATE DIPLOMA IN AUDIO ENGINEERING

(Two semesters)

Scheme & Syllabus 2019

(Effective from June 2019 admission)



INSTITUTE OF HUMAN RESOURCES DEVELOPMENT

POST GRADUATE DIPLOMA IN AUDIO ENGINEERING

(Two semesters)

Subjects of study and Scheme of Assessment
(Scheme-2019)

First Semester

Subject Code	Subject Name	No. of Hrs /Week		Minimum Marks			Maximum Marks		
		T	P	W/P	CE	T	W/P	CE	T
PGDAE101	Acoustics	6	-	40	20	75	100	50	150
PGDAE102	Sound recording	6	-	40	20	75	100	50	150
PGDAE103	Lab Work-1	-	13	40	20	75	100	50	150
Duration : Total 500 Hrs.		12	13	TOTAL MARKS			300	150	450

Second Semester

Subject Code	Subject Name	No. of Hrs/Week		Minimum Marks			Maximum Marks		
		L	P	W/P	CE	T	W/P	CE	T
PGDAE201	Amplifiers and Signal Processing	6	-	40	20	75	100	50	150
PGDAE202	Monitoring Mastering and Production	6	-	40	20	75	100	50	150
PGDAE203	Audio Lab Work	-	7	40	20	75	100	50	150
PGDAE204	Project Work & Viva-voce	-	6	80	40	150	200	100	300
Duration : Total 500 Hrs.		12	13	TOTAL MARKS			500	250	750

* T- Theory P - Practical W - Written CE-Continuous Evaluation T – Total

* CE for PGDAE 204- Total 100 marks is divided as 50 marks for viva voice and 50 marks for performance of student during song project in the studio.

PGDAE101 ACOUSTICS

(120 Hrs)

Module 1: *Sound and Hearing* (30 hrs)

The Basics of Sound, Waveform Characteristics, Loudness Levels, The Ear, Auditory Perception, Perception of Direction, Perception of Space, Doubling

Module 2 : *Studio Acoustics and Design* (30 hrs)

Studio Types, Primary Factors Governing Studio and Control Room Acoustics, Frequency Balance, Reverberation, Acoustic Echo Chambers, Power- and Ground-Related Issues

Module 3: *Microphones: Design* (30 hrs)

The Microphone: An Introduction, Microphone Design, Microphone Characteristics, Microphone Preamps,

Module 4: *Microphone Techniques and Application* (30 hrs)

Microphone Techniques, Pickup Characteristics as a Function of Working Distance, Stereo miking Techniques, Surround miking Techniques, Recording Direct, Microphone Placement Techniques for different instruments like Brass, Strings, Keyboard, Percussion, Wood instruments, Voice etc. Microphone Selection

Recommended Text Book:

1. Modern recording techniques 7th Edition: David Miles Huber Robert E. Runstein

Focal Press ISBN: 978-0-240-81069-0

References: PDFs

1. Handbook for Sound Engineers by Glen M. Ballou *Fourth Edition*
2. The recording engineer's handbook by bobby owsinski
3. Acoustics and hearing by peter damaske
4. Acoustics and psychoacoustics by David M.Howard and Jamie Angus
5. Master handbook of acoustics by F.Alton Everest *fourth edition*
6. Microphones-Methods of operation and type and examples by Gerhart Bore/Stephan peus
7. Microphone techniques for music sound reinforcement by SHURE
8. Studio recording procedures *How to record any instrument* by Mike shea

PGDAE102 SOUND RECORDING

(120 Hrs)

Module 1 : Introduction to Audio Recording and analog tape recorder (30Hrs)

Audio recording history, Different steps in recording and producing audio material

Magnetic Recording and Its Media, The Professional Analog ATR, The Tape Transport, The Magnetic Tape Head, Equalization, Bias Current, Recording Channels and Monitoring Modes, MIDI Machine Control, Tape, Tape Speed, and Head Configurations.

Module 2 : Digital Audio Technology (30Hrs)

The Basics of Digital Audio, The Digital Recording/Reproduction Process, Digital Audio Recording Systems, Minidisks, Hard-Disk Recording. Multimedia and the Web-The Multimedia Environment, Delivery Media, The CD, The DVD, The Web, Delivery Formats, Digital Audio, MIDI, Graphics, Desktop Video, Multimedia and the Web in the "Need for Speed" Era

Module 3 : MIDI and Electronic Music Technology (30Hrs)

MIDI Production Environments, What is MIDI, System Interconnections, MIDI Cable and Port Connections, USB and FireWire Connections, mLAN Network Connections, The MIDI Message, MIDI Channels, Channel Messages System Messages, System-Exclusive Messages ,MIDI Machine Control, The MIDI Interface, The Multiport Interface, Electronic Musical Instruments Mixing in the MIDI Environment

Module 4 : Synchronization (30Hrs)

Synchronization between Transports, Real-World Sync Applications for Using time Code and MIDI Time Code

Recommended Text Book:

1. Modern recording techniques 7th Edition: David Miles Huber Robert E. Runstein

Focal Press ISBN: 978-0-240-81069-0

References: PDFs

1. Sound and Recording by Francis Rumsey and Tim Mc cormick *sixth edition*

[Scheme 2019]

PGDAE103 LAB WORK-1

(260 Hrs)

PART A

- 1) Safety measures-Do's and don't's for Audio Engineers
- 2) Familiarization of different hand tools and measuring instruments
- 3) Familiarization of symbols and terminologies
- 4) Active passive component identification, specification and testing
- 5) Soldering de-soldering Practice
- 6) Measurement of Voltage, Current, Resistance etc.
- 7) Study of sound with different wave forms (Sine, Square, Sawtooth etc.)
- 8) Study of different cables and connectors
- 9) Assembling practice of simple circuits such as single stage amplifier, power supplies etc.
- 10) Study of Audio Amplifier and Power amplifier (Discrete and IC)
- 11) Study of Filters and Data acquisition ADC/DAC
- 12) Familiarization of circuit design and simulation software
- 13) PA System setup

PART B

- 14) Inside a P.C and a MAC
- 15) Installing O.S, hardware and basic software for recording
- 16) Networking of Computers
- 17) Connecting different storage media to Computers and their usage
- 18) Study of Dynamic and Condenser microphones with regards to placement, frequency response, gain etc.
- 19) Study of basic recording of sound using a P.C and Microphones
- 20) Listen, study and analyse different types and genres of music from different parts of the globe

PGDAE201 AMPLIFIERS AND SIGNAL PROCESSING
(120 Hrs)

Module 1 : Amplifiers (30Hrs)

Amplification, The Operational Amplifier, Preamplifiers, Equalizers, Summing Amplifiers, Isolation Amplifiers, Distribution Amplifiers, Impedance Amplifiers, Power Amplifiers, Voltage- and Digitally-Controlled Amplifiers

Module 2 : The Audio Production Console (30Hrs)

Recording, Monitoring, Overdubbing, Mixdown, The Professional Analog Console, Digital Console Technology, Console Automation

Module 3 : Signal Processing (30Hrs)

The Wonderful World of Analog, Digital, Plug-Ins, Inline vs. Side-Chain Processing, Equalization, Dynamic Range, Time-Based Effects, Multiple- Effects Devices

Module 4: Noise Reduction (30Hrs)

Analog Noise Reduction, Do It Yourself Tutorial: Analog Tape Modulation and Asperity Noise, The Compansion Process, The dbx Noise-Reduction System, The Dolby Noise-Reduction System, Single-Ended Noise-Reduction, Noise Gates, Digital Noise Reduction, Fast Fourier Transform , Do It Yourself Tutorial: FFT-Based Noise Reduction, Digital Single-Ended Noise-Reduction Systems, De-clicking and De-popping, Dither

Recommended Text Book:

1. Modern recording techniques 7th Edition: David Miles Huber Robert E. Runstein

Focal Press ISBN: 978-0-240-81069-0

Ref: PDFs

1. Sound and Recording by Francis Rumsey and Tim Mc cormick *sixth edition*
2. Audio power amplifier design handbook by Douglas self
3. The Sound reinforcement handbook by Gary davis & Ralph jones

