Scheme of Teaching and Examination for
IV Semester DIPLOMA in ELECTRONICS & COMMUNICATION ENGINEERING

THEORY

Sl. No.	SUBJECTS	SUBJECT CODE	TEACHING SCHEME		EXAMINATION SCHEME					
			Periods per Week	Periods in one Session	Hours of Exam.	Terminal Exam. (A) Marks	Final Exam. (B) Marks	Total Marks (A+B)	Pass Marks Final Exam.	Pass Marks in the Subject
1	Digital Electronics– I	21401	6	50	3	20	80	100	26	36
2	Communication Components and Materials	38402	6	50	3	20	80	100	26	36
3	Advance Electronic Devices and Circuits	21403	6	60	3	20	80	100	26	36
4	Network and Lines	21404	6	50	3	20	80	100	26	36
5	Basic Comm. Techniques & Sound Engineering	21405	6	50	3	20	80	100	26	36
	Total :-		30					500		

PRACTICAL

Sl. No.	SUBJECTS	SUBJECT CODE	TEACHING SCHEME		EXAMINATION SCHEME					
			Periods per Week	Periods in one Session	Hours of Exam.	Marks Internal Exam. (A)	Marks External Exam. (B)	Total Marks (A+B)	Pass Marks Final Exam.	Pass Marks in the Subject
6	Electronic Constriction and repair Lab.	21406	6	60	3	20	80	100	32	42
	Total :-		6					100		

SESSIONAL

Sl. No.	SUBJECTS	SUBJECT CODE	TEACHING SCHEME		EXAMINATION SCHEME			
			Periods per Week	Periods in One Session	Marks of Internal Examiner (X)	Marks of External Examiner (Y)	Total Marks (X+Y)	Pass Marks in the Subject
7	Electronics Circuit Lab.	21407	3	50	40	60	100	50
8	Digital Electronics Lab.	21408	3	50	20	30	50	25
	Total :-		6				150	

Total Periods per Week	42	Total Marks	750

DIGITAL ELECTRONICS - I

Subject Code 21401	Theory			No of Period in one session : 50		
	No. of Periods Per Week			Full Marks	:	100
	L	T	P/S	Annual Exam.	:	80
	06	-	-	Internal Exam.	:	20

Rationale

Digital System has made great in roads in the field of Electronics. The use of Digital Circuits is rapidly increasing in all most all the electronic applications, to be it microprocessors, Computers, Communications, Measuring instruments and others.

Objectives

This paper is to deal with the basics of Digital System. The students are expected to learn the Binary System, Conversions from one System to another, the various Logic Circuits, Digital ICs and connected basic Digital Circuits used in Electronic field.

CURRICULUM

SL	Topics	Periods
1.	Binary System	08
2.	Boolean Algebra and Logic Gates	06
3.	Simplification of Boolean Function	05
4.	Digital Integrated Circuits	06
5.	Combinational Logic	12
6.	Multivibrator and Synchronous Sequential Logic	06
7.	Shift Registers and Counters	07
	Total	**50**

CONTENTS

Topics	Content	Periods
01	**Binary System**	**08**
01.01	Transistor in cut off and saturation.	02
01.02	Binary Numbers.	02
01.03	Number Base Conversion.	01
01.04	Hexadecimal.	01
01.05	Complements, Signed Binary numbers.	01
01.06	Codes: Weighted and Non-Weighted codes.	01
02	**Boolean Algebra and Logic Gates**	**06**
02.01	Basic Definition of Boolean Algebra, Axiomatic definition of Boolean Algebra.	01
02.02	Basic theorem and properties of Boolean Algebra.	02
02.03	Boolean functions, Canonical and standard forms.	01
02.04	Other Logic Operations.	01
02.05	Digital Logic Gates.	01
03	**Simplification of Boolean Function**	**05**
03.01	Theorem and K-map methods up to variables.	02
03.02	Product of sum and sum of product simplification.	01
03.03	NAND and NOR implementation.	01
03.04	Don't care conditions.	01
04	**Digital Integrated Circuits**	**06**
04.01	Introduction to following: RTL, DTL, Circuits, TTL, ECL, MOS, CMOS, Transmission gate circuits.	

