COURSE INFORMATION

**Course Code: ES-201**

**Course Name: Basic Electrical and Electronics Engg.-II( Electronics)**

**Contacts: 2L+1T**

PREREQUISITES

**To understand this course, the studentmust have idea of:**

* Basic operational principle of diode and BJT
* Fundamental idea of KCL,KVL, ohms laws etc

SYLLABI

**Basic Electronics Engineering - II**

***Module – 1: Field Effect Transistors***:

Concept of Field Effect Transistors (channel width modulation), Gate isolation types, JFET Structure and characteristics, MOSFET Structure and characteristics, depletion and enhancement type; CS, CG, CD configurations; CMOS: Basic Principles.

***Module – 2: Feed Back Amplifier, Oscillators and Operational Amplifiers:***

Concept (Block diagram), properties, positive and negative feedback, loop gain, open loop gain, feedback factors; topologies of feedback amplifier; effect of feedback on gain, output impedance, input impedance, sensitivities (qualitative), bandwidth stability; effect of positive feedback: instability and oscillation, condition of oscillation, Barkhausen criteria.

Introduction to integrated circuits, operational amplifier and its terminal properties; Application of operational amplifier; inverting and non-inverting mode of operation, Adders, Subtractors, Constant-gain multiplier, Voltage follower, Comparator, Integrator, Differentiator.

***Module – 3: Digital Electronics:***

Introduction to binary number; Basic Boolean algebra; Logic gates and function realization with OPAMPs.

BEYOND SYLLABI COVERAGE

**Lecture Plan:**

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| Cl. No. | Date | Topics | Remarks |
| 1 | 18/01/15 | Concept of Field Effect Transistors (channel width modulation), Gate isolation types |  |
| 2 | 01/02/15 | JFET Structure and characteristics |  |
| 3 | 05/02/15 | MOSFET Structure and characteristics |  |
| 4 | 08/02/15 | Depletion and enhancement type |  |
| 5,6 | 12/02/1515/02/15 | CS, CG, CD configurations | Problems to be solved |
| 7 | 22/02/1 | CMOS: Basic Principles | Problems to be solved  |
| 8 | 26/02/15 | Introduction to integrated circuits, operational amplifier |  |
| 9 | 29/02/15 | Terminal properties of operational amplifier |  |
| 10,11 | 04/03/1507/03/15 | Application of operational amplifier |  |
| 12 | 11/03/15 | Inverting and non-inverting mode of operation, |  |
| 13 | 14/03/15 | Adders, Subtractors, Constant-gain multiplier, Voltage follower |  |
| 14 | 18/03/15 | Comparator, Integrator, Differentiator |  |
| 15,16 | 25/03/1528/03/15 | Concept (Block diagram), properties, positive and negative feedback, loop gain, open loop gain, feedback factorsEffect of feedback on gain, sensitivities (qualitative), bandwidth stability |  |
| 17 | 01/04/15 | Types of feedback amplifier, Topologies of feedback amplifier |  |
| 18 | 04/04/15 | Effect of feedback on output impedance, input impedance |  |
| 19 | 22/04/15 | Effect of positive feedback: instability and oscillation, condition of oscillation, Barkhausen criteria. |  |
| 20 | 25/04/15 | Introduction to binary number; Basic Boolean algebra |  |
| 21 | 29/04/15 | Logic gates and function realization |  |

**Recommended Books:**

Text:

1. Sedra& Smith: Microelectronics Engineering.
2. Millman&Halkias: Integrated Electronics.
3. Basic Electrical and Electronic Engineering Vol.- II , J.P. Bandyopadhyay, Vikas WBUT Students’series

References:

1. Malvino: Electronic Principle.
2. Schilling &Belove: Electronics Circuits.
3. Millman&Grabal: Microelectronics.
4. Salivahanan: Electronics Devices & Circuits.
5. Boyelstad&Nashelsky: Electronic Devices & Circuit Theory.

**Subject Teacher: Sankhadeep Ghosh**

Signature: