STATE BOARD OF TECHNICAL EDUCATION, BIHAR
Scheme of Teaching and Examinations for
VI SEMESTER DIPLOMA IN ELECTRONICS & COMMUNICATION ENGINEERING

(Effective from Session 2016-17 Batch)

THEORY

Sr. No.	SUBJECTS	SUBJECT CODE	TEACHING SCHEME Periods per Week	Hours of Exam.	Teacher's Assessment (TA) Marks (A)	Class Test(CT) Marks (B)	End Semester Exam. (ESE) Marks (C)	Total Marks (A+B+C)	Pass Marks ESE	Pass Marks in the Subject	Credits
1.	Management (Common)	1600601	03	03	10	20	70	100	28	40	03
2.	Advance Communication Systems	1638602	04	03	10	20	70	100	28	40	03
3.	Digital Communication	1638603	04	03	10	20	70	100	28	40	03
4.	Signal System	1621604	03	03	10	20	70	100	28	40	03
5.	Elective (Any One)	1621605	03	03	10	20	70	100	28	40	03
	Elective-(i) Advanced Microprocessor (1621605A)	(ii) Advanced Instrumentation & Measurement (1621605B)		(iii) Mining Electronics (1621605C)		(iv) Medical Electronics (1621605D)		(v) Microwave Engineering (1621605E)			
	Total:- 17						350	500			

PRACTICAL

Sr. No.	SUBJECTS	SUBJECT CODE	TEACHING SCHEME Periods per Week	Hours of Exam.	Practical (ESE) Internal (A)	Practical (ESE) External (B)	Total Marks (A+B)	Pass Marks in the Subject	Credits
6.	Advance Communication Systems Lab.	1638606	06	03	15	35	50	20	03
	Total:- 06						50		

TERM WORK

Sr. No.	SUBJECTS	SUBJECT CODE	TEACHING SCHEME Periods per week	Marks of Internal Examiner (X)	Marks of External Examiner (Y)	Total Marks (X+Y)	Pass Marks in the Subject	Credits
7.	Signal and System -TW	1621607	04	15	35	50	20	02
8.	Digital Communication -TW	1638608	06	15	35	50	20	02
9.	Project Work & Its presentation in Seminar -TW	1621609	-	30	70	100	40	02
	Total:- 10					200		
	Total Periods per week Each of duration One Hours = 33					Total Marks = 750		24

MANAGEMENT (COMMON)

Subject Code 1600601	Theory						Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
	—	—	—	CT	:	20	

CONTENTS : THEORY

	Name of the Topics	Hrs/week	Marks
Unit -1	**Overview Of Business** 1.1. Types of Business • Service • Manufacturing • Trade 1.2. Industrial sectors Introduction to • Engineering industry • Process industry • Textile industry • Chemical industry • Agro industry 1.3 Globalization • Introduction • Advantages & disadvantages w.r.t. India • 1.4 Intellectual Property Rights (I.P.R.)	02	
Unit -2	**Management Process** 2.1 What is Management? • Evolution • Various definitions • Concept of management • Levels of management • Administration & management • Scientific management by F.W.Taylor 2.2 Principles of Management (14 principles of Henry Fayol) 2.3 Functions of Management • Planning • Organizing • Directing • Controlling	07	
Unit – 3	**Organizational Management** 3.1 Organization :- • Definition • Steps in organization 3.2 Types of organization • Line • Line & staff • Functional • Project 3.3 Departmentatin • Centralized & Decentralized • Authority & Responsibility • Span of Control 3.4 Forms of ownership • Propriotership • Partnership • Joint stock • Co-operative Society • Govt. Sector	07	

Unit – 4	**Human Resource Management**
	       4.1 Personnel Management
	            • Introduction
	            • Definition
	            • Functions
	       4.2 Staffing
	            • Introduction to HR Planning
	            • Recruitment Procedure
	       4.3 Personnel– Training & Development
	            • Types of training
	  ➢ Induction
	  ➢ Skill Enhancement
	4.4 Leadership & Motivation
	    • Maslow's Theory of Motivation
	  4.5 Safety Management
	    • Causes of accident
	    • Safety precautions
	  4.6 Introduction to –
	    • Factory Act
	    • ESI Act
	    • Workmen Compensation Act
	Industrial Dispute Act
		08	

Unit – 5	**Financial Management**
	    5.1. Financial Management- Objectives & Functions
	    5.2. Capital Generation & Management
	    • Types of Capitals
	    • Sources of raising Capital
	    5.3. Budgets and accounts
	    • Types of Budgets
	      ➢ Production Budget (including Variance Report)
	      ➢ Labour Budget
	    •Introduction to Profit & Loss Account (only concepts) ;
	      Balance Sheet
	  5.4 Introduction to –
	    • Excise Tax
	    • Service Tax
	    • Income Tax
	    • VAT
	    • Custom Duty
		08	

Unit – 6	**Materials Management**
	      6.1. Inventory Management (No Numerical)
	        • Meaning & Objectives
	6.2 ABC Analysis
	6.3 Economic Order Quantity
	    • Introduction & Graphical Representation
	6.4 Purchase Procedure
	    • Objects of Purchasing
	    • Functions of Purchase Dept.
	    • Steps in Purchasing
	6.5 Modern Techniques of Material Management
	    • Introductory treatment to JIT / SAP / ERP
		08	

Unit – 7	**Project Management** (No Numerical) 7.1 Project Management • Introduction & Meaning • Introduction to CPM & PERT Technique • Concept of Break Even Analysis 7.2 Quality Management • Definition of Quality , concept of Quality , Quality Circle, Quality Assurance • Introduction to TQM, Kaizen, 5 'S', & 6 Sigma	08	
	Total	**48**	

Text/ Reference Books:-

Name of Authors	Titles of the Book	Name of the Publishe
Dr. O.P. Khanna	Industrial Engg & Management	Dhanpal Rai & sons New
Dr. S.C. Saksena	Business Administration & Management	Sahitya Bhavan Agra
W.H. Newman E.Kirby Warren Andrew R. McGill	The process of Management	Prentice- Hall
Rustom S. Davar	Industrial Management	Khanna Publication
Banga & Sharma	Industrial Organisation & Management	Khanna Publication
Jhamb & Bokil	Industrial Management	Everest Publication , Pune

ADVANCE COMMUNICATION SYSTEMS

Subject Code 1638602	Theory			No of Period in one session : 50			Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	04	—	—	TA	:	10	
				CT	:	20	

	Contents : Theory	**Hrs/week**	**Marks**
UNIT-1	**Introduction** (1.1) Introduction to electronic communication system, (1.2) classification of radio wave, (1.3) AM, (1.4) FM, (1.5) PM and etc. (1.6) Related concepts. (Simple problems based on formulae)	(08)	
UNIT-2	**Waveguide** (2.1) Microwave region and band designations, (2.2) Introduction to TEM/TE/TM. (2.3) Comparison of wave guide with two wire Transmission line, (2.4) definition and interpretation of cut off frequency of a wave guide, wave length, phase velocity and group velocity. Simple related problems.	(09)	
UNIT-3	**Microwave components** (3.1) Microwave components, (3.2) construction and working principle and application of multicavity klystron amplifier, reflex klystron amplifier, TWT, Magnetron. (3.3) Construction and working principle of Pin diode, Gunn diode, IMPATT, and TRAPATT diode.	(09)	
UNIT-4	**Propagation of waves** (4.1)Modes of propagation (4.2) Ground wave, sky wave, space wave propagation, (4.3) Fading, ionospheric layer, virtual height, skip distance. (Simple problems based on formulae)	(08)	
UNIT-5	**Satellite communication System** (5.1) Introduction to satellite communication system, (5.2) Satellite orbits, (5.3) Basic components of satellite communication system, commonly used frequencies in satellite communication in India.	(08)	
UNIT-6	**Radar System** (6.1) Basic Radar system, (6.2) radar range, (6.3) pulsed radar system, (6.4)PPI, (6.5) MTI, (6.6) Doppler effect, (6.7) MTI principle, (6.8)Radar beacons, (6.9)LORAN	(08)	
	Total	**50**	

Recommended Books :-

(i) Communication System-Mg Graw Hill.   -   Kenedy

(ii) Principles of Communication   -   B.P. Lathi-

(iii) Principles of Communication. Kataria & Sons-   -   A.K. Gautam-

DIGITAL COMMUNICATION

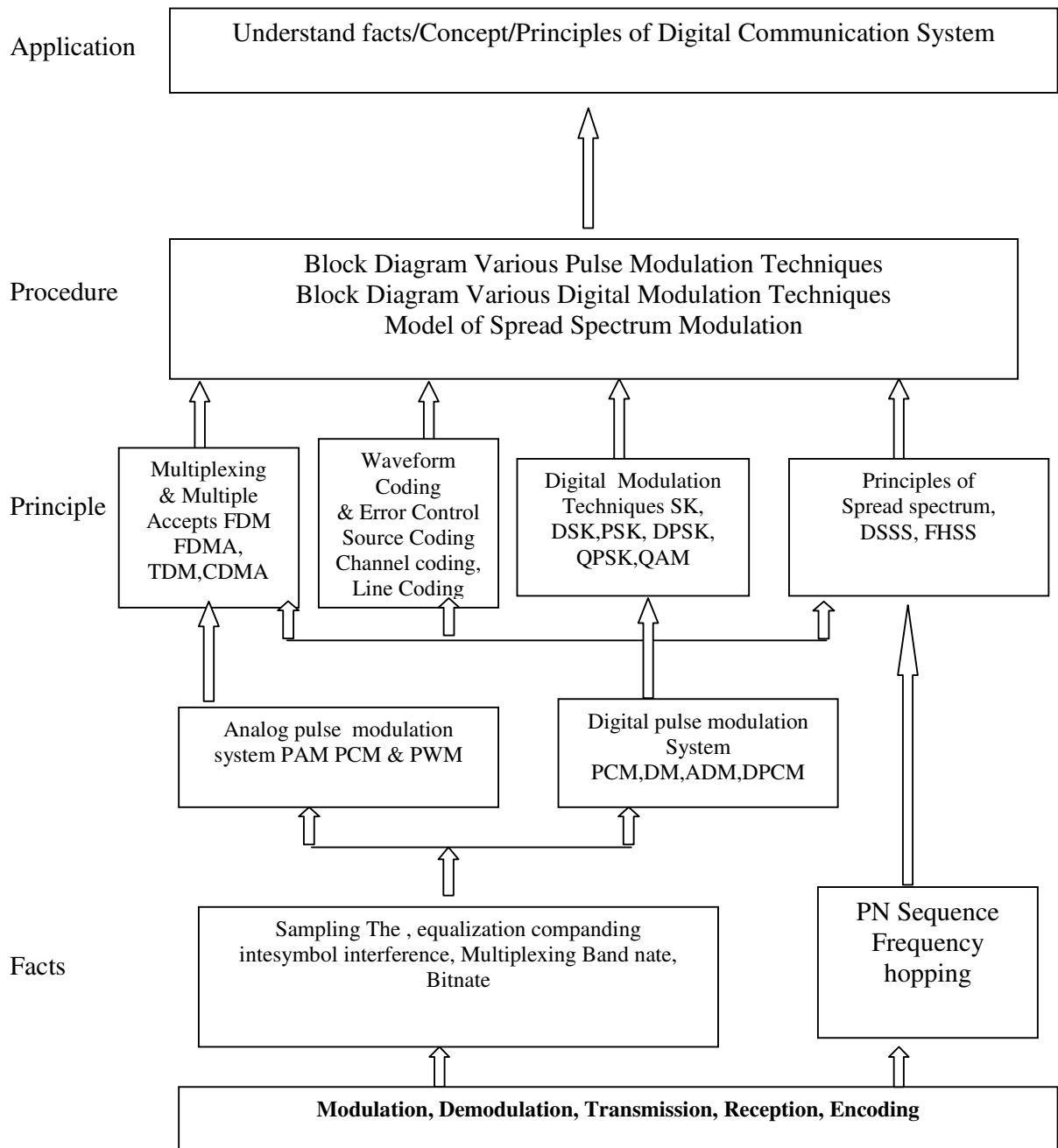| Subject Code 1638603	Theory			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	100	
	L	T	P/S	ESE	:	70	03
	04	—	—	TA	:	10	
				CT	:	20	

Rationale:

Digital communication systems are becoming increasingly attractive because of ever- growing demand for data communication. Digital transmission offers data processing option and flexibility not available with analog transmission. This is technology group subject, which will enable student to comprehend facts, concepts &
working principle of digital communication system. This subject familiarizes the student with information theory, measurement of information rate &capacity. This subject helps the student to understand the concept of various pulse modulations, Digital modulation techniques, coding methods and error control, multiplexing & multiple access techniques and S.S. modulation. The knowledge acquired by students will help them to apply it in various modern communication systems.

Objectives:

The students will be able to:

1. Compare analog communication system with digital communication system.
2. Define channel capacity and entropy.
3. Explain sampling theorem.
4. Compare PAM, PWM, PCM.
5. Describe PCM.
6. Draw the block diagram of PCM, DM, ADM, and DPCM.
7. Draw block of PSK transmitter & receiver. Compare ASK, FSK, PSK.
8. Draw block diagram for QFSK, QAM DP
9. Describe the various types of coding methods & error detection and correction.
10. Explain need of multiplexing.
11. Explain concept of TDMA, FDMA, and CDMA.
12. Define PN sequence.
13. Explain spread spectrum modulation.
14. Differentiate Direct sequence spread spectrum signal & frequency spread spectrum.
15. List the application of S.S. modulation.

Learning Structure:

Application

Understand facts/Concept/Principles of Digital Communication System

Procedure

Block Diagram Various Pulse Modulation Techniques
Block Diagram Various Digital Modulation Techniques
Model of Spread Spectrum Modulation

Principle

Multiplexing & Multiple Accepts FDM FDMA, TDM,CDMA

Waveform Coding & Error Control Source Coding Channel coding, Line Coding

Digital Modulation Techniques SK, DSK,PSK, DPSK, QPSK,QAM

Principles of Spread spectrum, DSSS, FHSS

Analog pulse modulation system PAM PCM & PWM

Digital pulse modulation System PCM,DM,ADM,DPCM

Facts

Sampling The , equalization companding intesymbol interference, Multiplexing Band nate, Bitnate

PN Sequence Frequency hopping

Modulation, Demodulation, Transmission, Reception, Encoding

Contents : Theory		Hrs/week	Marks
UNIT-1	**Introduction of Digital Communication** 1.1 Basic digital communication system, block diagram 1.2 Channel capacity-definition, Hartley's law, Shannon-Hartley theorem, Channel capacity equation, channel noise and its effect, entropy 1.3 Advantages and disadvantages of digital communication	10	
UNIT-2	**Pulse Communication** 2.1 Introduction, comparison with Continuous Wave Modulation, advantages 2.2 Sampling theorem, Nyquist rate, aliasing, natural & flat top sampling. 2.3 PAM, PWM, PPM definition, generation, block diagram, waveform analysis, and their comparison. 2.4 Pulse code modulation- block diagram of PCM transmitter & receiver, sampling quantization, quantization error, compading, inter symbol interference 2.5 Delta modulation- block diagram of DM, slope overload, granular noise. 2.6 ADM, DPCM, block diagram and its working.	14	
UNIT-3	**Digital Modulation Techniques** 3.1 ASK, FSK, PSK definition & waveforms, their transmitter and receiver block diagram and working. 3.2 M-ary encoding. 3.3 QPSK, QAM, DPSK block diagram of transmitter and receiver and working. 3.4 Bandwidth for each modulation technique and their comparison.	12	
UNIT-4	**Coding methods and Error control** 4.1 Baud rate, Bit rate. 4.2 Line coding - unipolar, bipolar – NRZ, RZ, Manchester 4.3 Source coding, ASCII, EBCDIC and baudot code. 4.4 Channel coding, Error, Causes of error and its effects, error detection & correction using parity, Hamming code & simple numerical.	12	
UNIT-5	**Multiplexing and Multiple Access** 5.1 Need of Multiplexing, TDM, FDM definition block diagram and their comparison. 5.2 Introduction to WDM. 5.3 Access technique TDMA, FDMA, CDMA (only concepts), advantages of TDMA over FDMA.	12	
	Total		

Recommended Books:

Sl.No.	Author	Title	Publisher
1	Wayne Tomasi	Electronic communication system	Pearson Education
2	Louis E. Frenzl	Electronics Communication	Tata McGraw Hill
3	Roddy Collen	Communication System	Prentice Hall of India
4	Amitabha Bhattacharya	Digital Communication	Tata McGraw Hill
5	K. Sam. & Shanmugar	Digital & Analog Communication	Jhon wiley & sons
6	B. Sklar	Digital Communication Fundamentals & Applications	Pearson Education
7	Siman Haykin	Digital Communication	Jhon wiley & sons
8	J.S. Chitode	Digital Communication	Technical Publication, Pune
9	Fronuzen	Data Communication Networking	Tata Mc-graw Hill

SIGNAL SYSTEM

Subject Code 1621604	Theory			No of Period in one session : 60			Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
				CT	:	20	

Rationale :

Objective:

S.No.	Topics	Periods
01	Signals & their representation.	(07)
02	Introduction to Linear System.	(05)
03	Fourier Series & Transforms.	(08)
04	Laplace Transforms.	(10)
05	Inverse Laplace Transformations.	(09)
06	Sampled-Data System & the Z-Transformations.	(12)
07	Mathematical modelling of physical systems.	(09)
	Total :	(60)

Contents : Theory			Hrs/week	Marks
UNIT-1	**SIGNALS & THEIR REPRESENTATION:**		**(07)**	
	01.01	Basic Continuous time Signals.		
	01.02	Basic discrete time Signals.		
	01.03	Linear time invariant Signals.		
	01.04	Random Signals.		
UNIT-2	**INTRODUCTION TO LINEAR SYSTEM:**		**(05)**	
	02.01	Introduction.		
	02.02	Linear System from a physical point of view		
	02.03	Linear System from a Mathematical point of view		
UNIT-3	**FOURIER SERIES & TRANSFORMS:**		**(08)**	
	03.01	Fourier series expansion.		
	03.02	Symmetry expansion.		
	03.03	Exponential form of Fourier series.		
	03.04	Fourier Integral & Fourier Transform.		
	03.05	Analysis by Fourier Methods.		
UNIT-4	**LAPLACE TRANSFORMS:**		**[10]**	
	04.01	04.01 Introduction, Definition of Laplace transform of a function, Inverse Laplace transform Basic properties of Laplace transform, Laplace transform algebraic and trigonometric functions, Laplace transform of derivatives and integrals. L-transform of periodic function.		
UNIT-5	**INVERSE LAPLACE TRANSFORMATIONS:**		**[09]**	
	05.01	Inverse Laplace transform Heaviside expansion theorem, initial and final value theorem, convolution integral, inverse Laplace transform of some irrational function, Application of Laplace transform and Inverse Laplace transform for the solution of differential equations.		
UNIT-6	**SAMPLED-DATA SYSTEM & THE Z-TRANSFORMATIONS:**		**[12]**	
	06.01	Introduction.		
	06.02	The Z-transformations.		
	06.03	Z-transformations of some important functions.		
	06.04	The shifting Theorem.		
	06.05	The initial & final value Theorem.		
	06.06	Introductions to difference equations.		
	06.07	Solution of difference equations.		

UNIT-7		MATHEMATICAL MODELLING OF PHYSICAL SYSTEMS:	[09]	
	07.01	System response & transfer function.		
	07.02	Block diagram representations.		
	07.03	Rule for block diagram transformations Signal flow graph.		
	07.04	Mason's gain formula & its applications.		
		Total	**60**	

Books Recommended:

1. Analysis of linear systems.   - D. K. Cheng.
2. Circuit & System Analysis.   - A. Paspoulis.
3. Signal & linear system.   - Gabel & Roberts.
4. Communication System.   - Haykins.
5. Signals and Systems, PHI.   - A. Oppenheirn and A. Willsky.
6. Control System Engineering.   - Nagrath & Gopal.

