

Indian Institute of Technology Kanpur

Proposal for a New Course

1. Course No.: *(To be assigned)*

2. Course Title: Music Technology: Sound Design & Musical Interfaces

3. Per Week:

Lectures: **3 (L)** Tutorial: **0 (T)** Laboratory: **0 (P)** Additional Hours: **0 (A)**

Credits: $(3*L+2*T+P+A)$: 9 **Duration:** Full Semester

4. Proposing Department/IDP: Department of Design

Other Departments/IDPs Interested: Department of Electrical Engineering, Cognitive Science, and Computer Science & Engineering.

5. Proposing Instructor(s): Gowdham Prabhakar

6. Course Description

A) Objectives

To explore sound as a medium for design, perception, and performance through hands-on learning in psychoacoustics, sound design, music production, interaction design, and AI-assisted creativity. The course combines music technology, human-computer interaction, and performance studies through interdisciplinary projects and a final public showcase.

B) Contents (in 10 Broad Titles)

S. No	Broad Title	Topics	No. of Lectures
1	Psychoacoustics & Auditory Perception	Pitch, loudness, timbre, masking, auditory cognition	4
2	UX & Product Sound Design	Notifications, branding, auditory icons, sound feedback	4
3	Foley & Film Sound	Foley recording, cue spotting, synchronization	4
4	Groove & Synthesis Design	Subtractive, FM, granular, and sample-based synthesis	4
5	MIDI, OSC & Patch Programming	Max/MSP, signal routing, modular synthesis, Arduino MIDI	4

6	AI-Assisted Sound Design	Generative patch making, diffusion-based textures, ML-audio	4
7	Interactive Systems	Sensor mapping, gestural performance, data-driven sound	4
8	Audiovisual Integration	TouchDesigner, audio-reactive visuals, GEMIDI-like mapping	4
9	Stagecraft & Live Systems	Soundcheck, redundancy, performance design	4
10	Final Performance & Critique	Public concert, reflection, documentation	3

Total Contact Hours: 39 lectures (including studio sessions)

C) Pre-requisites:

Students must have a strong interest in sound/music and at least **ONE** of the following (**NOT ALL**):

- Completion of DES638 Human–Machine Interaction
- Music Theory/practice exposure
- Music Production
- Programming experience
- Basic Electronics experience

D) Short Summary (for Courses of Study Booklet)

An interdisciplinary, studio-based course exploring psychoacoustics, sound design, and music performance through design and technology. Students learn UX sound, film sound, and AI-assisted music production, build interactive systems using MIDI/OSC/Max MSP/Arduino, and design new musical interfaces. The course culminates in a public performance showcasing original works.

Past works video: <https://www.youtube.com/watch?v=QGf6TXCTHuU>

7. Recommended References

Textbooks:

- Farnell, A. *Designing Sound*.
- Howard & Angus. *Acoustics and Psychoacoustics*.

Conference Proceedings:

- NIME (New Interfaces for Musical Expression)
- CHI (ACM Conference on Human Factors in Computing Systems)
- TEI (ACM Conference on Tangible, Embedded and Embodied Interaction)
- MOCO (Movement and Computing Conference)
- SMC (Sound and Music Computing Conference)
- ISMIR (International Society for Music Information Retrieval Conference)
- ICAD (International Conference on Auditory Display)

8. Any Other Remarks

- Course includes **hands-on use of Logic Pro X/FL Studio, Max/MSP, TouchDesigner, and AI tools.**
- Students can design **Digital Musical Instruments (DMIs), augmented acoustic instruments, or AI-based sound systems.**
- End-semester **public performance** based on the projects
- Supports research submissions to **NIME, CHI, TEI, and MOCO.**

Dated: 30 Nov 2025

Proposer: Gowdham Prabhakar

Dated:

DUGC/DPGC Convener:

The course is approved / not approved

Chairman, SUGC/SPGC:

Dated: