# 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 | 3 |
| 3 | Foley & Film Sound | Foley recording, cue spotting, synchronization | 3 |
| 4 | Groove & Synthesis Design | Subtractive, FM, granular, and sample-based synthesis | 3 |
| 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 | 3 |
| 7 | Interactive Systems | Sensor mapping, gestural performance, data-driven sound | 4 |
| 8 | Audiovisual Integration | TouchDesigner, audio-reactive visuals, GEMIDI-like mapping | 3 |
| 9 | Stagecraft & Live Systems | Soundcheck, redundancy, performance design | 2 |
| 10 | Final Performance & Critique | Public concert, reflection, documentation | 2 |

**Total Contact Hours:** ~31-35 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:**