

Semester Lecture Plan

Name of the college: Government College of Arts, Science & Commerce, Sanquelim-Goa							
Name of Faculty: Aga D. A.			Subject: Physics (THEORY) and (PRACTICALS)				
Paper code:-PHY- 300 Analog and Digital Electronics			Program/Course: T.Y. B.Sc.		Division: A		
Academic year: 2026 – 2027			Semester: V		Total Lectures: 60 Plus Practicals		
Course Objectives: This course aims to provide the students with a foundation in basic knowledge of Analogue and Digital Electronics.							
Course Learning Outcome: The student after undergoing this course will be able to: 1. Describe and explain the basic function of a transistor, transistor as a Switch, Multivibrators using Transistors. 2) Explain FETs in detail 3) Design and Assemble the circuits of Voltage regulators using IC 78-- and 79—series. 4)Draw and Discuss the block diagram of IC555 and its use as Astable & Monostable multivibrator. 5) Illustrate the Number system logic and 6) Classify Flip Flops and Counters with diagram, truth table and waveforms.							
Month	Lectures From: To:		No. of lectures allotted	Topic, Subtopic to be covered	Learning outcome	ICT Tools	Reference books
JUNE	22/06/2026	27/06/2026	04	Topic 1 Binary number system, Binary to Decimal and Decimal to Binary conversion	The student will be able to: 1. Describe and explain Binary number system, Binary to Decimal and Decimal to	White board and marker	1. Malvino and Leach, Digital Principles and Applications, TMH (1986). 2. R. P. Jain, Modern Digital Electronics, TMH (2003).

					Binary conversion , Preparation of 2 i/p, 3i/p and 4 i/p truth table		
June and July	29/06/2026	04/07/2026	04		The student will be able to: . Describe and explain Basic logic gates, NOT,OR, AND, gates	White board and marker	1. Malvino and Leach, Digital Principles and Applications, TMH (1986). 2. R. P. Jain, Modern Digital Electronics, TMH (2003).
				Topic-1 Basic logic gates, NOT,OR, AND, gates			
JULY	06/07/2026	11/07/2026	04	Topic 1 NOR, NAND, and EX-OR, Bubbled OR and Bubbled AND gates	The student will be able to: 1) Describe and explain NOR, NAND, and EX-OR, Bubbled OR and Bubbled AND gates	White board and marker	1. Malvino and Leach, Digital Principles and Applications, TMH (1986). 2. R. P. Jain, Modern Digital Electronics, TMH (2003).
			04	PRACTICAL	Verification of De Morgan Laws and Boolean Identities. (Construction using Gates).		
JULY	13/07/2026	18/07/2026	04	Topic1 De Morgan's Law's, Boolean	The student will be able to: 1. Describe and	White board and marker	1. Malvi no and Leach, Digital

				Algebra, NAND and NOR gates as universal building blocks in logic circuits,	explain De Morgan's Law's, Boolean Algebra, NAND and NOR gates as universal building blocks in logic circuits,		Principles and Applications, TMH (1986). 2. R. P. Jain, Modern Digital Electronics, TMH (2003).J. Millman and C. Halkias, Electronic Devices and Circuits , Mc Graw Hill (1972).
			04	PRACTICAL	NAND and NOR gates as universal building blocks.		
JULY	20/07/2026	25/07/2026	04	Topic 2 Sum of Products methods and Product of Sum methods of representation of logical functions.	The student will be able to: 1. Describe and explain Sum of Products methods and Product of Sum methods of representation of logical functions.	White board and marker	1. Malvino and Leach, Digital Principles and Applications, TMH (1986). 2. R. P. Jain, Modern Digital Electronics, TMH (2003).
			04	PRACTICAL	REVISION		
July and August	27/07/2026	01/08/2026	04	Topic 2 Binary addition and Subtraction, Half adder and Full adder, Multiplexer and Demultiplexer. Encoders and	The student will be able to: . Describe and explain Binary addition and Subtraction, Half adder and Full adder,	White board and marker	1.Allen Mottershed, Electronic Devices and Circuits An Introduction: PHI (1997). 2.Malvino, Electronic Principles, TMH (2007).

				decoders	Multiplexer and Demultiplexer. Encoders and decoders		J. Millman and C. Halkias, Electronic Devices and Circuits , Mc Graw Hill (1972).
			04	PRACTICAL	Binary addition- Half adder and Full adder using logic gates.		
AUGUST	03/08/2026	08/08/2026	03	Logic families – DTL, TTL Standard TTL NAND gate,	The student will be able to: Explin Logic families – DTL, TTL Standard TTL NAND gate,	White board and marker	1. Malvino and Leach, Digital Principles and Applications, TMH (1986). 2. R. P. Jain, Modern Digital Electronics, TMH (2003).
			04	PRACTICAL	Digital MULTIPLEXER		
AUGUST	10/08/2026	15/08/2026	04	Schottky TTL, ECL OR and NOR gate, MOS (inverter, NAND and NOR gates) and CMOS (inverter, NAND and NOR gates).,	The student will be able to: Explain Schottky TTL, ECL OR and NOR gate, MOS (inverter, NAND and NOR gates) and CMOS (inverter, NAND and NOR gates)	White board and marker	1. Malvino and Leach, Digital Principles and Applications, TMH (1986). 2. R. P. Jain, Modern Digital Electronics, TMH (2003).
			04	PRACTICAL	REVISION		
AUGUST	17/08/2026	22/08/2026	04	Transistors	The student	White board	1.