PGDAE202 MONITORING, MASTERING AND PRODUCTION
(120 Hrs)

Module 1 : Monitoring (30Hrs)

Speaker and Room Considerations, Speaker Design, Speaker Polarity, Monitoring, Monitor Speaker Types, Monitoring in the Studio

Module 2 : Surround Sound (30Hrs)

Surround Sound: Past to the Present, Surround in the Not-Too-Distant Future, Monitoring in 5.1 Surround, Practical Placement, Active/Passive Monitors in Surround, Surround Interfacing, Surround Formats, Mixing in Surround, Virtual Surround Mixers, Mixing Philosophies, Re-issuing Back Catalog Material
Concept of 3D sound and Introduction to Dolby Atmos sound.

Module 3: Mastering (30Hrs)

The Mastering Process. Product manufacture -Choosing the Right Facility and Manufacturer, CD Manufacturing, The Process CD Burning, Rolling Your Own, Burning Speeds, CD Labeling, CD and DVD Handling and Care , DVD Burning, Cassette Duplication, Producing for the web

Module 4 : Studio Session procedures (30Hrs)

Preparation, Setting Up, Recording, Overdubbing, Mixdown, Sequence Editing, Mastering , Marketing and Sales.

Recommended Text Book:

1. Modern recording techniques 7th Edition: David Miles Huber Robert E. Runstein

Focal Press ISBN: 978-0-240-81069-0

References: PDFs

1. Sound and Recording by Francis Rumsey and Tim Mc cormick *sixth edition*
2. The art of recording-*Understanding and crafting the mix* By William Moylan
3. The Mixing engineer's handbook by Bobby Owsinski
4. Mastering audio – The art and the science By Bob Katz
5. The secret of the mastering engineer by Bob Katz (Advanced use)

PGDAE203 AUDIO LAB WORK

(140 Hrs)

- 1) Study of DAW
- 2) Working on PROTOOLS
- 3) Working on LOGIC PRO
- 4) Working with MIDI Controllers
- 5) Mastering and authoring CD's and DVD's

PRACTICE SESSIONS

INTRODUCTION TO

- 1) BASIC RECORDING
- 2) SOUND DESIGNING (Sound editing, foley, sound effects track layering, spot recording Using professional handy recorders)
- 3) STUDIO CABLING ,ROUTING AND CONNECTIONS WITH INTERFACES
- 4) SONG MIXING
- 5) STEREO MASTERING

Recommended Text Book:

1. Modern recording techniques 7th Edition: David Miles Huber Robert E. Runstein
Focal Press ISBN: 978-0-240-81069-0

Reference Books:

1. Holman, Tomlinson, Sound for film and television, Focal Press
2. McCormick, Tim and Rumsey, Francis, Sound and recording: An introduction, Focal Press
3. Talbot-Smith, Michael, Sound engineering explained, Focal Press
4. Talbot-Smith, Michael, Sound assistance, Focal Press
5. Altman, Rick, ed., Sound theory sound practice, Routledge
6. Talbot-Smith, Michael, Sound engineer's pocket book, Focal Press
7. Truebitt, Rudy and David, Trubitt, Live sound for musicians, Hal Leonard
8. Nathan, Julian, Back to basic audio, Newnes
9. Yewdall, Lewis, David, Practical art of motion picture sound, Focal Press
10. Leider, N., Colby, Digital audio workstation, McGraw-Hill
11. Electronics lab manual vol 1 by Shyam and T D Kuriachan
12. Sound reinforcement handbook by Gary davis and ralph jone 2nd edition

PGDAE204 PROJECT WORK & VIVA-VOCE
(120 Hrs)

1. Aim: Expose the students to industry-standard sound studio practices, through a real-life project work under time and deliverable constraints.

