

COURSE TITLE	BASIC ELECTRONICS
COURSE CODE	01EE1112
COURSE CREDITS	4

Objective:

- 1 To provide the fundamental knowledge of electronic circuits required for analysis and design of electronic circuits and systems.

Course Outcomes: After completion of this course, student will be able to:

- 1 Describe the construction and working of various semiconductor devices. (Understand)
- 2 Construct the different electronic circuit using diode, BJT and FET. (Apply)
- 3 Prepare various biasing circuit for transistors. (Apply)
- 4 Analyse various electronic circuits consisting of Diode, BJT and FET. (Analyze)
- 5 Recognize the use of electronic components in various logic families and logic gates (Understand)

Pre-requisite of course: Basic knowledge of Physics

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
3	0	2	50	30	20	25	25

Contents : Unit	Topics	Contact Hours
1	Semiconductor Diodes Intrinsic and extrinsic semiconductor materials,, Construction and working of PN junction diode,, Characteristic of PN junction diode, DC and AC resistance of diode,, Diode equivalent circuits,, Construction and working of Zener diode, optical diodes and solar cell.	8
2	Diode Applications Load line analysis, Diode as Switch, Clippers, Clampers and Rectifiers, Zener voltage regulator, IC voltage regulators	9
3	Bipolar Junction Transistor and its Biasing Construction and operation, CB, CC and CE configuration, Input and Output characteristic, , Biasing: Fixed bias, emitter bias and voltage divider bias, Load line and operating point,, Emitter follower configuration and Darlington configuration	12

Contents : Unit	Topics	Contact Hours
4	FET and its Biasing Junction field effect transistors (JFET), , Comparison of BJT and FET, JFET characteristics, FET Biasing in ohmic region and active region,, Trans-conductance, amplification and switching,, MOSFETs (D-type and E-type MOSFET),, CMOS introduction, E-MOSFET amplifier., MOSFET testing, Reading datasheet for FET and MOSFET.	8
5	Introduction of Digital Circuits Digital logic families RTL, DTL, TTL, CMOS, Comparison of logic families,, Basic gates AND, OR, NOT, NAND, NOR, EX-OR, EX-NOR, Building AND, OR Gate with diodes,	5
Total Hours		42

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
1	Experiment No. 01 To study and perform the V-I characteristic of Silicon Diode	2
2	Experiment No. 02 To study and perform the V-I characteristic Zener Diode.	2
3	Experiment No. 03 To use the Zener Diode as voltage regulator	2
4	Experiment No. 04 Design and analyses the clipper circuits using PN junction diode.	2
5	Experiment No. 05 Design and analyses the clamper circuits using PN junction diode.	2
6	Experiment No. 06 To analyze the Half Wave rectifier using silicon diode without and with filter capacitor.	2
7	Experiment No. 07 To analyze the Full Wave rectifier using silicon diode without and with filter capacitor.	2
8	Experiment No. 08 To plot the input and output characteristics of bipolar junction transistor.	2
9	Experiment No. 09 To study and plot the frequency response curve of BJT as an amplifier.	2
10	Experiment No. 10 To study about the input and output characteristics of MOSFET.	2
11	Experiment No. 11 Verification and interpretation of truth table for NOT, AND, OR, NAND, NOR, Ex-OR, and Ex-NOR gates	2
12	Experiment No.. 12 To study the datasheet of MOSFET.	2

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
13	Open Ended Problems Design a full wave bridge rectifier for input 50 Hz 10Vp-p AC signal and expected output of 5 V DC signal., Design a regulated power supply using zener diode to get 12 DC for input variation of 10 to 20 Vp-p.	2
Total Hours		26

Textbook :

- 1 Electronics Principles, Albert Malvino and David Bates, ata McGraw-Hill, 7th Edition, 2006
- 2 Electronic Devices and Circuit Theory, Robert Boylestad and Louis Nashelsky, Pearson Education, 10th Edition, 2009

References:

- 1 Organic Electronics: Materials, Manufacturing, and Applications, Organic Electronics: Materials, Manufacturing, and Applications, Hagen Klauk , WILEY, 2006
- 2 Electronics Device and Circuits, Electronics Device and Circuits, S Salivahanan and N Suresh Kumar, Tata McGraw-Hill Education Private Limited, 2nd Edition, 2008
- 3 Electronics Devices: Conventional Current Version, Electronics Devices: Conventional Current Version, Thomas L. Floyd, Pearson Education, 7th Edition, 2008
- 4 Electronics Device and Circuits, Electronics Device and Circuits, Jacob Milman and Christos C. Halkias, Tata McGraw-Hill, 3rd Edition, 2008

Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery					
Remember / Knowledge	Understand	Apply	Analyze	Evaluate	Higher order Thinking / Creative
20.00	30.00	25.00	15.00	10.00	0.00

Instructional Method:

- 1 The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc
- 2 The internal evaluation will be done on the basis of continuous evaluation of students in the laboratory and class-room.
- 3 Practical examination will be conducted at the end of semester for evaluation of performance of students in laboratory.

Instructional Method:

- 4 Students will use supplementary resources such as online videos, NPTEL videos, e-courses, Virtual Laboratory.

Supplementary Resources:

- 1 <http://textofvideo.nptel.iitm.ac.in/video.php?courseId=117103063>
- 2 <https://www.coursera.org/course/eefunlab>
- 3 <https://www.coursera.org/course/introtoelectronics>
- 4 <https://www.edx.org/course/circuits-electronics-1-basic-circuit-mitx-6-002-1x>
- 5 <http://www.learnabout-electronics.org>
- 6 <http://www.electronics-tutorials.ws>
- 7 <http://101science.com/Radio.htm>
- 8 <http://www.electronicandyou.com>