05	**Combinational Logic**	**12**
05.01	Half Adder, Full Adder.	01
05.02	Half and Full Subtractor.	01
05.03	Code Conversion.	02
05.04	Binary Adder and Subtractor.	02
05.05	Magnitude Comparator.	02
05.06	Decoder and Encoder.	02
05.07	Multiplexer and Demultiplexer.	02
06	**Multivibrator and Synchronous Sequential Logic**	**06**
06.01	Transistor/IC based multivibrator circutes.	02
06.02	Flip Flop (RS, JK, T, D, Master Slave type)	03
06.03	Triggering of flip flops.	01
07	**Shift Registers and Counters**	**07**
07.01	Registers.	03
07.02	Shift Registers using different types of flip flops.	02
07.03	Ripple Counter, Synchronous and Asynchronous counter.	02

Reference Books

SL	**Title/Publisher**	**Author**
1.	Digital Design	Maho
2.	Design Principle Application	Malvino and Mano
3.	Digital Computer System	Malvino
4.	Digital Circuits and Logic Design	Lee

COMMUNCATION COMPONENTS AND MATERIALS

Subject Code 38402	Theory			No of Period in one session : 50		
	No. of Periods Per Week			Full Marks	:	100
	L	T	P/S	Annual Exam.	:	80
	06	-	-	Internal Exam.	:	20

Rationale:

Electronics is a major part of our day to day life. In each and every field electronic systems are used. Basic electronics is one of the subjects which are the base of all advance electronics. It starts with PN junction which makes the student to follow the functioning of all semiconductor based electronics. This is a core group subject and it develops cognitive and psychomotor skills.

Chapter	Name of the Topic	Topic
1	**Passive Components** Resistor: definition, symbol, unit. Thermistor (symbol and list of application only) Resistor colour code, wattage (w.r to size) Capacitor : definition, symbol, unit Types of capacitor(to be shown in practical, no theory) Inductor : definition, symbol, unit Transformer :symbol, types (step up and step down), application.	12
2	**Rectifiers & Filters** Need of rectifier , definition Types of rectifier – Half wave rectifier, Full wave rectifier, (Bridge & centre tapped) Circuit operation Input/output waveforms for voltage & current Average (dc) value of current & voltage (no derivation) Ripple, ripple factor, ripple frequency, PIV of diode used, transformer utilization factor, efficiency of rectifier.	11
3	**Optical Diodes** LED, photo diode, Symbol, operating principle & applications of each. Tunnel diode, Varacter diode	7
4	**Integrated Circuits** Integrated Circuits Advantage and disadvantage of Integrated Circuits Inside an IC Package IC Classifications Making Monolithic IC Fabrication of Components on Monolithic IC Simple Monolithic ICs IC Symbols Scale of Integration	14
5	Gun diode, PIN diode Characteristics and their uses.	6

ADVANCE ELECTRONIC DEVICES AND CIRCUITS

Subject Code 21403	Theory			No of Period in one session : 60		
	No. of Periods Per Week			Full Marks	:	100
	L	T	P/S	Annual Exam.	:	80
	06	-	-	Internal Exam.	:	20

Rationale

This paper is meant to make the students familiar with widely used IC chips and the solid state devices such as FETs.

The utility of Electronic Devices depends on circuits. Students are to study amplifier and oscillator circuits of different type meant for various applications and specific uses.

