You will learn:

**Sound**: properties of sound waves

**Human auditory system**: perception, critical band, frequency masking

**Digitization of audio signals**: bandwidth, precision, and signal-to-quantization noise ratio, over-sampling A/D conversion.
Digital Audio Processing and Applications (EE5809)

**Basic lossless compression:** Entropy, Huffman coding, Arithmetic coding

**Audio Coding:**

**Lossy compression:**

- **Waveform coding:** ADPCM, linear prediction
- **Psychoacoustic coding:** transform coding, QMF and MDCT, scale factor, masking and quantization, MPEG I, II, IV audio coders, MP3, Advanced Audio Coding (AAC), quality evaluation; PEAQ

**Audio coding format:** compact disc, DVD, Blu-Ray laser and HD

**Lossless compression:** Meridian Lossless Packing (MLP) coding for DVD-Audio, Direct Stream Digital for Super Audio CD, MPEG-4 ALS
Digital Audio Processing and Applications (EE5809)

**Music synthesis**: musical acoustic, sinusoidal and harmonic signal
- additive synthesis,
- non-linear synthesis; FM synthesis and Chebyshev techniques,
- physical modelling,
- wavetable synthesis;
- MIDI format, instrument and sequencing

**Sound effects**: reverberation, depth perception, binaural perception, sound localization/spatialization, 3D sound processing/synthesis, Head related transfer functions.

**Surround sound**: multi-channel audio, compression and expansion, digital mixing and filtering, Dolby ProLogic I, II,
Digital Audio Processing and Applications (EE5809)

Assessment
- Tutorial quiz
- Mid-term test
- Assignment (audio coding)
- Final examination

For more course information:
http://www.cityu.edu.hk/pg/current/course/EE5809.htm