C. Syllabus Detailing and Learning objectives

Module	Chapter	Detailed Content	Syllabus Detailing	Learning Objectives
Module 1	**CH 1** Electronic Circuits:Bipolar junction transistor. (8-Hours)	Input and Output characteristics, Types of Biasing - Fixed bias, self-bias, voltage divider bias, DC load line and significance, CE amplifier using re model, (Analysis based Numericals)	**Purpose**: To make students understand basic Electronic Circuits, Bipolar junction transistor. **Scope –** **1. Academic Aspects-** Understanding Input and Output characteristics, Biasing, amplifier. **2. Technology Aspect-** Understand basics Bipolar junction transistor. **3. Application Aspect-** Application of performance measure in amplifier. **Students Evaluation** – 1. Theory Questions to be asked on Input and Output characteristics, Baising, Amplifier. 2. Viva questions can be asked on characteristics, biasing, load line, amplifier	1. To describe the fundamentals and technological aspects of Bipolar junction transistor **(R)** 2.To explain DC load line and significance **(U)** 3. To Differentiate Types of Biasing - Fixed bias, self-bias, voltage divider bias **(A)** 4. To identify CE amplifier using re model.**(AN)** 5**.** Solve numericals based on amplifiers. **(A)**
	CH 2 Power Amplifiers: (4-Hours)	Introduction, Class A and Class C power amplifier. Oscillators: Introduction, Barkhausen criteria, Colpitts oscillator and Crystal oscillator	**Purpose** – This chapter gives detailed insight of power amplifier, Oscillators, Types of Oscillators, Barkhausen criteria	1. Draw and explain the Colpitts oscillator and Crystal oscillator. **[R]** 2**.** Explain Barkhausen criteria. **(A)**

			Scope – **1. Academic Aspects-** Learning the insights of power amplifier and oscillators **2. Technology Aspect-**Designing of power amplifiers and oscillators for various operations. **3. Application Aspect-** Application of power amplifier and oscillators.	3. Compare Class A and Class C power amplifier. **[U]** 4. Explain Class A power amplifier. **[A]** **5.** Illustrate the oscillators. **[AN]**
			Students Evaluation 1. Theory Questions based on power amplifiers, oscillators can be asked. 2. Viva questions based on types of power amplifiers, oscillators and their differences, barkhausen criteria can be asked.	
Module 3	**Chapter 3** Electronic Circuits : Operational Amplifier and its applications (Hours -10)	Op-amp – block diagram, parameters and characteristics, applications- Inverting and Non inverting amplifier, Summing Amplifier(Numerical), Difference amplifier, Basic Integrator and Differentiator,	**Purpose-** This chapter is focused on the details of the Op-amp, types and its application.	1. Draw the Op-amp – block diagram **(R)** 2. List the and explain characteristics of Op-amp. **(U)** 3. Illustrate the working of Comparator.**(AN)** 4..Compare Integrator and Differentiator. **(AN)**
			Scope – **1. Academic Aspects-** Understanding the block diagram of op-amp, parameters, types and applications. **2. Technology Aspect-** Design of op-amp for various operations. **3. Application Aspect-** Students should understand how the op-amp and its application.	

		Comparator, Zero Crossing Detector (only theory)	**Students Evaluation –** 1. Theory Questions to be asked on block diagram of op-amp, applications. 2. Lab experiments for based on op-amp 3. Corresponding viva questions can be asked for characteristics, types, integrator, differentiator, zero crossing detector	5. Differentiate - Inverting and Non inverting amplifier **(U)** 6. To solve numericals based on op-amp . **(A)**
	Chapter 4 Communication Fundamentals: Analog Communication (Hours -10)	Block diagram and elements of analog communication systems, Theory of amplitude modulation and types of AM (Numerical) Generation of DSB SC using diode based balanced modulator, Generation of SSB using phase shift method, Introduction of FM,and its mathematical representation, Statement of Carson"s Rule Comparison of AM, FM, Block diagram of AM transmitter (HLM and	**Purpose-** This chapter gives the overview Analog Communication, DSB SC, SSB, FM, Superheterodyne Reciever **Scope -** **1. Academic Aspects-** Understanding the DSB SC, SSB, FM, Superheterodyne Reciever and comparison of FM and AM. **2. Technology Aspect-** Generation of DSB SC, SSB, FM, Transmitters and Recievers **3. Application Aspect-** Students should understand how AM, FM, DSB SC, SSB can be generated in any system. **Students Evaluation –** 1. Theory Questions to be asked on DSB SC, SSB, AM, FM, Transmitters and Recievers. 2. Corresponding viva questions can be asked for AM, FM, Carsons rule, SSB, phase shift, DSB SC.	1. List the elements of analog communication. **(R)** 2. Describe Generation of DSB SC using diode based balanced modulator. **(U)** 3. Describe and Design Generation of SSB using phase shift method, **(C)** 4. Explain the concept of AM Superheterodyne receiver. **(A)** 5. Compare AM, FM **(AN)**

		LLM) Block diagram of AM Superheterodyne receiver.		
Module 5	**Chapter 5** - I Pulse Modulation and Multiplexing (Hours -10)	Statement of Sampling Theorem, Generation and detection of PAM, PWM, PPM, PCM, DM and ADM. Principle of TDM using PCM and FDM	**Purpose –** To make students understand basics about Pulse Modulation and Multiplexing. Also to make students understand concept of TDM, FDM **Scope –** **1. Academic Aspects-** Sampling Theorem, PAM, PWM, PPM, PCM, DM and ADM. Principle of TDM and FDM **2. Technology Aspect-** Understand basics of Pulse Modulation and Multiplexing **3. Application Aspect-** PAM, PWM, PPM, PCM, DM, ADM, TDM, FDM and their use. **Student Evaluation -** 1. Theory Questions to be asked on PAM, PWM, PPM, PCM, DM and ADM. 2. Explain TDM and FDM 3. Lab experiments based on TDM, FDM	1. To describe the fundamental Principle of TDM using PCM **(R)** 2. Compare PAM, PWM, PPM, PCM. **[AN]** **3.** Describe Sampling Theorem. [R] 4. Determine the working of TDM, FDM **(AN)** **5.** Illustrate the Generation and detection of PAM, PWM, PPM, PCM. **(AN)**
Module 6	**Chapter 6 -** Communicati	Amount of information, average information,	**Purpose –** To make students understand basics of Communication. Also to make students understand concept of Information theory.	1. To describe channel capacity. **(AN)**

	on Fundamentals: Information theory (Hours -6)	information rate, Statement of Shannon's theorem, channel capacity (Numericals)	**Scope –** **1. Academic Aspects-** Understanding information, average information, information rate, Statement of Shannon's theorem, channel capacity **2. Application Aspect-** Understanding the use of information theory for system. **Student Evaluation -** 1. Theory Questions to be asked on Shannon's theorem and channel capacity. 2. Explanation of information, average information, information rate.	2.Explain Shannon's theorem.**[U]** 3. Define information, average information, information rate.**(AN)** **4.** Solve the numericals on shannon's capacity. **[A]**