BHARATHIAR UNIVERSITY, COIMBATORE - 641046
DIPLOMA IN AUDIO & MUSIC PRODUCTION
(For CPP/COP students admitted from the academic year 2015-2016 & Onwards)

SCHEME OF EXAMINATION

Course Title	Ins.hrs/ week	Examination	
		Dur.Hrs	Total Marks
SEMESTER – I			
1.1. Introduction to Studio Studies	5	3	100
1.2 Studio Equipments	5	3	100
1.3. Musicianship & Creative Research	5	3	100
1.4. Digital Audio Technology	5	3	100
1.5. MIDI, Sampling & Synthesis	5	3	100
SEMESTER – II			
2.1. Digital Recording	5	3	100
2.2. Acoustics & 3D Sound	5	3	100
2.3. Advanced Studio Studies	5	3	100
2.4. Music Computing & DAW	5	3	100
2.5. Advanced Music Production, Mixing & Mastering Techniques	5	3	100
TOTAL	-	-	**1000**

Eligibility for admission: Candidates for admission to the course shall be required to have passed the Higher Secondary examinations (Academic or Vocational).

Duration of the course: The course shall extend over a period of One Year comprising of Two semester.

Medium of instruction and examinations: The medium of instruction and examinations shall be in English.

Other requirements: Studio trainings as and when suggested by Institute is to be completed within the duration of the course followed by submission of the report and Presentation on the Practical work

SEMESTER 1
1.1 – INTRODUCTION TO STUDIO STUDIES

UNIT I - INTRODUCTION TO AUDIO
What is sound? ; Basics of sound wave propagation ; Frequency – unit of measurement ; Characteristics of Frequency bands, Wavelength calculation. Simple and complex waveforms; Human ear – functions; psycoacoustic phenomenon

UNIT II - STUDIO PROTOCOL
Brief history of recording; What is astereo image?; Phantom Centre, An Introduction To Various Audio Production Facilities In The Industry; Music Production Studio Layout And Design ;Basic audio signal path within astudio ; Audio equipmentsused; Broad Classification of microphones used in the industry.

UNIT III - BASIC ELECTRONICS
Structure Of Atoms;Unit Of Charge; Resistance ; Resistors ; Resistances In Series And Parallel ; Work, Power And Energy. Phenomenon Of Electromagnetic Induction.Faraday's Law. Induced E.M.F.; A Straight Conductor Diodes. Operational Amplifiers; Tubes And Valves; Electrical Safety

UNIT IV - DECIBELS
Introduction to Decibels; Logarithmic nature of the Ears Perception of Loudness ; Logarithms – Basic Operations ; Decibels – Evolution, Applications (Electrical/Acoustic) ; Power Calculations & Rules; Voltage Calculations & Rules. Intro To Signal Analysis And Advanced Metering Techniques ; Equipment Testing And Analysis Products

UNIT V - AUDIO CABLES & INTERCONNECTION
Introduction to Cabling;Balanced And Unbalanced Audio ; Direct Injection Box;Special Cables – Snake, Y-Cable, Headphone Cable, Forward Referencing; Patch-bay ; Soldering Kit Essentials; Power Supply & Grounding Overview [Power Conditioning Guidelines];

RECOMMENDED READING :
1. Yamaha-Sound Reinforcement Handbook
2. Fundamentals of Hearing: William A. Yost
3. The Theory of Sound: J.W.S. Rayleigh / Robert B. Lindsay
4. Basic Electronics: Bernard Grob

1.2 – STUDIO EQUIPMENTS

UNIT I - TAPES & MULTITRACK

Introduction to Tapes and MTR, Operations of the playback Head, Overdubbing ,punching,Cleaning & degaussing ; History of Tapes and MTR ; MTR features and specification, Recording & using time code + Auto locator, Noise reduction

UNIT II - INTRODUCTION TO ANALOG CONSOLES

Introduction to Consoles and its Purpose ; Console Formats – Inline And Split ; Signal Flow ; Channel Strip ; Auxillary – Application – Pre/Post ; Eq – Application – Parameters ; AFL/PFL – Application ; Mix B Section – Application , Routing ; Master Section in Detail – Rear Panel ; Aux Masters ; Sub Masters .