				Multivibrators. Transistor as a switch, switching times, Multivibrators – Astable, Monostable,	will be able to: Explain Transistor as a switch, switching times, Multivibrators – Astable, Monostable,	and marker	Malvino and Leach, Digital Principles and Applications, TMH (1986). 2. R. P. Jain, Modern Digital Electronics, TMH (2003).
			04	PRACTICAL	Study and analysis of transistorised Multivibrators- Astable, Monostable.		
August	24/08/2026	29/08/2026	03	Topic Bistable and Schmitt Trigger. Field Effect Transistors. Basic structure of the JFET, Principles of operation, Characteristic curves and parameters	The student will be able to: Explain Bistable and Schmitt Trigger. Field Effect Transistors. Basic structure of the JFET, Principles of operation,	White board and marker	1. Malvino and Leach, Digital Principles and Applications, TMH (1986) 2. R. P. Jain, Modern Digital Electronics, TMH (2003).
			04	PRACTICAL	Study and analysis of transistorised Multivibrators- Astable, Monostable.		2.
September	31/08/2026	05/09/2026	05	Topic-6	The student will be able to: Explain 3 bit	White board and marker	1. Malvino and Leach, Digital Principles and

				Common source amplifiers, Common gate amplifier (only qualitative discussion), The MOSFET Depletion Mode and Enhancement mode,	Shift register (shift left, shift right), Applications of FF's in counters, 3 bit count up/count down binary ripple counter,		Applications, TMH (1986). 2. R. P. Jain, Modern Digital Electronics, TMH (2003).
			04	PRACTICAL	Study and analysis of transistorised Multivibrators- Astable, Monostable.		
SEPTEMBER	07/09/2026	12/09/2026	04	Dual-Gate MOSFET. FET Phase shift oscillator, FET as VVR and its applications in Attenuator, AGC and Voltmeter circuits. Applications of OP-AMP. Active diode circuits, Intergrator, Differentiator, Comparator, Window comparator, Schmitt Trigger, Waveform	The student will be able to: Explain Dual-Gate MOSFET. FET Phase shift oscillator, FET as VVR and its applications in Attenuator, AGC and Voltmeter circuits. Applications of OP-AMP. Active diode circuits, Intergrator, Differentiator, Comparator, Window	White board and marker	1. Malvino and Leach, Digital Principles and Applications, TMH (1986). 2. R. P. Jain, Modern Digital Electronics, TMH (2003).

				generator – Square wave, Triangular and Ramp Generator and monostable	comparator, Schmitt Trigger, Waveform generator – Square wave, Triangular and Ramp Generator and monostable		
			04	PRACTICAL	Study and analysis of transistorised Multivibrators- Bistable, Schmitt trigger.		
SEPTEMBER	21/09/26	26/09/26	04	Voltage Regulation: Fixed voltage regulation using IC-78 & 79 series, adjustable voltage regulators using IC LM-317. Timers: IC-555 Timer : basic concept, block diagram, Monostable, Astable and Voltage controlled oscillator (VCO).	The student will be able to: Explain Voltage Regulation: Fixed voltage regulation using IC-78 & 79 series, adjustable voltage regulators using IC LM-317. Timers: IC-555 Timer : basic concept, block diagram, Monostable, Astable and Voltage controlled	White board and marker	1. Malvino and Leach, Digital Principles and Applications, TMH (1986). 2. R. P. Jain, Modern Digital Electronics, TMH (2003).

					oscillator (VCO).		
			04	PRACTICAL	Study and analysis of transistorised Multivibrators-Bistable, Schmitt trigger.		
September and October	28/09/2026	03/10/2026	04	Flip Flops and Counters :- Basic RS FF, Clocked RS FF, JK FF, D-type and T-type FF, Master Slave Concept,	The student will be able to: Explain Basic RS FF, Clocked RS FF, JK FF, D-type and T-type FF, Master Slave Concept,	White board and marker	H. S. Kalsi, Electronic Instrumentation: TMH (2004).
			04	PRACTICAL	F.E.T Characteristics & F.E.T		

					Common Source Amplifier.		
October	05/10/26	10/10/26	04	Topic-3 bit Shift register (shift left, shift right), Applications of FF's in counters, 3 bit count up/count down binary ripple counter,	The student will be able to: Explain 3 bit Shift register (shift left, shift right), Applications of FF's in counters, 3 bit count up/count down binary ripple counter,	White board and marker	1. Malvino and Leach, Digital Principles and Applications, TMH (1986). 2. R. P. Jain, Modern Digital Electronics, TMH (2003).
			04	PRACTICAL	F.E.T Characteristics & F.E.T Common Source Amplifier		
OCTOBER	12/10/26	14/10/26	04	Mod 3, Mod 5, Mod 7 Counters, BCD Decade Counter, Cascade	The student will be able to: Explain Mod 3, Mod 5, Mod 7 Counters,	White board and marker	1. Malvino and Leach, Digital Principles and Applications, TMH (1986). 2. R. P. Jain, Modern Digital Electronics, TMH (2003).--
			04	PRACTICAL	Op-Amp as a square wave generator & integrator		
OCTOBER	12/10/26	14/10/26		BCD Decade Counter, Cascade BCD	The student will be able to: Explain BCD	White board and marker	1. Malvino and Leach, Digital Principles and

				Decade counters, Principle of digital clock.	Decade Counter, Cascade BCD Decade counters, Principle of digital clock.	Applications, TMH (1986). 2. R. P. Jain, Modern Digital Electronics, TMH
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