## Course Syllabi: UEC001 Electronic Engineering (L : T : P :: 3 : 1 : 2)

1. **Course number and name**: UEC001 Electronic Engineering

2. **Credits and contact hours**: 4.5 and 6

3. **Text book, title, author, and year**

**Text Books / Reference Books**

- *M. M. Mano and M.D. Ciletti, Digital Design, Pearson, Prentice Hall, 2013.*
- *Milliman, J. and Halkias, C.C., Electronic Devices and Circuits, Tata McGraw Hill, 2007.*
- *Donald D Givone, Digital Principles and Design, McGraw-Hill, 2003.*
- *John F Wakerly, Digital Design: Principles and Practices, Pearson, (2000).*
- *N Storey, Electronics: a Systems Approach, Pearson, Prentice Hall, (2009).*
- *Boylestad, R.L. and Nashelsky, L., Electronic Devices & Circuit Theory, Perason (2009).*
- *M. M. Mano and M.D. Ciletti, Digital Design, Pearson, Prentice Hall, 2013.*
- *Milliman, J. and Halkias, C.C., Electronic Devices and Circuits, Tata McGraw Hill, 2007.*
- *Donald D Givone, Digital Principles and Design, McGraw-Hill, 2003.*
- *John F Wakerly, Digital Design: Principles and Practices, Pearson, (2000).*
- *N Storey, Electronics: a Systems Approach, Pearson, Prentice Hall, (2009).*
    1. *Boylestad, R.L. and Nashelsky, L., Electronic Devices & Circuit Theory, Perason (2009).*

a. Other supplemental materials
   - Nil

4. **Specific course information**

a. Brief description of the content of the course (catalog description)

**Semiconductor Devices:** P-N junction diode: Ideal diode, V-I characteristics of diode, Diode small signal model, Diode switching characteristics, Zener diode

**Electronics Devices and Circuits:** P-N Diode as a rectifier, Clipper and clamper, Operation of Bipolar Junction Transistor and Transistor Biasing, CB, CE, CC (Relationship between $\alpha$, $\beta$, $\gamma$) circuit configuration Input-output characteristics, Equivalent circuit of ideal and real amplifiers, Low frequency response of amplifiers, Introduction to Field Effect Transistor and its characteristics

**Operational Amplifier Circuits**: The ideal operational amplifier, the inverting, non-inverting amplifiers, Op-Amp Characteristics, Frequency response of op-amp, Application of op-amp

**Digital Systems and Binary Numbers:** Introduction to Digital signals and systems, Number systems, Positive and negative representation of numbers, Binary arithmetic, Definitions and basic theorems of boolean Algebra**,** Algebraic simplification, Sum of products and product of sums formulations (SOP and POS), Gate primitives, AND, OR, NOT and Universal Gate, Minimization of logic functions, Karnaugh maps.

**Combinational and Sequential Logic:** Code converters, multiplexors, decoders, Addition circuits and priority encoder,Master-slave and edge-triggered flip-flops,Synchronous and Asynchronous counters, Registers

**Logic families:** N and P channel MOS transistors, CMOS inverter, NAND and NOR gates, General CMOS Logic, TTL and CMOS logic families, and their interfacing.

**Laboratory Work:**

Familiarization of CRO and Electronic Components, Diodes characteristics Input-Output and Switching characteristics, BJT and MOSFET Characteristics, Zener diode as voltage regulator, Transistorized Series voltage regulator. Half and Full wave Rectifiers with and without filter circuit, Half and full adder circuit implementation, Decoder, DMUX and MUX, Binary/BCD up/down counters.

5. **Specific goals for the course**

After the completion of the course, the students will be able to

- Demonstrate the use of semiconductor diodes in various applications.
- Discuss and explain the working of transistors and Operational Amplifiers, their configurations and applications.
- Recognize and apply the number systems and Boolean Algebra.
- Reduce Boolean Expressions and implement them with Logic Gates.
- Analyze, design and Implement combinational and sequential circuits.
- Analyze and differentiate logic families, TTL and CMOS.

6. **Brief list of topics to be covered**

- Semiconductor devices
- Transistor
- FET
- Op-amp
- Digital circuits
- Sequential circuits