UNIT III - EFFECTS AND DYNAMIC SIGNAL PROCESSORS

Need For Audio Signal Processing [Domains – Frequency-Dynamics-{Fx} Effects]; Frequency Based Processors; Dynamic Processors – Analog And Digital – Brands And Models; Efects – Fx Processors; Time Based Fx

UNIT IV - MICROPHONES

Introduction To Microphones; Phantom Power in Microphones;Microphone Specifications; Mic Pre-Amps; Directional Response ; Microphone Accessories – Shock Mount – Stands – Air Velocity Filters – Pop Filter.

UNITV - Miking Techniques

Miking Techniques; Stereo Miking Techniques; Miking A Cabinet Loudspeaker – DI Split; Introduction To Soundfield Microphones – Surround Miking; Microphone Considerations – Brands, Models And Specifications.

RECOMMENDED READING:

1. Modern Recording Techniques: David Miles Huber / Robert E
2. Magnetic Tape Recording: Marvin Camras
3. Elements of Magnetic Tape Recording: N. M. Haynes
4. Mixing Engineers Handbook: Bobby Owsinsky
5. Understanding Audio: Daniel M. Thompson
6. Audio Engineers Reference Book: Michael Tabolt Smith

1.3 – MUSICIANSHIP & CREATIVE RESEARCH

UNIT I: MUSIC THEORY
Major Scales;Natural Minor Scales And The Concept Of Relative Keys; Harmonic Minor And Melodic Minor Scales; Key Signatures; Intervals ; Chords Built From Major Scales; Note Duration; Time Signature.

UNIT II: MUSIC HISTORY
Brief History of Musical Instruments ; Different Eras of Music; Social Background, Characteristics and Classification (Genres) ; Musical Styles , Famous Composers & Compositions of Different Era.

UNIT III: MUSIC LAW
Introduction ; Copyright And Mechanical Royalties; Mechanical Royalties And Licensing; Performance Royalties And Pros; Berne Convention ; Poor Man's Copyright; Copyright Infringements And Penal Code.

UNIT IV : MUSIC BUSINESS
Music Business – Marketing As An Artist; Creating A Professional Profile ; Distribution Fundamentals ; Funding a Music Project ; Distribution Deal Types ; Licensing Income.

UNIT V: RESEARCH TECHNIQUES FOR CREATIVE INDUSTRY
Methods & type of research; Undertaking Interviews; Critical Review ; Selecting suitable methodologies ; Contextualising the area of research ; Validation of appropriate research material ; Research Format; Presentation methods.

RECOMMENDED READINGS :
1. The Complete Idiot's Guide to Music Theory: Michael Miller
2. All you need to know about Music Business: Donald S. Rassman
3. Sheet Music: Kevin Leman
4. A History of Western Music: Donald J. Gront
5. The Complete Idiots Guide to Music Composition: Michael Miller

1.4 – DIGITAL AUDIO TECHNOLOGY

UNIT I : BASIC DIGITAL TECHNOLOGY FUNDAMENTALS
Analog Vs Digital: A Comparison ; ADC , DAC ; Nyquist Theorem; Sampling Rate; Bit Depth; Anti-Aliasing Filter; Signal to Error Ratio; Dither ; Quantization Error; ErrorCorrection.

UNIT II : ADVANCED DIGITAL TECHNOLOGY
Digital Metering Dbfs; Pcm Vs Compressed; Lossy And Lossless Audio Formats; Mp3, Ogg, Wma, Ra; Flac; Lame Codec; Pro Audio Recording Parameters And Guidelines; Signal To Error Ratio; Dither : Quantization Error.

UNIT III : DIGITAL RECORDING FORMATS
Digital Recording Formats ; CD ; DVD ; DAT ; ADAT ; Blue-Ray Disc ; Spars Code; Digital Audio Tape ; Adaptive Transform Acoustic Coding (Atrac) ; Material of tape , Adaptive Transform Acoustic Coding (Atrac);Shock Proof Memory; Mini Disc Specifications.

UNIT IV : DIGITAL AUDIO FORMATS
Various Audio Formats; Audio Details Of Dvd-Video; Surround Sound Format; Linear Pcm; Dolby Digital; Mpeg Audio; Digital Theater Systems; Sony Dynamic Digital Sound; Super Audio Compact Disc (Sacd); Dsd – Delta Sigma Modulation; Watermark – Anti Piracy Feature; Hybrid Disc; Blue Ray.

UNIT V : DIGITAL AUDIO WORKSTATION
Introduction To Daw ; Digital Audio Requirements ; Daw Workflow ; Arrangement/Sequencing And Mixer Overview; Audio Editing Concepts; Multichannel Recording; Creative Automation And Automation Modes. Types Of Hard Disks; Concepts In Hard Disk Recording

RECOMMENDED READING

1. Principles of Digital Audio: Ken C. Pohlmann
2. Art of Digital Audio; John Watkinson
3. Digital Audio Explained: Nika Aldrich
4. Users' Guide to Sound Synthesis with VST Instruments: Simon Millward

1.5 – MIDI, SAMPLING & SYNTHESIS

UNIT I : INTRODUCTION TO MIDI
Introduction To Midi ;Applications, Midi Channels ; Midi Connections Signal Flow ; Midi Echo – Cable Length Limitations;Omni-Monophonic On/Off-Polyhphonic On /Off. Midi Modes ; Midi Messages – Channel And System Messages; Channel Voice Messages.

UNIT II : MULTI-TIMBRAL INSTRUMENTS
Concept Of A Patch – Multi Timbral Instruments; System Real Time Messages – Midi Clock, Start, Stop, Continue, Active Sense, System Reset; Midi Transmission Protocol – Midi Cables And Pin Connectors; Midi Interface – Brands; Midi Over – Usb, Fw, Ethernet.

UNIT III : SAMPLING
Introduction To Sampling Software Samplers ; Definition Of Synthesis – An Introduction – Brief History ; Software Samplers – Halion, Battery, Konkakt, Stylus Rmx, Sample Tank, Addictive Drummer, sampling examples Cd

UNIT IV : INTRODUCTION TO SYNTHESIS
Definition Of Synthesis – An Introduction – Brief History; Application Of Synthesis – Music Production And Sound Design For Film; Classification Of Synthesizers Based On; Fourier Analysis.

UNIT V : ANALOG & DIGITAL SYNTHESIZERS
Architecture Of An Analog Synthesizer; Patch Concept; Contemporary Analog Synth Manufacturers – Integrated And Modular; Contemporary Digital Hardware Syntheziser Manufacturers; Virtual Synths – Apple, Arturia, Rob Papen, Native Instruments.

RECOMMENEDED READING

1. MIDI Power: Hal Ceonard
2. The MIDI Manual: David Miles Huber
3. Basic MIDI: Paul White
4. The Guide to MIDI Orchestration: Paul Gilreath
5. Sound Synthesis and Sampling: Martin Russ

SEMESTER -2
2.1 – DIGITAL RECORDING

UNIT I : DIGITAL AUDIO CONSOLE
Introduction To Digital Audio Consoles; Classification Of Consoles Based On; Basic Features + Signal Flow Within A Console; High End Format – Large Setup ;Yamaha O2r; I/Home Recording Setups – Apogee, Focusrite, Pre Sonus, Motu, Avid , Steinberg; Control Surfaces – Euphonix Artist Series

UNIT II : INTRODUCTION TO TIMECODE AND SYNCHRONIZATION
Need for Synchronization; History; Pulse Synchronization methods; Timepiece & Synchronization; Open Loop Systems; Closed Loop Systems; LTC ; VITC (Signal Structure & Application); MTC (Signal Structure & Application)'

UNIT III : SYNCHRONIZATION TECHNIQUES
Refreshing, Jam Syncing, Reshaping; Midi Clock; Machine Control – MMC& Sony 9 Pin; Syncing to an ATR ; Syncing to a DAW; Syncing to a MDM ; Syncing to akeyboard; Syncing to video device; Syncing on location. Uncommon Sync Techniques,); Sync Unit Brands; Pro Tools Sync; Nuendo Sync; Sync Tips For Production

UNIT IV : MASTERING
What Is Mastering?;Brief History – The Vinyl Disc ; Mastering Facility Orientation – The Room – The Equipment; Mastering – The Signal Path; Mastering Eq And Compressor Brands (Hardware And Softwares); Mastering in a DAW.

UNIT V : MASTERING TECHNIQUES
Mastering Daw – Brands; Digital Plugin – Brands – Eq, Effects, Dynamics; Dither; Delivery Formats; Monitoring + Calibration; Cd Replication; Mastering A Track Using Izotope Ozone.