The topics to be covered are:

CURRICULUM

SL	Topics	Periods
1.	Transistor Biasing.	07
2.	Transistor as Amplifier	07
3.	Coupled Amplifiers.	09
4.	Feed-Back Amplifiers.	10
5.	Oscillators.	10
6.	FET Amplifiers.	09
7.	Operational Amplifier.	08
	Total	**50**

CONTENTS

Topics	Content	Periods
01	**Transistor Biasing**	**07**
01.01	Output Characteristics of CE Amplifier.	
01.02	Operating Point.	
01.03	Bias Stability.	
01.04	Types of Biasing.	
01.05	Bias Compensation.	
01.06	Thermal Sunway.	
02	**Transistor as Amplifier**	**07**
02.01	Hybrid Circuits	
02.02	Z, Y & H Parameters of Two Port Networks.	
02.03	Equivalent Circuit of Transistor at low and medium frequencies.	
02.04	Analysis of voltage gains, current gain, power gain, input impedance and output impedance.	
03	**Coupled Amplifiers**	**09**
03.01	Cascading of Amplifier Types.	
03.02	Principles of R-C, D-D and Transformer Coupling.	
03.03	Gain Bandwidth consideration.	
03.04	Effects of coupling on amplifier performance.	
03.05	Changes in frequency response and due to effects on coupling.	
03.06	High frequency considerations.	
03.07	Compensation of amplifier for high and low frequency tuned circuit.	
04	**Feed-Back Amplifiers**	**10**
04.01	Classification concept.	
04.02	Gain with feedback, input resistance, type of resistance.	
04.03	Current Series and Current Shunt Feedback Circuits.	
04.04	Voltage Series and Voltage Shunt Feedback Circuits.	
04.05	Voltage Shunt Feedback Circuits with Frequency Response.	

05 Oscillators **10**

05.01 Principle of Oscillators.
05.02 Effect of feedback on Amplifier Bandwidth.
05.03 Gain and Phase Margin.
05.04 Wein Bridge Oscillator (Basic idea).
05.05 Crystal Oscillator.
05.06 Frequency Stability.

06 FET Amplifiers **09**

06.01 Biasing of FETs.
06.02 CS, CD, CG amplifiers with equivalent circuits analysis and frequency response.
06.03 Biasing of UJT.

07 Operational Amplifiers **08**

07.01 Basic Operational Amplifier (OP-AMP).
07.02 Differential Amplifier.
07.03 Operational Amplifier Parameters.
07.04 Parameters Measurement.
07.05 Basic Circuits: Subtractor, Adder, Integrator, Differentiator circuits using Operational Amplifier (OP-AMP).

Reference Books

SL	Title/Publisher	Author
1.	Integrated Electronics	Millman and Halkias
2.	Electronics Devices and Circuits	John D. Ryder
3.	Electronics Devices and Circuits	Millman and Halkias
4.	Linear Integrated Circuits	Byan
5.	Principle of electronics	V.K Mehta
6.	Basic electronics	B.L. Thereja

NETWORK AND LINES

Subject Code 21404	Theory			No of Period in one session : 50		
	No. of Periods Per Week			Full Marks	:	100
	L	T	P/S	Annual Exam.	:	80
	06	-	-	Internal Exam.	:	20

Rationale

Objectives

The topics to be covered are:

CURRICULUM

SL	Topics	Periods
1.	Network Parameters	07
2.	Two Port Network	12
3.	Attenuator and Equalizers	04
4.	Filters	08
5.	Transmission Lines	19
	Total	**50**

PART I - GENERATION

Topics	Content	Periods
01	**Network Parameters**	**07**
01.01	Active and Passive Elements.	02
01.02	Linear and non-linear elements.	01
01.03	Unilateral and Bilateral Elements.	01
01.04	Lumped and Distributed Elements.	01
01.05	Ideal and Practical Voltage and Current Sources.	01
01.06	Concept of Nodes, Mesh, Branch, Loop etc.	01
02	**Two Port Network**	**12**
02.01	Introduction to Z, Y and ABCD parameters.	01
02.02	Equivalent Circuits in Z, Y, ABCD, h parameters.	02
02.03	Transfer function, Concept and Calculation for two port network.	01
02.04	Four Terminal Networks.	01
02.05	Symmetrical and Asymmetrical Networks.	01
02.06	Image and Iterative Impedance.	01
02.07	Design of Simple Symmetrical and Asymmetrical networks.	01
02.08	Propagation Constant.	01
02.09	T and Pai Network.	01
02.10	T to Pai to T network transformation.	01
02.11	Ladder and Lattice Network.	01
03	**Attenuator and Equalizers**	**04**
03.01	Symmetrical and Asymmetrical Networks.	01
03.02	Design of T and Pai type attenuators.	01
03.03	Equalizers - Introduction.	02
04	**Filters**	**08**
04.01	Concept of Decibel and Neper.	01
04.02	Basic Relations in Filters.	01
04.03	Classification as per use: Low Pass Filters, High Pass Filters, Band Pass Filters and Band Stop Filters.	02
04.04	Attenuation and phase shift characteristics.	02
04.05	Design of simple T and Pai type in derived filters.	02