2. Project Guidelines for song project

Write lyrics, compose, orchestration, recording live instruments, vocal, mix these tracks and master the song. Each student must do - record, edit, mix & master their song individually and submit to concern in prescribed time. During the song project each student is considered as Studio engineer-the responsible man in studio. There is an assistant, and producer to help the engineer for the fulfillment of the song project. The assistant and producer are selected from their batch. Assistant must help the engineer if he needs. Producer must manage the studio, monetary control of the recording artist, and make them all comfortable.

3 Project Planning:

- 3.1 Song should be new, which no one created before.
- 3.2 Song. Lyrics can be written by the students themselves or their friends, or can seek help from experts.
- 3.3 Compose the lyrics if they are capable or can do by their friends, or seek help from experts.
- 3.4 Arrange the music in different tracks (Keyboard programming) by the students or their friends, or seek help from experts.
- 3.5 In addition to these tracks student must record at least 2 instruments, vocal using microphones in the studio and, finally one instrument through line-in using DAW.
- 3.6 Students must submit pre project report before starting record process.
- 3.7 Students should complete their recordings and editing within 3 hrs for each instruments/vocal.
- 3.8 Student can select their recording artist from their batch, or seek help from experts.
- 3.9 Student must complete their mixing process of project song in 4 hrs.
- 3.10 Student can do mastering process and should complete in 2 hrs.
- 3.11 Student must submit the final audio in .wav format, post production report to the Audio department after the completion of their recording works.
- 3.12 Finally these songs are evaluated by a panel of experts.

4 Documentation:

One copy should be maintained by each student and a copy from the group to the Institution library. The format for preparation of the project report is standardized (students need not consult earlier project reports). The following are the major guidelines: The final outer dimensions of the report shall be 21 cm X 30 cm. The colour of the flap cover shall be light green. Only hard binding should be done, with title of the thesis and the words "<BRIEF TITLE> PGDAE Project Report 201..." displayed on the spine in 20 point, Bold, Times New Roman, as in example below. In case the title is too long, a shorter version of it may be used (Like "Image Pro" instead of "Image Pro – An Interactive Image Processing package").

- The text of the report should be set in 12 pt, Times New Roman/Calibri/Cambria, Single Spaced.
- Headings should be set as follows: CHAPTER HEADINGS 20 pt, Times New Roman, Bold, All Caps, Centered.

1. SECTION HEADINGS 12 pt, Times New Roman, Bold, All Caps, Left Adjusted.

1.1 Section Sub-headings 12 pt, Times New Roman, Bold, Left Adjusted.

Titles of Figures, Tables etc are done in 12 point, Times New Roman, Italics, Centered.

Some general guidelines on documentation stylistics are:

- Double quotes and single quotes ("", "") should be used only when essential. In most cases words put in quotes are better highlighted by setting them in italics
- Page numbers shall be set at right hand top corner, paragraph indent shall be set as 3.
- Only single space need be left above a section or sub-section heading and no space may be left after them.

- Certificate should be in the format: "Certified that this report titled..... is a bonafide record of the project work done by Sri/Kum..... under our supervision and guidance, towards partial fulfillment of the requirements for the award of the Post Graduate Diploma in Computer Application of IHRD" with dated signatures of Internal Guide and Head of Institution.
- Space for signature of Internal / External Examiners shall be provided in the facing sheet or index page.

<p><PROJECT TITLE></p> <p><STUDENT'S NAME> <COLLEGE/INSTITUTION NAME></p> <p>PROJECT REPORT SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF POST GRADUATE DIPLOMA IN AUDIO ENGINEERING OF IHRD 2019</p>
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Drafts should be read, modified, spell checked and grammar checked at least twice during the course of the project and before a final printout is taken, the same may be got approved from the internal guide. The students should send two interim reports to internal guides. This will also help the students in their report writing.

