Joint Courses

Course Code	21ECC211L	Course Name	Devices and Digital IC Lab	Course Category	S	Professional Core	L	T	P	C
							0	0	4	2

Pre-requisite Courses	21ECC101J	Co-requisite Courses	21ECC201J	Progressive Courses	21ECC222L
Course Offering Department	ECE	Data Book / Codes/Standards	NIL		

Course Learning Rationale (CLR):	The purpose of learning this course is to:
CLR-1 :	Understand the principles of Zener diode and its application
CLR-2 :	Gain knowledge about applications of PN
CLR-3 :	Explore the characteristics and operation of BJT and MOSFET
CLR-4 :	Acquire knowledge combinational circuits and its applications.
CLR-5 :	Familiarize operations of various sequential circuits

Course Outcomes (CO):	At the end of this course, learners will be able to:	Program Outcomes (PO)												Program Specific outcomes		
		1	2	3	4	5	6	7	8	9	10	11	12			
		Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problems	Modern Tool Usage	The engineer and society	Environment & Sustainability	Ethics	Individual & Team Work	Communication	Project Mgt. & Finance	Life Long Learning	PSO-1	PSO-2	PSO-3
CO-1:	Demonstrate the characteristics of Zener and its applications	3	2	-	-	1	-	-	-	-	-	-	-	1	-	-
CO-2:	Analyze applications of PN diode.	3	2	-	-	1	-	-	-	-	-	-	-	1	-	-
CO-3:	Articulate the characteristics and parameters of BJT and MOSFET	3	2	-	-	1	-	-	-	-	-	-	-	1	-	-
CO-4:	Implement different combinational circuits	3	2	-	-	1	-	-	-	-	-	-	-	1	-	-
CO-5:	Design various sequential circuits in real life	3	2	-	-	1	-	-	-	-	-	-	-	1	-	-

Unit-1 ZENER DIODE AND APPLICATION

Semiconductor principles- Properties of PN- Principle of Zener diode- Characteristics of Zener diode, Forward biasing, Reverse Biasing- Diode parameters- I-V characteristics- Application in reverse Biasing- Voltage regulator- Series, Shunt- Load regulation, line regulation

Unit-2 PN APLLICATIONS

Rectifiers- Half wave, Full wave centre tapped- Filters: Capacitive filter- Rectification with and without filter, Efficiency, ripple factor- Clipper: Principles, Series clipper, Shunt clipper, Biased clipper- Clamper: Positive clamper, Negative clamper, Biased clamper

Unit-3 BIPOLAR JUNCTION TRANSISTOR AND METAL OXIDE SEMICONDUCTOR FIELD EFFECT TRANSISTOR

BJT: Principle, Operation, Characteristics: Input characteristics, Output characteristics- Transistor parameters- DC load line- BJT biasing: Fixed bias, Collector feedback bias, Emitter bias, Voltage divider bias
MOSFET: Principle, Operation, Characteristics: Transfer characteristics, Drain characteristics, FET parameters, MOSFET Switching

Unit-4 COMBINATIONAL CIRCUITS

Design of combinational circuits- Adders: Half adder, full adder, Full adder using half adder, 4 bit binary parallel adder- Encode: 4×2, 8×3- Decoder: 2×4, 3×8- 4:1 Multiplexer- 1:4 Demultiplexer

Unit-5 SEQUENTIAL CIRCUITS

Clock- Flip flop: RS, JK, D & T- Synchronous counters: Up, Down, Up/Down, Asynchronous counters: Up, Down, Up/Down

Learning Resources

1. David A. Bell, *"Electronic Devices and Circuits"*, 5th edition, Oxford University Press, 2015.
2. Donald A Neamen, Dhrubes Biswas *"Semiconductor Physics and Devices"*, 4th edition, McGraw-Hill Education, 2012.
3. Robert L. Boylestad and Louis Nashelsky, *"Electronic Devices and Circuit Theory"*, Pearson Education, 11th Edition, 2013.
4. Morris Mano M, Michael D. Ciletti, Digital Design with an Introduction to the Verilog HDL, 5th ed., Pearson Education, 2014
5. Charles H Roth (Jr), Larry L. Kinney, Fundamentals of Logic Design, 5th ed., Cengage Learning India Edition, 2010
6. Thomas L. Floyd, Digital Fundamentals, 10th ed., Pearson Education, 2013

Learning Assessment								
	Bloom's Level of Thinking	*Continuous Learning Assessment (CLA)*				***Summative*** *Final Examination (40% weightage)*	
		Formative *CLA-1 Average of unit test (45%)*		***Life Long Learning*** *CLA-2 – Practice (15%)*			
		Theory	*Practice*	*Theory*	*Practice*	*Theory*	*Practice*
Level 1	*Remember*	-	15%	-	15%	-	15%
Level 2	*Understand*	-	15%	-	15%	-	15%
Level 3	*Apply*	-	30%	-	30%	-	30%
Level 4	*Analyze*	-	30%	-	30%	-	30%
Level 5	*Evaluate*	-	5%	-	5%	-	5%
Level 6	*Create*	-	5%	-	5%	-	5%
	Total	*100 %*		*100 %*		*100 %*	

Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
	1.	*1. Mrs. A. Ramya, SRMIST*
	2.	*2. Dr. J. Manjula, SRMIST*