05	**Transmission Lines**	**19**
05.01	Classification.	01
05.02	Introduction to open wire, co-axial cable, wave guide, optical fibers with application.	01
05.03	Distributed parameters of lines.	01
05.04	Equivalent Circuit of a finite line.	01
05.05	T and Pai type representation of a section of line.	01
05.06	Voltage and Current distribution in an infinite line.	01
05.07	Characteristics impedance a TX line.	01
05.08	Concept of propagation, attenuation constant and phase shift constant of a line.	01
05.09	Expression for impedance at a point on line.	01
05.10	Reflected and standing waves.	02
05.11	Voltage reflection coefficient and VSWR.	01
05.12	Maximum and Minimum impedance.	02
05.13	Input and Output impedance of an open and short-circuited loss-less line.	01
05.14	Input impedance as a function of length of line.	01
05.15	Introduction to Smith Chart and Circle Diagrams.	03

Recommended Books

SL	**Title/Publisher**	**Author**

BASIC COMMUNICATION TECHNIQUES AND SOUND ENGINEERING

Subject Code 21405	Theory			No of Period in one session : 50		
	No. of Periods Per Week			Full Marks	:	100
	L	T	P/S	Annual Exam.	:	80
	06	-	-	Internal Exam.	:	20

Rationale

The basis of communication techniques and a working knowledge of the principles of Acoustics are felt fit to be imparted at this stage.

Objectives

The students are expected to get familiar with the process of Modulation and detection, Sonar and the basic principles of Acoustics. The broad topics to covered are:

CURRICULUM

SL	Topics	Periods
1.	Introduction to Communication System and Noise	04
2.	Modulation	10
3.	De-modulation	06
4.	Pulse Code Modulation	13
5.	Ultrasonic G/R	04
6.	Acoustics	13
	Total	**50**

CONTENTS

Topics	Content	Periods
01	**Introduction to Communication System and Noise**	**04**
01.01	Classification.	01
01.02	Introduction to Information Noise.	01
01.03	Concept to Band Gap and Boad Widter.	02
02	**Modulation**	**10**
02.01	A M Balanced Modulators.	02
02.02	SSB and Vestigial Side Boad Systems.	04
02.03	Frequency Modulation.	02
02.04	Phase Modulation Noise.	02
03	**De-Modulation**	**06**
03.01	Diode Transistor and FET Demodulation for AM waves.	02
03.02	Phase discriminators and ratio detectors for FM and PM waves.	04
04	**Pulse Code Modulation**	**13**
04.01	Introduction.	01
04.02	Type of Pulse Code Modulation.	02
04.03	PWM, PPM, PCM, Multiplexing.	04
04.04	Time-Division Multiplexing and Frequency-Division Multiplexing.	02
04.05	Introduction to Radio Telemetry.	04
05	**Ultrasonic G/R**	**04**
05.01	Detection and Application of Remote Control.	

06 **Acoustics** **13**

06.01 Introduction to sound, ear hibidelity and stereo.

06.02 Recording and Reproduction disc recording type of recorder

06.03 Reproducers, recording chassidic record and their processing

06.04 Hi-Fi and Stereophonic Systems Surround Sound.

06.05 Room Acoustics: Requirement of record room, acoustics room shape. Optimum reverb ration in room, Absorbent materials, scale model tests, designer considerations of open air theaters auditorium, commercial building sound recording.