Regarding the body of the report, as an indicative example, the following is given (though students should not attempt to fit every kind of project report into this format):

Project report must contain:

1. Introduction
2. Initial setup- Mention the names of musician, lyricist, orchestration, artists.
3. Production team-mention the names of assistant, producer, recordist.
4. Technical consideration- Miking details for each instruments that are using in the project.
5. Session details- Song name, tempo details, time signature, scale, how many tracks used and their details in session
6. Details of miking instruments and their date of recording, artiste details.
7. Details of expense during recording project, Keep the voucher for every expense.
8. Conclusion

5 Project IPR & Utilisation: The intellectual property rights in all project work done by the students shall vest with IHRD, except in cases where some external organizations seek undertaking from students to concede IPR in all work done in their organization or under their guidance. Where possible, students should attempt to obtain at least a joint IPR for IHRD. In cases where project works are of public utility, students shall be asked to publish their work including source code and documentation, in so far as their rights are clear.

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[Scheme 2019]

POST GRADUATE DIPLOMA IN AUDIO ENGINEERING

1. Question paper pattern

Duration of Exam. : 3 Hrs. Maximum marks : 100

Part - A Multiple choice / fill in the blanks type questions

Part - B Short Answer type Questions with answer size up to 1 page per question.

Part - C Descriptive type Questions with answer size up to 2 to 3 pages per question.

Marks Distribution

Part	No. of questions.	Need to be answered	Marks/Question	Total
A	20	20	1	20
B	10	8	5	40
C	6	4	10	40
Total		32	...	100

Guidelines for question paper setters:

1. Each part should cover questions from each module in the syllabus.
2. The level of difficulty shall be as follows
 - i) Easy Questions : 30% -40%
 - ii) Intermediate level to difficult : 30% -40%
 - iii) Difficult questions : 20% -30%
3. The question paper setters must prepare and submit the question papers as per the following guidelines.
 - a. Question paper must be designed and prepared to fit in an A4 size paper with one inch margin on all four sides.
 - b. Prepare the Question in MS-Word/Open office-Write document format. Use only "TimesNewRoman" font with size 10. Align text to both left and right margins.
 - c. Please leave 5 cm. free area at the top of the front page of each question paper to place examination details/Question paper header by the examination department.
 - d. Avoid placing 1 or 2 questions in the last part in a fresh page, unless it is absolutely necessary. In such case, try to accommodate above questions in the previous page(s) by adjusting top/bottom margins and line spacing, if possible. This will reduce printing expenses.
 - e. Specify marks for each question/part clearly.
 - f. Clearly specify the number of questions to be answered for each Part.
 - g. Confirm that no questions in part B is repeated in Part C also.
 - h. Avoid repeating questions in Part C from the immediate previous examination.
 - i. Key for evaluation must be prepared and enclosed in a separate cover and should be submitted along with the question paper set. Key for evaluation must specify evaluation guidelines for each part in the question paper, otherwise the key prepared will be treated as incomplete.
 - j. Submit Question paper in Laser print out form only. Hand written and printed in poor quality printers is not acceptable.

[Scheme 2019]

POST GRADUATE DIPLOMA IN AUDIO ENGINEERING

2. Scheme for Continuous Evaluation.

1. For Theory Papers : Weightage

- a). Average of minimum Two test papers : 30 %
- b). Average of minimum Two Assignments : 30%
- c). Score for Seminar : 20%
- d). Score for Class Attendance. : 10%
- e). Overall performance in the class. : 10%

2. For Practical Papers : Weightage

- a). Average of minimum Two Lab tests : 30 %
- b). Average of minimum Two Lab Assignments : 30%
- c). Maintenance of Lab record : 20%
- d). Score for Lab Attendance. : 10%
- e). Overall performance in the Lab. : 10%

3. Teachers shall submit Mark list for Continuous Evaluation to the Head of Institution in the following format.

Subject:

Sl no.	Regno.	Name	a.Test	b.Assignment	c.Seminar	d.Attendance	e.Performance	Total

4. Head of Institution/Co-ordinator shall forward Continuous evaluation marks to the Examination Department in the following format only.

Centre code : Centre name:

Sl no.	Regno.	Name	PGDAE101 50	PGDAE102 50	PGDAE103 50

5. Continuous evaluation (CE) marks must be published in the notice board at least one week before the commencement of theory examinations after getting approval from the Head of Institution/Co-ordinator.

Thiruvananthapuram

Sd/-
Director