ENSEA COURSES TAUGHT IN ENGLISH
SPRING Semester

1) Electronic Circuits & Laboratory

Lecture : 45 hours
Laboratory : 45 hours
US Credits : 6

Analysis of integrated amplifiers with bipolar junction transistors and field-effect transistors. Transistors linear equivalent models at high frequencies.
Frequency response of transistor amplifiers.
Feedback configurations, stability, frequency response of feedback amplifiers.
Analog integrated circuits : differential-pair, active load, operational amplifier.

To reinforce concepts, laboratory experiments involve work with real components on didactic circuits and SPICE simulation.

Prerequisite : Circuit analysis with sinusoidal signals. Bipolar and field-effect transistor operating principles, basic biasing techniques.

This course is relatively similar to the following courses :

IIT ECE 312 Electronic circuits
UB EE 311 & 353 Electronic Devices & Circuits 2

2a) Introduction to Microprocessors and Assembly Language Programming

Lecture: 17 hours
Laboratory: 28 hours
US Credits : 3

Microprocessor architecture, machine language programming, microprocessor assemblers, assembly language programming, link between assembly language and C language, memory and I/O interface, interrupts microprocessor system design.

During the laboratory hours the students are guided to develop software for an embedded system in assembly language and even in C language with interrupt system programming.

Prerequisite: experience using any programming language, notions about digital systems, computer arithmetics, information representation.

This course is relatively similar to these courses:

IIT Courses:

CS350 Computer Organization and Assembly language Programming

SUNY Buffalo Courses:

CSE 379 Introductions to Microprocessors and Microcomputers

and CSE 380 Introduction to Microprocessors Lab

2b) Computer Architecture*

Lecture: 17 hours
Laboratory: 28 hours
US Credits : 3

*Detailed description will be given if course opens

IIT Courses:

CS450 Computer Organization and Assembly language Programming

SUNY Buffalo Courses:

CSE 379 Introductions to Microprocessors and Microcomputers

and CSE 380 Introduction to Microprocessors Lab

3) Signals and Systems

US Credits : 3

Prerequisite

Students are supposed to have a knowledge about circuit analysis with sinusoidal signals and some ideas about Fourier series representation of periodical signals. They must of course know how to calculate basic integrals (mainly exponential functions and rectangular window) and finite and infinite geometrical series.

Course description

Organization

Duration : 45 h (3 h per week, for 15 weeks)

Approximately 40 % on continuous time signals, 60 % on discrete time signals

Approximately 2/3 of the time will be used for formal lecturing, the remaining third being in form of tutorials
(tutorial and lecture will be intertwined, as the group will be small enough to do it in the same place).

Content

Continuous time signals

- Fourier and Laplace transforms
- Time invariant linear systems and convolution
- Transfer functions, stability, frequency response, Bode representation, poles / zeros diagrams
- Application to physical systems (electrical, mechanical)

Discrete time signals

- Sampling theorem. Fourier equivalence of sampled signals and sequences.
  Practical sampling and converters. Problem of practical reconstruction (blocker effects).
- Linear systems, time invariant and non time invariant (i.e. compressor and oversampler)
- Fourier and Z transforms
- Convolution, transfer functions, stability, frequency response, poles / zero diagrams
- Convolution / product duality. Windowing.
- Frequency sampling : Discrete Fourier Transform and applications
- Introduction to filter design.

IIT ECE 308 Signals

UB EE 303 Signals & Transforms

4) Electromagnetism

3 hours/week 15 weeks = 45 hrs
US Credits : 3

Topics :

Electrostatic and magnetostatic fields and potentials, Coulomb's law, Gauss's Law, Biot-Savart and Ampere's law, Faraday's induction law.

Maxwell's equations, electromagnetic uniform-plane wave propagation, propagation in dielectrics, guided propagation, electromagnetic radiation, reflection and transmission coefficients.

Light sources, imperfection and temporal coherence of a real source, interferences, laser sources.

Diffraction, Fourier optics and applications.

IIT 307 Electrodynamics
EE 324 Applied Electromagnetics

Electrodynamics . Vector analysis applied to static and time-varying electric and magnetic fields. Coulomb's Law, electric field intensity, flux density and Gauss's Law. Energy and potential. Biot-Savart and Ampere's Law. Maxwell's equations with applications including uniform-plane wave propagation.

5) French Language and culture

45 Hours
US Credits : 3

Content to be determined