Recommended Books

SL	**Title/Publisher**	**Author**
1.	Electronics Communication System	Kemecy
2.	Hi-Fi Stereo Hand Book	
3.	Radio and TV	S.P. Sharma

ELECTRONIC CONSTRUCITONS AND REPAIR Lab.

Subject Code 21406	Practical			No of Period in one session : 60		
	No. of Periods Per Week			Full Marks	:	100
	L	T	P/S	Annual Exam.	:	80
	-	-	06	Internal Exam.	:	20

LIST OF PRACTICALS

SL **Content**

1. Construction of a Battery Eliminator Box, Stabilizer Box, Radio and TV Cabinets.
2. Soldering Practice: connecting circuit components.
3. Assembling Battery-Stabilizer, Radio Receiver, Intercoil Circuit.
4. Assembling Inverter.
5. – Location of faults and repair of:
   – Battery Eliminator
   – Voltage Stabilizer
   – Inverter
   – Radio Receiver
6. Location of faults in different types of Electronics Circuits.
7. Tracing fault in a C.H.O. and its repair.
8. Handling of different types of multimeter: VTVM, Frequency meters, Calculators.
9. Fault Location and repair of instruments - Multimeter VTVM, Frequency meters, Calculators.
10. Repair of faulty study panels of your laboratory.

Note: Three assignments for practical under SL 1 and 2. Two assignments for practical listed under SL 3 and 4, and at least one assignment for each of the practical under SL No. 5 to 10. Altogether eleven assignments to be done by the students in the workshop or laboratory.

ELECTRONICS CIRCUIT Lab.

Subject Code 21407	Sessional			No of Period in one session : 50		
	No. of Periods Per Week			Full Marks	:	100
	L	T	P/S	Annual Exam.	:	60
	-	-	03	Internal Exam.	:	40

LIST OF SESSIONALS

SL	Experiments
1.	Introduction to various meters and instruments to be used. – Study of CRO; Phase and Frequency measurement.
2.	Measurement of h-parameter of transistor.
3.	Frequency response of a CE amplifier.
4.	Frequency response of direct-coupled amplifier.
5.	Frequency response of RC-coupled amplifiers.
6.	Characteristics of a transformer-coupled amplifier.
7.	Calculation of gain, input impedance and output impedance in case of cascaded amplifiers.
8.	Operation of Push-Pull amplifier.
9.	Operation of Class C amplifier.
10.	Characteristics Curves of FETs.
11.	Operation of Wein Bridge and RC Phase shift oscillator.
12.	Verification of basic operation of OP-AMP curves.
13.	Use of OP-AMP as Adder and Subtractor.
14.	Use of OP-AMP as integrator and differentiator.

DIGITAL ELECTRONICS LAB.

Subject Code 21408	Sessional			No of Period in one session : 50		
	No. of Periods Per Week			Full Marks	:	50
	L	T	P/S	Annual Exam.	:	30
	-	-	03	Internal Exam.	:	20

LIST OF SESSIONALS

SL	Experiments
1.	Construction and verification of diode OR gate.
2.	Construction and verification of diode AND gate.
3.	Verification of truth table of Basic Gates.
4.	Verification of truth table of Universal Gates from ICs.
5.	Construction of Basic gates from Universal Gates.
6.	Construction of Ex-OR gate from Universal Gates.
7.	Construction of Half Adder and Full adder circuit from Gates and Verification of its function.
8.	Construction of Half and Full subtractor circuit from Universal Gates and Verification of its function.
9.	Verification of truth table of R-S and J-K Flip Flop.
10.	Operation of Transistor Multimeter circuits.
11.	Operation of multivibrator functions from 555 IC.
12.	Construction and verification of function of Ripple and BCD Counter.
13.	Construction and verification of Sequence Generator.