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:PYC- 106 Analog &Digital Electronics	**Program/Course: T.Y. B.Sc.**	**Division: A**
Academic year: 2024 – 2025	**Semester: V**	**Total Lectures: 60 Plus Pract.**

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 & JULY	28/06/2024	06/07/2024	05	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**	White board and marker	1. Malvino and Leach, Digital Principles and Applications, TMH (1986). 2. R. P. Jain, Modern Digital

					Decimal to Binary conversion , Preparation of 2 i/p, 3i/p and 4 i/p truth table		Electronics, TMH (2003).
JULY	08/07/2024	13/07/2024	04	Topic-1 Basic logic gates, NOT,OR, AND, gates	**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).
JULY	15/07/2024	20/07/2024	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	22/07/2024	27/07/2024	04	Topic1 De Morgan's Law's,	**The student will be able to: 1.**	White board and marker	1. Malvi

				Boolean Algebra, NAND and NOR gates as universal building blocks in logic circuits,	**Describe and explain De Morgan's Law's, Boolean Algebra, NAND and NOR gates as universal building blocks in logic circuits,**		no and Leach, Digital 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 & August	29/07/2024	03/08/2024	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**		
August	05/08/2024	10/08/2024	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	12/08/2024	17/08/2024	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	19/08/2024	24/08/2024	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	26/08/2024	31/08/2024	04	Transistors Multivibrators. Transistor as a switch,	**The student will be able to: Explain Transistor as a**	White board and marker	1. Malvino and Leach, Digital Principles and

				switching times, Multivibrators – Astable, Monostable,	**switch, switching times, Multivibrators – Astable, Monostable,**		Applications, TMH (1986). 2. R. P. Jain, Modern Digital Electronics, TMH (2003).
			04	**PRACTICAL**	**Study and analysis of transistorised Multivibrators- Astable, Monostable.**		
Septembe r	02/09/2024	05/09/2024	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	13/09/2024	21/09/2024	05	Topic-6 Common source amplifiers,	**The student will be able to: Explain 3 bit Shift register (shift left, shift**	White board and marker	1. Malvino and Leach, Digital Principles and Applications, TMH (1986).

				Common gate amplifier (only qualitative discussion), The MOSFET Depletion Mode and Enhancement mode,	**right), Applications of FF's in counters, 3 bit count up/count down binary ripple counter,**		2. R. P. Jain, Modern Digital Electronics, TMH (2003).
			04	**PRACTICAL**	**Study and analysis of transistorised Multivibrators- Astable, Monostable.**		
September	22/09/2024	28/09/2024	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 generator – Square wave,	**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 comparator, Schmitt Trigger, Waveform**	White board and marker	1. Malvino and Leach, Digital Principles and Applications, TMH (1986). 2. R. P. Jain, Modern Digital Electronics, TMH (2003).

				Triangular and Ramp Generator and monostable	**generator – Square wave, Triangular and Ramp Generator and monostable**		
			04	**PRACTICAL**	**Study and analysis of transistorised Multivibrators- Bistable, Schmitt trigger.**		
September & October	30/09/24	05/10/24	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 oscillator (VCO).**	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- Bistable, Schmitt trigger.**		

October	07/10/2024	12/10/2024	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	14/10/24	19/10/24	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	21/10/24	22/10/24	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	21/10/24	22/10/24		**BCD Decade Counter, Cascade BCD Decade counters, Principle of digital clock.**	The student will be able to: Explain BCD Decade Counter, Cascade BCD Decade counters, Principle of digital clock.	White board and marker	1. Malvino and Leach, Digital Principles and Applications, TMH (1986). 2. R. P. Jain, Modern Digital Electronics, TMH

*Note: Data filled in the above form is sample data.