RECOMMENDED READING

1. Principles of Digital Audio: Ken C. Pohlmann
2. Art of Digital Audio; John Watkinson
3. Digital Audio Explained: Nika Aldrich
4. Time Code: A User's Guide : J. Ratchiff
5. Mastering Audio: Bob Katz
6. The Mastering Engineers Handbook: Bobby Owsinski

2.2 – ACOUSTICS & 3D SOUND

UNIT I : INTRODUCTION TO ACOUSTIC DESIGN AND SOUND THEORY
Introduction – Aesthetic and Technical ; Various Audio Production Facilities ; Infrastructureand Considerations – Building – Pillars ; Acoustic Terminology [Sac, Nrc, Stc, Stl] ; Reverb Time.

UNIT II : ACOUSTIC CONSTRUCTION TECHNIQUES/ELECTRICAL CALCULATIONS AND WIRING/HVAC CALCULATION AND INSTALLATION
Construction Concepts ; Practical Design - Concrete Shell , Control Room [Rfz], Recording Room, Equipment Room, Machine Room And Sound Lock.

UNIT III : ACOUSTIC TREATMENT AND ROOM TUNING
Room Resonances ; Choosing Correct Dimensions – Spemeyer's Ratio ; Reverb Treatment, Absorbers, Diffusors – QRD And PRD ; Diffusion ; Panel Resonators, Helm Holtz Resonators ; Early Reflection Control.

UNIT IV : 3D SURROUND SOUND I
Introduction to DTS Stereo, 5.1 ; Dolby 5.1; Basic 5.1 workflow &signal path (Gear + Routing) ; Dolby & DTS playback In theatres ; Dolby & DTSon consumer media (Other multichannel formats) ; Dolby & DTSin broadcast, 6.1 – Es & Ex.

UNIT V : 3D SURROUND SOUND II
Multichannel for future formats ; SDDS ; Multichannel on headphones, Multichannel game sound, Pseudo surround systems, Multichannel miking using Mono/Stereo mics, Surround sound mics, Virtual instruments supporting multichannel.

RECOMMENDED READINGS :
1. Fundamental of Acoustics: Lawrence E. Kinsler
2. Acoustics Design for Home Studio: Mitch Gallagher
3. Surround Sound, Up and Running: Tomlinson Holman
4. Master Handbook of Acoustics: Alton Everest

2.3 – ADVANCED STUDIO STUIDES

UNIT I : Audio Post Production
Sound for film; production sound ; noise reduction of post production dialogues; dialogue editing : foley – introduction; types of foley ; sfx creative editing – layering sfx; sound designing Music edits for commercials; Music for television.

UNIT II : BROADCAST
Introduction; History; Electromagnetism); A wireless system ; Radio frequency spectrum + frequency allocation (int/nat); Am technology ; C quam ; Shortwave, medium wave & long wave; Fm technology; Analog tv broadcast ; Digital broadcasting.

UNIT III : AUDIO STREAMING
Intro to data compression ; Psychoacoustic coding : Masking theories; History of mpeg; ; Digital rights management; Popular ; Real time broadcasting ; Embedding streaming audio on your webpage ; Playlists & offering multiple lists to the same file; Mpeg video compression.

UNIT IV : SPEAKERS & AMPLIFIERS
Introduction to studio monitors; Loudspeaker specifications; Bass reflex ; Multi-driver system – woofer & tweeter; Dual concentric design ; Enclosure design and imaging; Crossovers ; Ribbon drivers ; Loudspeaker impedance; Near field and far field monitors.

UNIT V : LIVE SOUND

Introduction to live sound; Career prospects; Microphones –suitable for live; Placement techniques; Wireless microphone systems]; Signal flow; Monitor of house ; Cross over [active and passive]; Stack pa [amplifier brands]; Speaker brands; Digital crossover ; Line array sound .

RECOMMENDED READING:

1. Guide to Post Production for TV and Film: Barbara Clark
2. Post Production in your home studio: Casay Kim
3. A Broadcasting Engineering Tutorial: Graham A. Johnes
4. Radio Production: Robert McLeish
5. Streaming Audio: Jon Luini
6. Live Sound Reinforcement: Scott Hunter Stark
7. Live Sound Basics: Tony Marvuglio
8. Sound Systems Design and Optimization: Bob McCarthy

2.4 – MUSIC COMPUTING & DAW

UNIT I : ADVANCED- MIDI

MIDI hardware and Pin connections;MIDI setup and Daisy chaining;MIDI message structure; Pitch Bend, Control Change, Running status Messages;Active sense;MIDI effects, Quantization, etc.;MIDI file formats.

