1. Title of the course   Introduction to Elecrtical systems and electronics (EE101)

2. Credit structure   3 0 0 6

3. Prerequisites, if any   No pre-requisite

4. Course content   *See attachement*

5. Text, references   *See attachement*

6. Instructor   B. N. Bharath

7. TA's   Will be announced soon!

1. Course Content

1. **From Physics to Electrical Engineering**

   (a) Lumped matter discipline

   (b) Batteries, resistors, current sources and basic laws

   (c) *I-V* characteristics and modeling physical systems

2. **Basic Circuit Analysis Methods**

   (a) KCL and KVL, voltage and current dividers

   (b) Parallel and serial resistive circuits

   (c) More complicated circuits

   (d) Dependent sources, and the node method

   (e) Superposition principle

   (f) Thevenin and Norton method of solving linear circuits

   (g) Delta-Wye conversion

3. **Analysis of Non-linear Circuits**

   (a) Toy example of non-linear circuit and its analysis

   (b) Incremental analysis

   (c) Introduction to MOSFET Amplifiers

   (d) Large and small signal analysis of MOSFETs

   (e) MOSFET as a switch

4. **Introduction to the Digital World**

   (a) Voltage level and static discipline

   (b) Boolean logic and combinational gates

   (c) MOSFET devices and the S Model

   (d) MOSFET as a switch; revisited

   (e) The SR model of MOSFETs

   (f) Non-linearities: A snapshot

5. **Capacitors and Inductors**

   (a) Behavior of capacitors, inductors and its linearity

   (b) Basic RC and RLC circuits

   (c) Modeling MOSFET anomalies using capacitors

   (d) RLC circuit and its analysis

   (e) Sinusoidal steady state analysis

6. **Transformers and Motors**

   (a) AC Power circuit analysis

   (b) Polyphase circuits

   (c) Introduction to transformers

   (d) Introduction to motors

1. Text Books and References[1]

1. Anant Agarwal and Jefferey H. Lang, "Foundations of Analog and Digital Electronics Circuits," *Morgan Kaufmann publishers,* 2005

2. Wlilliam H. Hayt, Jr., Jack E. Kemmerly and Steven M. Durbin, "Engineering Circuit Analysis," *Tata McGraw-Hill*

3. Theodore Wildi, "Electrical Machines, Drives and Power Systems," *Pearson,* 6-*th edition.*

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[1]There may be a slight deviation in following the books mentioned above. Appropriate pointers will be given during the corresponding lecture.