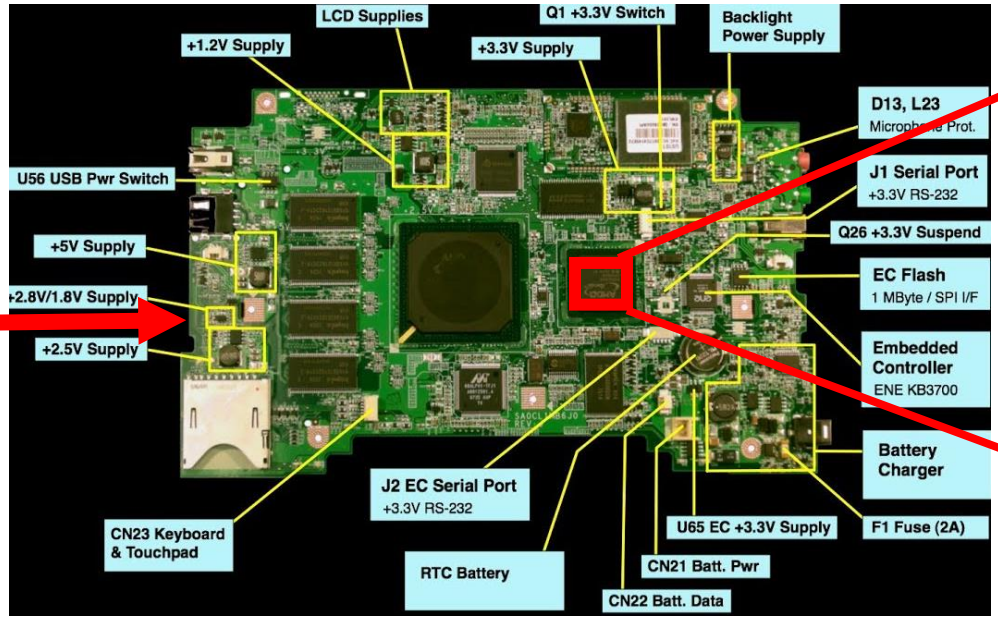

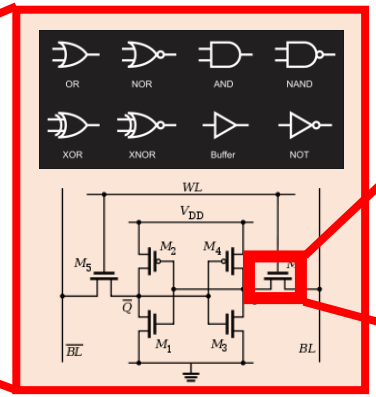

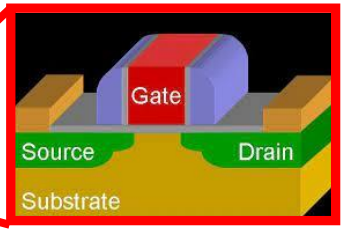

ESC201: Introduction to Electronics

FCH

Dr. Shubham Sahay,
Assistant Professor,
Department of Electrical Engineering,
IIT Kanpur

Course Schedule

- We will meet:
  - Every Monday, Wednesday, and Thursday : 5:10-6:00 p.m.
- Tutors will meet:
  - Every Tuesday : 5:10-6:00 p.m.
  - No tutorial in the first week and holiday in the second week (Cheers!)
- You will get hands-on experience during:
  - One Lab session each week : 2:00-5:00 p.m.
  - No Lab first week (Yay!)

The Instructor

- Course Instructor :
  - Dr. Shubham Sahay
  - Email: ssahay@iitk.ac.in
  - Assistant Professor, EE
  - Research areas:

    Neuromorphic Computing

    Hardware Security

    Emerging Logic and Memory Devices

- Lab Coordinator:
  - Dr. Rik Dey
  - Email: rikdey@iitk.ac.in
  - Assistant Professor, EE
  - Research Areas:

    Solid-state Devices

    Spintronics

Course Objective

This course intends to provide:

- an introduction to the basic principles of electrical circuit analysis.
- exposure to basic electronic devices, and analog and digital circuits.
- a panoramic view of the mutual relevance and dependence between other branches of engineering and sciences with concepts encountered in electronics.
- Mathematical modeling methods useful across disciplines.

Course Content

Circuits	– Circuit Analysis (Nodal, Mesh, Superposition, Thevenin's and Norton's Theorem) – Elements with memory- inductors/capacitors – Transient analysis and sinusoidal steady state analysis circuits – Transfer function and frequency response
Diodes/Transistors	– Non-linear circuits- Diode/transistors/BJT - Semi-conductor evolution – Circuit analysis- Large/small scale signals – Applications- Rectifiers/amplifiers – Op-amps (Operational amplifier) circuits
Digital Circuits	– Logic gates, logic minimization – Combinational circuits – Sequential circuits, Flip flops, Counters, shift registers

References

- Most of these books are available online as well as in the Library (check both circulation and reference sections). You may use whichever book you prefer.
  - Foundations of Analog and Digital Electronic Circuits by Agarwal, Lang, Elsevier
  - Engineering Circuit Analysis by W. Hayt, J. E. Kemmerly and S. M. Durbin, TATA McGraw Hill
  - Electronic Devices and Circuit Theory by R. Boylestad and L. Nashelsky, Prentice Hall of India
  - Microelectronics Circuits, by Sedra/Smith, 5th edition, Oxford University Press
  - Digital Design by Mano, Ciletti, 4th edition, Pearson
  - Digital Principles and Applications, by Leach, Malvino, 5th edition, Tata McGraw Hilll
  - Essential of Electrical and Computer Engineering, Kerns and Irvin, Pearson, Prentice Hall, 2004.

Tutorial Plan

- Tutorials are for clarifying doubts incurred during lectures and assignments.
- Homework assignment sheets will be given every week.
- For efficient learning, it is suggested that you attempt all the assignment problems prior to the tutorial session.
- You are not required to submit the homework solutions.
- Tutors will discuss the solutions to the homework assignments.
- A Mini-Quiz (MQ) will be scheduled at the beginning of every tutorial session.

Grading Scheme

- Lab component 20%
- Mini-Quizzes (best n-1 out of n) 14%
- 2 Major Quizzes (on 11th Feb & 8th Apr) 16%
- Mid-semester Exam 20%
- End-semester Exam 30%

Attendance policies

Attending classes is strongly recommended!

Missing more than 25 lectures → automatic drop/"F"

First week is not included

Academic honesty policy

Any cheating/academic dishonesty: automatic "F" and reported to SSAC

Policy regarding missed exams/labs:

- If you miss an examination due to approved medical leave or you have your leave approved by the competent authority at IIT Kanpur, following policy will be applied:

1. *Missed MQ/Quiz-1/Quiz-II/Mid-semester examination*: No make up examination.
2. Missed end-semester exam: You will be allowed to sit in a make-up examination. It is your responsibility to apply for it through DoAA office.
3. Missed Laboratory sessions: You will be allowed to complete the experiment in the designated make-up laboratory sessions. However, if you do not appear in the makeup laboratory sessions, you will be awarded zero marks for that experiment.

Acknowledgement

- Prof. Baquer Mazhari
- Prof. A. R. Harish
- Prof. S.S.K. Iyer
- Prof. Yogesh S. Chauhan
- Prof. Adrish Banerjee
- Prof. K. V. Srivastava
- Prof. Imon Mondal
- Prof. Pradeep Kumar
- Prof. Shilpi Gupta
- Prof. Ketan Rajawat
- Prof. Amit Verma
- Prof. Vipul Arora
- Prof. Abhishek Gupta
- Prof. Rik Dey