UNIT II : ADVANCED- SYNTHESIS & SAMPLING

History of synths;Moog synths;Fourier Analysis and synthesis;Types of Basic Waveforms;Types of synths;Concepts of on-location sound recording using hand-held recorder; Concept of noise cleaning; Advanced concept of ADSR curve; Advanced concept of filters used in sampling; Pitch shifting the sample.

UNIT III : NUENDO/CUBASE/ REASON

Software application for audio editing ; editing tools ; nuendo/cubase extensive training ;Reason fundamentals and signal flow; Overview of instruments, fx, eq, automation and mixing; Advanced routing for creative audio production and design; Creative production tricks and tips.

UNIT IV : PROGRAMMING TECHNIQUE WITH LOGIC STUDIO

Navigating through logic ; Environment and arrange window ; Matrix, event, and hyper information ; Recording and editing audio ; Score window overview ; Rewire ; Automation ; Plug-ins and mixing.

UNIT V : OVERVIEW OF ABLETON LIVE

Introduction to ableton live concepts;Arrangement view ;Recording audio within live;Loop based arrangement;Groove pool, warping and clip automation;Programming beats using drum racks and impulse.

RECOMMENDED READING:

1. Principles of Digital Audio: Ken C. Pohlmann
2. Art of Digital Audio; John Watkinson
3. Digital Audio Explained: Nika Aldrich
4. Users' Guide to Sound Synthesis with VST Instruments: Simon Millward
5. MIDI Power: Hal Ceonard

2.5 – ADVANCED MUSIC PRODUCTION, MIXING & MASTERING TECHNIQUES

UNIT I : USING LIVE INSTRUMENTS IN COMPOSITION & WORKING WITH 3RD PARTY VIRTUAL INSTRUMENTS

Microphone Techniques to capture instruments; Accent Miking; Ambient Miking; Stereo Miking Techniques; AB or Spaced Pair; XY, Near Coincident or OSS (Optimal Stereo Sound); Understanding multitracking and overdubbing; Use of quick punch when necessary.; Different plugin types for different daws; VST, AU, RTAS, AAX,ASIO.

UNIT II : ADVANCE GROOVE DESIGN & MUSIC FOR VIDEO GAMES

Using Grooves; Game Audio Overview; Sound Types and Game Genres;Game sound development overview;Working with SFX libraries;Trim, Edit and Level different sound; Manipulating the sound Overview of music for games and visual medium; Style and Genre Considerations.

UNIT III : RE-MIXING TECHNIQUES & MAKING LIVE SETS

History of remixing;Beat mapping concepts;Conforming to grid and finding the tempo of a song; Remixing an acapella; Remixing a track; Arrangement of remixing a track; Effects and processing needed for remixing a track; Mash-up of different songs.

UNIT IV : VOCAL PROCESSING AND PITCH CORRECTION TECHNIQUES

Overview of vocal styles in different genres of music; Vocal ranges of different singers. Editing concepts of vocals; Vocal Processing using iZotope Nectar; Elaborate concepts of different modules of iZotope Nectar; Breath Control, Harmony Module, Pitch Editor, FX module.

UNIT V : MIXING & MASTERING CONCEPTS FOR DIFFERENT GENRES

Overview of Mixing Music; Exporting the Mix; Equalization Techniques; Dessing, Multi-Band Compression, and Limiting; Chorusing, Flanging, Phasing, Tremolo, Leslie Cabinet; Distortion, Soundfield Processing, Amp Simulation; Reverse Reverb, Reverse Delays, Backwards Compression; Baril language.

RECOMMENDED READING:

1.zhaki, R., 2011. Mixing Audio: Concepts, Practices and Tools,2nd ed. Focal Press. Production, 2nd Revised ed. artistpro.com LLC.
2.White, P., 2003. Creative Recording Part One: Effects and Processors,Sanctuary
3.Collins, M., 2011. Pro Tools 9: Music Production, Recording, Editing, and Mixing,Focal Press Everest, F.A., 2005.
4.Critical Listening Skills for Audio Professionals,2nd Revised ed. Course Technology Inc.
5.Gibson, D., 2005. The Art of Mixing: A Visual Guide to Recording, Engineering and Production, Artist Pro Publishing