

**GOVERNMENT POLYTECHNIC, PUNE**  
(An Autonomous Institute of Govt. of Maharashtra)

<b>Programme</b>	:	<b>Diploma in CM / IT</b>
<b>Programme Code</b>	:	<b>06 /07/26</b>
<b>Name of Course</b>	:	<b>Fundamentals of Electronics</b>
<b>Course Code</b>	:	<b>ET 284</b>

**Teaching Scheme:**

	<b>Hours /Week</b>	<b>Total Hours</b>
<b>Theory</b>	<b>03</b>	<b>48</b>
<b>Practical</b>	<b>02</b>	<b>32</b>

**Evaluation Scheme:**

	<b>Progressive Assessment</b>	<b>Semester End Examination</b>			
		<b>Theory</b>	<b>Practical</b>	<b>Oral</b>	<b>Term work</b>
<b>Duration</b>	Three class tests, each of 60 minutes	3 hrs.	3 hrs.	--	--
<b>Marks</b>	<b>20</b>	<b>80</b>		25	<b>25</b>

**Course Rationale:**

This course will be useful in understanding of construction, working and applications of semiconductor devices and circuits.

**Course Objectives:**

After studying this course, the student will be able to

- Explain construction, working, characteristics and applications of semiconductor devices and circuits.
- Build and test the circuits

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**Course Content:**

Chapter No.	Name of Topic/Sub topic	Hrs	Marks
<b>1.</b>	<b>Semiconductor devices</b>		
	<b>Concept&amp; principles of electronics devices</b>		
1.1	Rectifying diode: Review of P - type and N - type semiconductor ,PN junction, Barrier voltage , depletion region ,Junction Capacitance Forward biased & reversed biased junction. Diode symbol , forward & reversed Characteristics of PN junction diode <b>Specifications :</b> Forward voltage drop , Reverse saturation current, maximum forward current , power dissipation ,Package view of diodes of different power ratings (to be shown during practical hours)	<b>16</b>	<b>22</b>
1.2	<b>Zener diode :</b> Construction ,Symbol ,characteristics ( forward & reversed ) Avalanche &zener breakdown <b>Specifications :</b> Zener voltage , power dissipation , break over current,dynamic resistance & maximum reverse current (to be shown during practical hours)		
1.3	<b>Rectifier :</b> Half wave and Full wave Rectifier, circuit diagram, working, comparison, merits and demerits. Filters, necessity, types, comparison, merits, demerits.		
1.4	<b>Transistor :</b> construction, symbol, operating principle, characteristics, applications, rating and specifications, configurations, comparison between CB, CE, CC.		
1.5	<b>UJT :</b> Construction, symbol, operating principle, characteristics, applications, rating and specifications.		
1.6	<b>FET:</b> Construction, symbol, operating principle, characteristics, applications, rating and specifications, configurations, comparison.		
1.7	<b>SCR :</b> Symbol, their construction, working, characteristics, applications		
<b>2.</b>	<b>Oscillator</b>		
	2.1	Block diagram, Barkhausen Criteria for sustained oscillations	

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	2.2	classification: LC and RC. Oscillations in LC tank circuit; Hartley; Colpitts. RC Wein Bridge and Phase shift, Oscillator. Crystal Oscillator.	08	16
<b>3.</b>	<b>Linear ICs,</b>			
	3.1	OP AMP. IC 741, symbol, pin diagram, ideal and typical characteristics, Applications such as Inverting , Non Inverting amplifier, Difference amplifier, adder subtractor , Integrator, differentiator.	09	14
	3.2	Timer IC 555: Block diagram, operating modes viz. Astable, Monostable.		
<b>4.</b>	<b>Instrumentation</b>			
	4.1	CRO: Cathode Ray Tube, Oscilloscope Block diagram, operation, oscilloscope specifications, Applications.	07	12
	4.2	Function generator, Block diagram, operation, specifications, applications		
<b>5.</b>	<b>Transducer</b>			
	5.1	Definition, classification: Active, Passive, Primary, Secondary, Mechanical, Electronic, Analog, Digital, Selection criteria, Resistive, Capacitive, Inductive, Transducers(LVDT), Photoelectric, Piezoelectric Transducers, proximity switch, Construction, Operation, One example of each, Applications,	08	16
<b>Total</b>			<b>48</b>	<b>80</b>

**List of Practicals/Experiments/Assignments:**

Sr. No.	Name of Practical/Experiment/Assignment	Hrs
1.	Plot V-I characteristics of P-N junction diode.	02
2.	Study of Half wave and Full wave rectifier with and without filter.	02
3.	Plot the i/p and o/p characteristics in CE configurations.	02
4.	Plot the characteristics of FET.	02
5.	Plot the characteristics of UJT.	02
6.	Plot the characteristics of SCR.	02
7.	Study of Hartley and Colpitts oscillator.	02
8.	Study of RC phase shift and Wein Bridge.	02
9.	Study of Inverting and Non Inverting Amplifier.	02
10.	Study of Integrator and Differentiator.	02
11.	Study of astable multivibrator using 555.	02
12.	Study of C.R.O.	01
13.	Study of Function generator.	01
14.	Study of Transducers.	02
<b>Total</b>		<b>32</b>

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**Instructional Strategy:**

Sr. No.	Topic	Instructional Strategy
1.	Semiconductor devices.	Classroom teaching and laboratory work.
2.	Digital fundamentals.	Classroom teaching and laboratory work.
3.	Linear IC's.	Classroom teaching and laboratory work.
4.	Oscillator.	Classroom teaching and laboratory work.
5.	Instrumentation.	Classroom teaching and laboratory work.
6.	Transducer.	Classroom teaching and laboratory work.

**Text Books:**


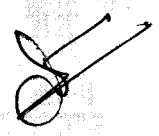

Sr. No	Author	Title	Publication
1.	Albert Malvino.	Basic Electronics.	TMH.
2.	Katre.	Basic Electronics.	Tech-Max.
3.	B.L. Theraja.	Basic Electronics.	S.Chand.
4.	Ramakant Gaikwad	Linear Integrated Circuits	PHI
5.	R P Jain	<b>Modern Digital Electronics</b>	TMH
6.	A K Sawheny	Instrumentation	DHANPAT RAI & SONS

**Reference Books:**

Sr. No	Author	Title	Publication
1.	Mottershed	Electronics Devices and Circuits.	PHI
2.	Milman Halkies	Electronics Devices and Circuits.	TMH

**Learning Resources:** Reference Books, Data Manual

**Prepared By :**

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