



**Electronics Paper-I**  
**Semiconductor Devices and Basic Electronic Systems**  
**[CORE COURSE]**

Semester: I	Credits:2	Subject Code: BS12007	Lectures: 40
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**Course Outcomes:**

**At the end of this course, the learner will be able to:**

- Memorize the basic knowledge of semiconductor devices and their working through characteristics and distinguish between them.
- Differentiate between different types of rectifiers, Understand the concept of filter identify different voltage regulator circuits.
- Describe working about BJT and its I-V Characteristics and compare and analyze different transistor configuration and amplifier
- Differentiate between E-MOSFET and D-MOSFET and application as a switch

<b>Unit 1: Semiconductor Devices</b>	<b>9</b>
<ul style="list-style-type: none"> <li>Introduction to semiconductor: Intrinsic and extrinsic semiconductor P and N type semiconductor</li> <li>Study of semiconductor devices with reference to symbol, working principle, I-V characteristics, parameters, specifications. - Rectifier diode, Zener diode, LED, Photo diode, Opto- coupler</li> </ul>	

<b>Unit 2: Power Supply</b>	<b>12</b>
<ul style="list-style-type: none"> <li>Half wave rectifier, Full wave rectifier and Bridge rectifier with RC filter and comparison of all rectifiers.</li> <li>Block diagram of power supply, Voltage Regulation: Load and Line Regulation, Application of Zener as a voltage regulator, three pin regulators</li> </ul>	

<b>Unit 3: Bipolar Junction Transistor and Circuits</b>	<b>15</b>
<ul style="list-style-type: none"> <li>Bipolar Junction Transistor (BJT) symbol, types, construction, working principle, CB, CC (only concept), I-V output Characteristics of CE configuration, Definition of <math>\alpha</math>, <math>\beta</math> and <math>Y</math> and relationship between them.</li> <li>Applications of Transistor as a switch and as an amplifier.</li> <li>Single stage RC coupled CE amplifier, Formula for gain, frequency response and bandwidth.</li> </ul>	

<b>Unit 4: MOSFET</b>	<b>4</b>
<ul style="list-style-type: none"> <li>Metal Oxide Semiconductor FET (MOSFET),</li> <li>Enhancement and Depletion mode MOSFET, MOSFET as switch.</li> </ul>	

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**Basic Reading:**

- Working principle of Resistor, capacitor and Inductor. Knowledge of conductor, insulator and semiconductor on the basis of conduction band and valance band.

**Reference Books:**

- A. Motorshed , *Electronic Devices and circuits*:, Prentice Hall of India.
- Albert Malvino, David J Bates, *Electronic Principles*, McGraw Hill 7th Edition. 2012
- Bernard Grob ,*Basic Electronics*:, McGraw Hill Publication, 8th Revised Edition, 2010
- B.L.Theraja *Basic Electronics*, S. Chand and Co.
- Bolyestad, *Electronic Devices and Circuits*, Tata McGraw Hill.
- V.K. Mehta ,*Principals of Electronics*, S. Chand and Co.

**Websites:**

- <https://www.electronics-tutorials.ws/>
- <http://www.electronicsforu.com/newelectronics/default.asp>
- <https://www.instructables.com/id/Basic-Electronics/>
- <https://www.instructables.com/id/Basic-Electronics/>

**E-Resources:**

- <https://nptel.ac.in/courses/122/106/122106025/>
- <https://nptel.ac.in/courses/117/103/117103063/>

**Contact Hours: 12 hours for Library work, practical or field work or research purposes**

Board of Studies	Name	Signature (in white cell)
Chairman (HoD)	Swatee Sarwate	<i>Swatee Sarwate</i> 22/7/20
Faculty	Anitha Menon	<i>R.D. Menon</i> 22/7/20
VC Nominee (SPPU)	Dr. Neha Deshpande	<i>Neha Deshpande</i> 22/7/20
Subject Expert (Outside SPPU)	Dr. R.K.Kamat	<i>R.K. Kamat</i> 22/7/20
Subject Expert (Outside SPPU)	Dr. Sangeeta Kale	<i>Sangeeta Kale</i> 22/7/20
Industry Expert	Amber Mukherjee	<i>Amber Mukherjee</i> 22/7/20
Alumni	Supriya Palande	<i>Supriya Palande</i> 22/7/20

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