ELECTIVE - (ANY ONE) - (i) ADVANCED MICROPROCESSOR

Subject Code 1621605A	Theory			No of Period in one session : 60			Credits
	No. of Periods Per Week			Full Marks	:	100	
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	03
				CT	:	20	

Rationale :

Objective:

S.No.	Topics	Periods
01	Introduction to 16 BIT Microprocessor.	
02	Data and Address-BUS Configuration.	
03	Addressing Modes.	
04	Interrupt Processing.	
05	Peripheral Interfacing Chips.	
06	Architecture of 68000 Motorola processor in detail.	
07	Organisation of Instruction Sets.	
08	Architecture for standard peripheral devices.	
09	I/O Control.	
10	System Design with few industrial examples using 8086 and 68000 processors.	

Contents : Theory			Hrs/week	Marks
UNIT-1	**INTRODUCTION TO 16 BIT MICROPROCESSOR:**			
	01.01	Intel 8086 Architecture.		
	01.02	Intel 8088 Architecture.		
	01.03	Pipeline Architecture.		
	01.04	Bus interface unit and execution unit.		
UNIT-2	**DATA AND ADDRESS-BUS CONFIGURATION:**			
	02.01	Memory segmentation.		
	02.02	Memory address generation details.		
	02.03	Logical and Physical address generation.		
	02.04	I/O Port addresses.		
	02.05	Memory mapping.		
	02.06	Data, Code and Stack segmentation.		
UNIT-3	**ADDRESSING MODES:**			
	03.01	Instruction set in detail and Addressing Modes.		
	03.02	Assembler directives.		
	03.03	Programming examples.		
UNIT-4	**INTERRUPT PROCESSING:**			
	04.01	Hardware Interrupt.		
	04.02	Software Interrupt.		
	04.03	Internal Interrupt.		
	04.04	Types of Interrupt.		
	04.05	Interrupt enabling and disabling.		
UNIT-5	**PERIPHERAL INTERFACING CHIPS:**			
	05.01	Intel 8255.		
	05.02	Intel 8253.		
	05.03	Intel 8259.		
	05.04	Intel 8251.		
	05.05	Interfacing of these chips with processor.		
	05.06	Digital interfacing.		
	05.07	Analog interfacing.		
	05.08	Industrial control applications.		
UNIT-6	**ARCHITECTURE OF 68000 MOTOROLA PROCESSOR IN DETAIL.**			
	06.01	Introduction.		
	06.02	Reference in 68000.		
	06.03	Memory Address.		
	06.04	Instruction formats.		
	06.05	Addressing Modes.		
	06.06	Instruction Sets.		
	06.07	STACK, Read and Write Cycle Timing.		

UNIT-7	**ORGANISATION OF INSTRUCTION SETS:**			
	07.01	Addressing modes.		
	07.02	Assembly language programming.		
	07.03	Examples for sorting logical operations.		
	07.04	Control loops.		
	07.05	Interrupt and exception programming.		
UNIT-8	**I/O CONTROL:**			
	08.01	I/O control using parallel interface.		
	08.02	I/O control using memory mapped I/O control for data acquisition.		
	08.03	Data output through binary I/O lines.		
		Total		

Books Recommended:

1. Intel Manual of 8086   -
2. Microprocessing and Interfacing.   - Hall
3. 6800 Assembly Lan. Programming.   - Leventhal
4. Microprocessor   - Lui & Gibson
5. Motorola Manufacturing Data Sheets.   -

ELECTIVE - (ANY ONE) - (ii) ADVANCED INSTRUMENTATION & MEASUREMENT

Subject Code 1621605B	Theory			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
				CT	:	20	

Rationale :

Objective:

S.No.	Topics	Periods
01	Sensors.	
02	Microprocessor based data acquisition.	
03	Process Control.	
04	Electronic Graphic Recording Systems.	

Contents : Theory			Hrs/week	Marks
UNIT-1	**SENSORS:**			
	01.01	Electrical sensors for : (a) Mechanical acquisition, (b) Hydraulic acquisition, (c) Pneumatic acquisition.		
	01.02	Analog sensors.		
	01.03	Digital sensors.		
UNIT-2	**MICROPROCESSOR BASED DATA ACQUISITION:**			
	02.01	Instrumentation amplifier.		
	02.02	Multiplexers.		
	02.03	Sample and hold circuit.		
	02.04	D/A Converter.		
	02.05	A/D Converter.		
	02.06	Data acquisition system.		
UNIT-3	**PROCESS CONTROL:**			
	03.01	Process controller.		
	03.02	Hardware data logging.		
	03.03	Microcomputer as process controller.		
	03.04	Supervisory control.		
	03.05	Direct digital control.		
UNIT-4	**ELECTRONIC GRAPHIC RECORDING SYSTEMS:**			
	04.01	Introduction.		
	04.02	Balancing arrangement.		
	04.03	XY Recorder.		
	04.04	Types and briefs of permanent recording systems.		

Books Recommended:

1. Microprocessor with Application in Control.   - Ahson.
2. Microprocessor in Instruments & Control.   - Bibbero
3. Modern Instrumentation System.   - Mani & Others.

ELECTIVE - (ANY ONE) - (iii) MINING ELECTRONICS

Subject Code 1621605C	Theory			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
				CT	:	20	

Rationale :

Objective:

S.No.	Topics	Periods
01	Basic Quantity Measurement.	
02	Environmental Measurement.	
03	Sensors.	
04	Detectors.	
05	Transport System Monitoring.	
06	Surveillance of Electrical System.	
07	MIS Systems.	

Contents : Theory			Hrs/week	Marks
UNIT-1	**BASIC QUANTITY MEASUREMENT:**			
	01.01	Measurement of temperature.		
	01.02	Measurement of pressure.		
	01.03	Measurement of humidity.		
	01.04	Measurement of Air Velocity.		
UNIT-2	**ENVIRONMENTAL MEASUREMENT:**			
	02.01	Introduction.		
	02.02	Monitoring and recording of methane.		
	02.03	Monitoring and recording of carbon mono-oxide.		
	02.04	Measuring of Oxygen and other gas quantities.		
UNIT-3	**SENSORS:**			
	03.01	Classification of gas sensors.		
	03.02	Solid state sensors.		
	03.03	Gas analysis.		
	03.04	Ionisation chamber.		
UNIT-4	**DETECTORS:**			
	04.01	Introduction & Classification.		
	04.02	Early detectors of ground fires.		
	04.03	Smoke/fire detectors.		
	04.04	Detection of rock movements.		
	04.05	Detection of change in pressure.		

UNIT-5	**TRANSPORT SYSTEM MONITORING:**			
	05.01	Introduction & Classification.		
	05.02	Tub transport system.		
	05.03	Conveyer belt transport system.		
	05.04	NDT for wire ropes.		
UNIT-6	**SURVEILLANCE OF ELECTRICAL SYSTEM:**			
	06.01	Introduction.		
	06.02	Surveillance of underground electrical systems.		
	06.03	Surveillance of ground electrical system.		
	06.04	Surveillance of communication system.		
	06.05	Insulation monitoring.		
	06.06	Fault detection in different section.		
UNIT-7	**MIS SYSTEMS:**			
	07.01	Introduction to control dispatch system.		
	07.02	Signaling in mines.		
	07.03	Different types of transmitters used in mines.		
	07.04	Different types of receiver used in mines.		
	07.05	Important safely signals used in mines.		
		Total		

ELECTIVE - (ANY ONE) - (iv) MEDICAL ELECTRONICS

Subject Code 1621605D	Theory			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
				CT	:	20	

Rationale :

Objective:

S.No.	Topics	Periods
01	Body Skeleton.	
02	Muscle Physiology.	
03	Heart Physiology.	
04	Respiration.	
05	Neuro Physiology.	
06	Recording Techniques.	
07	Measurement & Recording of Non-Electrical Systems.	
08	Electronic Instruments affecting Human Body.	

Contents : Theory			Hrs/week	Marks
UNIT-1	**BODY SKELETON:**			
	01.01	Nerve Physiology.		
	01.02	Membrane Potential.		
	01.03	Action Potential.		
	01.04	Function of Nerve Junctions.		
	01.05	Functions of Neo-Neural Junctions.		
UNIT-2	**MUSCLE PHYSIOLOGY:**			
	02.01	Function of Skeleton & Smooth Muscle.		
	02.02	Function of Cardiac Muscle.		
	02.03	Cardiac Rhythmic Contraction.		
UNIT-3	**HEART PHYSIOLOGY:**			
	03.01	Introduction to Heart function.		
	03.02	Blood flow.		
	03.03	Arterial Pressure.		
	03.04	E C G.		
UNIT-4	**RESPIRATION.**			
UNIT-5	**NEURO PHYSIOLOGY:**			
	05.01	Introduction.		
	05.02	Function of Spinal Cord.		
	05.03	Cord Reflexes.		
UNIT-6	**RECORDING TECHNIQUES:**			
	06.01	Introduction.		
	06.02	Electro-Cardiac Graph.		
	06.03	Electro Mypho Graph.		
	06.04	Electro Encyclo Graph.		

UNIT-7	**MEASUREMENT & RECORDING OF NON-ELECTRICAL SYSTEMS:**			
	07.01	Measurement & recording of biological parameters.		
	07.02	Bio-Telemetry.		
	07.03	Safety while recording.		
	07.04	Patient monitoring.		
	07.05	Intensive care unit.		
	07.06	Special techniques for measurement of non-electrical parameters.		
UNIT-8	**ELECTRONIC INSTRUMENTS AFFECTING HUMAN BODY:**			
	08.01	Simulator.		
	08.02	Defibrillator.		
	08.03	Pace maker.		
	08.04	Diathermy.		
	08.05	Blood pumps.		
	08.06	Myo electric control of paralysed muscles.		
		Total		

Books Recommended:

1. Bio Medical Electronics   - Cromwell & others.
2. Bio Electronic Instrument & Measurement   - Khandpur.
3. Bio Medical Instrument & Measurement   - Cromwell & others.

ELECTIVE - (ANY ONE) - (v) MICTROWAVE ENGINEERING

Subject Code 1621605E	Theory			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	100	
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	03
				CT	:	20	

Rationale:

Objective:

S.No.	Topics
01	Microwave Tubes.
02	Microwave Semi Conductor Devices.
03	Microwave Components and Antennas.
04	Microwave Transmission.
05	Microwave Measurements.

Contents :Theory			Hrs/week	Marks
UNIT-1	**MICROWAVE TUBES:**			
	01.01	Introduction.		
	01.02	Microwave frequency band spectrum.		
	01.03	Klystron.		
	01.04	Reflex Klystron.		
	01.05	Travelling Wave tubes. (TWT)		
	01.06	Magnetron.		
UNIT-2	**MICROWAVE SEMI CONDUCTOR DEVICES:**			
	02.01	Microwave Diodes.		
	02.01.01	Varactor Diodes.		
	02.01.02	Tunnel Diodes.		
	02.01.03	Gunn Diodes.		
	02.01.04	Avalanche effect diodes.		
	02.02	M A S E R.		
UNIT-3	**MICROWAVE COMPONENTS AND ANTENNAS:**			
	03.01	Coaxial Lines.		
	03.02	Wave guides.		
	03.02.01	Rectangular.		
	03.02.02	Circular.		
	03.03	Wave guide corners and Tees.		
	03.04	Directional couplers.		
	03.05	Attenualtors.		
	03.06	Antennas.		
	03.07.01	Parabolic.		
	03.08.02	Horn.		
	03.09.03	Slot.		

UNIT-4	**MICROWAVE TRANSMISSION:**			
	04.01	Maxwells equations.		
	04.02	Modes of propagation in rectangular and circular wave guides.		
	04.03	Transmission through rectangular wave guide.		
	04.04	Cut off frequency and guide wave length.		
	04.05	Phase and group velocity, and relation between them.		
UNIT-5	**DETECTORS:**			
	05.01	Measurement of impedance.		
	05.02	Measurement of frequency.		
	05.03	Voltage standing wave ratio. (VSWR) and its measurement.		
		Total		

Books Recommended:

1. Microwave Communication.   - Angelkos & Everhar.
2. Foundation of Microwave Communication.   - Collins.
3. Microwaves.   - Sanjeev Gupta & others.
4. Electromagnetic Waves & Radiating Systems   - Jordan.
5. Microwave Theory & Measurement   - Heylward Packard.

ADVANCE COMMUNICATION SYSTEMS LAB.

Subject Code 1638606	Practical			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	50	
	L	T	P/S	ESE	:	50	03
	—	—	06	Internal	:	15	
				External	:	35	

Rationale :

Objective:

Contents : Practical	Hrs/week	Marks
UNIT-1 Verify the characteristics of Reflex Klystron		
UNIT-2 Verification of characteristics of Circulator		
UNIT-3 Indirect measurement of frequency using cavity resonator		
UNIT-4 Verification of Characteristics of Photodiode, LED, tunnel diode		
UNIT-5 Application of CRO, for different communication parameters.		
UNIT-6 Operational amplifier as sub tractor, adder, integrator etc.		
UNIT-7 Verification of V – I characteristics of SCR.		
Total		

SIGNAL AND SYSTEM -TW

Subject Code 1621607	Term Work			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	50	02
	L	T	P/S	Internal	:	15	
	—	—	04	External	:	35	

Rationale :

Objective:

	Contents : Term Work	Hrs/week	Marks
UNIT-1	Write a program to generate the discrete sequences (i) unit step (ii) unit impulse (iii) ramp (iv) periodic sinusoidal sequences. Plot all the sequences.		
UNIT-2	Find the Fourier transform of a square pulse. Plot its amplitude and phase spectrum.		
UNIT-3	Write a program to convolve two discrete time sequences. Plot all the sequences. Verify the result by analytical calculation.		
UNIT-4	Write a program to find the trigonometric Fourier series coefficients of a rectangular periodic signal. Reconstruct the signal by combining the Fourier series coefficients with appropriate weightings.		
UNIT-5	Write a program to find the trigonometric and exponential Fourier series coefficients of a periodic rectangular signal. Plot the discrete spectrum of the signal.		
UNIT-6	Generate a discrete time sequence by sampling a continuous time signal. Show that with sampling rates less than Nyquist rate, aliasing occurs while reconstructing the signal.		
UNIT-7	The signal x)t) is defined as below. The signal is sampled at a sampling rate of 1000 samples per second. Find the power content and power spectral density for this signal. $$X(t)= \begin{cases} \cos(2 \pi \times 47 t) + \cos(2 \pi \times 219 t), & \leq t \leq 10 \\ 0, & \textit{otherwise} \end{cases}$$		
UNIT-8	Write a program to find the magnitude and phase response of first order low pass and high pass filter. Plot the responses in logarithmic scale.		
UNIT-9	Write a program to find the response of a low pass filter and high pass filter, when a speech signal is passed through these filters.		
UNIT-10	Write a program to find the autocorrelation and cross correlation of sequences.		
UNIT-11	Generate a uniformly distributed length 1000 random sequence in the range (l0,1). Plot the histogram and the probability function for the sequence. Compute the mean and variance of the random signal.		
UNIT-12	Generate a Gaussian distributed length 1000 random sequence. Compute the mean and variance of the random signal by a suitable method.		
UNIT-13	Write a program to generate a random sinusoidal signal and plot four possible realizations of the random signal.		
UNIT-14	Generate a discrete time sequence of N=1000 i.i.d uniformly distributed random numbers in the interval (-05, -05) and compute the autocorrelation of the sequence.		
UNIT-15	Obtain and plot the power spectrum of the output process when a white random process is passed through a filter with specific impulse response.		
	Total		

DIGITAL COMMUNICATION -TW

Subject Code 1638608	Term Work			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	50	
	L	T	P/S	Internal	:	15	02
	—	—	06	External	:	35	

	Contents : Term Work	**Hrs/week**	**Marks**
UNIT-1	Observe waveforms of Pulse Amplitude modulation (using natural sampling & flat top sampling).		
UNIT-2	Observe waveforms of Pulse width modulation (using natural sampling & flat top sampling)		
UNIT-3	Observe waveforms of Pulse Position modulation (using natural sampling.)		
UNIT-4	Observe waveforms of Pulse code modulation and demodulation.		
UNIT-5	Observe waveforms of ASK modulation & demodulation.		
UNIT-6	Observe waveforms of FSK modulation & demodulation.		
UNIT-7	Observe waveforms of PSK modulation & demodulation		
	Total		

PROJECT WORK AND ITS PRESENTATION IN SEMINAR -TW

Subject Code 1621609	Term Work			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	100	
	L	T	P/S	Internal	:	30	02
	—	—	—	External	:	70	

Rationale :

The Project work and its presentation in seminar is an important subject for a Diploma holder technician. The course is designed to help a students develop confidence, skill in report writing, skill to analyse, design, estimating and costing, deciding a process etc, the course will also help in developing communication skill, skill of quality documentation.

Objective:

A student will be able to:

- Identify a Problem
- Analyse the Problem
- Develop logical approach to solution of a Problem.
- Design of a product
- Make estimate of materials and processes and calculate the cost of production and decide the price of the product.
- Manufacture / assemble /fabricate the product in the workshop.
- Test the product for its quality.
- Prepare a project report (Computer printed / typed)
- Present in the form of seminar.

Contents : Term Work		Hrs/week	Marks
UNIT-1	To make a bridge rectifier.		
UNIT-2	To make/assemble a voltage stabilizer.		
UNIT-3	To make/assemble stabilizer for refrigerator.		
UNIT-4	To make a timer circuit IC 555.		
UNIT-5	Electronic Regulator for Ceiling Fan.		
UNIT-6	To fabricate a circuit for characteristics for NPN/PNP transistors.		
UNIT-7	Bi-stable Multivibrator		
UNIT-8	Half & Full adder, substractor & Comparator.		
UNIT-9	8:1 Multiplexer.		
UNIT-10	Realising Railway Signaling System.		

REPORT WRITING:

A report must include

Contents : Term Work		Hrs/week	Marks
UNIT-1	Introduction.		
UNIT-2	Design.		
UNIT-3	Estimating of materials.		
UNIT-4	Calculation of cost of the materials.		
UNIT-5	Operation time estimation.		
UNIT-6	Cost of Operation.		
UNIT-7	Process of Manufacture / Assembly / fabrication.		
UNIT-8	List of tools/equipments used with specification.		

<center>**OR**</center>

A project on live industrial problems that may be—

- Technical
- Human Relation
- Welfare
- Safety
- Any other

The Project Report should consist of :-

Contents : Term Work		Hrs/week	Marks
UNIT-1	Introduction.		
UNIT-2	Problem statement.		
UNIT-3	Background of Industry.		
UNIT-4	Organisational set –up.		
UNIT-5	Plant Lay –out.		
UNIT-6	Reason for selecting a problem.		
UNIT-7	Analysis of Problem.		
UNIT-8	Probable solution.		
UNIT-9	Best solution possible.		
UNIT-10	Any other.		
	Total		

Project work/ project report should be presented in the from of a seminar for developing confidence and communication skill among the students.

NOTE:-

Project work will be allotted to the students just in the beginning of the session. Each student will be give a separate work under the supervision of a teacher. Total number of students may be divided among the number of teachers available. The teacher concerned will select separate problem for each student under him and allot it to him at the beginning of the session. The work allotted should be completed with in scheduled time. i e. by the end of the session. Problems selected should preferably conform to the syllabus. If it is outside of the syllabus then it must be within the field of electronics engineering.