

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

**THEORY**

Sr. No.	SUBJECTS	SUBJECT CODE	TEACHING SCHEME		EXAMINATION - SCHEME					
			Periods per Week	Periods in one Session (Year)	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.	Professional Studies & Entrepreneurship	00601	06	60	03	20	80	100	26	36
2.	Advance Communication Systems	38602	06	60	03	20	80	100	26	36
3.	Digital Communication	38603	06	60	03	20	80	100	26	36
4.	Signal System	21604	06	50	03	20	80	100	26	36
5.	Elective*		06	60	03	20	80	100	26	36
	Advanced Microprocessor	21605A								
	Advanced Instrumentation & Measurement	21605B								
	Mining Electronics	21605C								
	Medical Electronics	21605D								
	Microwave Engineering	21605E								
<b>Total:-</b>			<b>30</b>					<b>500</b>		

**PRACTICAL**

Sr. No.	SUBJECTS	SUBJECT CODE	TEACHING SCHEME		EXAMINATION - SCHEME					
			Periods per Week	Periods in one Session (Year)	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.	Advance Communication Systems Lab.	38606	08	60	03	10	40	50	16	21
<b>Total:-</b>			<b>08</b>					<b>50</b>		

**SESSIONAL**

Sr. No.	SUBJECTS	SUBJECT CODE	TEACHING SCHEME		EXAMINATION - SCHEME			
			Periods per Week	Periods in One Session (Year)	Marks of Internal Examiner (X)	Marks of External Examiner (Y)	Total Marks (X+Y)	Pass Marks in the Subject
7.	Professional Studies & Entrepreneurship	00607	04	50	20	30	50	25
8.	Digital Communication Lab.	38608	--	--	20	30	50	25
9.	Project Work & Its presentation in Seminar	21609	--	--	40	60	100	50
<b>Total:-</b>			<b>04</b>				<b>200</b>	

<b>Total Periods per Week</b>	<b>42</b>	<b>Total Marks</b>	<b>750</b>
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# PROFESSIONAL STUDIES & ENTREPRENEURSHIP

<b>Subject Code</b> <b>00601</b>	<b>Theory</b>			<b>No of Period in one session : 60</b>		
	<b>No. of Periods Per Week</b>			<b>Full Marks</b>	<b>:</b>	<b>100</b>
	<b>L</b>	<b>T</b>	<b>P/S</b>	<b>Annual Exam.</b>	<b>:</b>	<b>80</b>
	<b>06</b>	<b>-</b>	<b>-</b>	<b>Internal Exam.</b>	<b>:</b>	<b>20</b>

**Rationale:**

The paper has been introduced to achieve dual purpose for the students. Firstly, this course provides the basics of Professional management and secondly it also prepares the student to develop self reliance by becoming an entrepreneur.

This makes them conversant with their duties and responsibility to make them successful in their career building by developing profession expertise.

**Objectives:**

With the input provided in this paper, the students will be able to :-

- Acquire basic knowledge of management.
- Understand the various area of management such as human resources, marketing, finance and commercial aspect, production & material management etc.
- Understand the benefit of becoming an entrepreneur.
- Handle a project efficiently and independently.
- To avail subsidies / grants / loan etc. from various of agencies.

## PART-I: PROFESSIONAL STUDIES

**TOPIC:**

**01 – INTRODUCTION:**

01.01	Professional Ethics: Definition, Objective, Right & Wrong, Duty & Obligation	[05]
01.02	Management: Definition, Function and Objectives.	[05]
01.03	Leadership: Definition, Types – Autocratic, Democratic and Laissez – faire, Functions and Characteristics of Leadership.	[05]
01.04	Motivation : Definition, Types and Importance / Benefits	[05]
01.05	Forms of Business organization: Sole proprietorship, Partnership, Joint Stock company and Co-operative Societies.	[05]
01.06	Supervisor’s/Technician’s role: Concept of supervisory management, career needs, Role of Technicians in an organization.	[05]

## PART-II: ENTREPRENEURSHIP

**TOPIC:**

**02 – INTRODUCTION:**

02.01	Entrepreneurship: Concept, Characteristics of a successful entrepreneurship, basic ingredients of entrepreneurship: 1. Finance 2. Technology 3. Sales and Marketing	[10]
02.02	Project Report: Meaning, Project Identification, Project Selection, Contents of a project Report, Techno-Economic Feasibility Report ( TEFRR), Market Survey.	[10]

- 02.03 Sources of Finance: [05]  
 Government, Commercial Banks, Financial institutions:  
 SIDBI – Small Industries development Bank of India  
 SFC – State Financial Corporations  
 IDBI – Industrial Development Bank of India  
 IFCI – Industrial Finance Corporation of India  
 ICICI – Industrial Credit Investment Corporation of India
- 02.04 Acts : [05]  
 Indian factories Act 1948 ( Main Provision Only)  
 Consumers Protection Act 1986 ( Main Provision Only)

**03 – PROJECT WORK:**

As elaborated in Sessional Paper (00607).

**Books Recommended :**

1. Essential of Management, Tata McGraw Hill, Publishing Company Ltd., New Delhi. - Herald Koonz & Cyril O' Donnel.
2. Business Organization and Management, S. C. Chand and Company (Pvt.) Ltd., Ram Nagar, New Delhi - M. C. Shukla.
3. Managerial Economics, Sultan Chand & Sons, New Delhi - R. L. Vashney & K. L. Maheshwari
4. Project Appraisal and Follow up, Govind Prakashan, Mumbai. - D. P. Sharda
5. Modern Marketing Management, Progressive Corporation Pvt. Ltd., P51, Mahatma Gandhi Road, Bombay-400 001 - Dr. Rustam S. Davar
6. A hand book for new entrepreneurs (with special reference to science and technology target group) - Entrepreneurship Development Institute of India, 83-A, Swastic Society Navrangpura, Ahmedabad, PIN-380 009.

**Reference Books :**

1. Leadership in Organisation - Published by I.S.T.E. Mysore
2. Motivation - Published by I.S.T.E. Mysore
3. Motivation - I.I.T. Kanpur - Published by I.S.T.E. Mysore
4. A Hand book on Project Appraisal and follow up, Govind Prakashan, 204, Saraswati Kunj, 90, S. V. Road, Goregoan, Bombay-400 062. - D. P. Sarda
5. Bihar Industrial Policy - Government of Bihar, Department of Industries.
6. Entrepreneurship Guide - Bihar State Financial Corporation, Fraser Road, Patna-800 001.

# ADVANCE COMMUNICATION SYSTEMS

Subject Code 38602	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 :

An improvement and development in the technology have occurred with tremendous rapidity in parallel with its increasingly wide scale deployment Telecommunication n/w based on Radar, Satellite, Microwave and optical fiber technology have become a major information transmission system to improve the transmission & ideality, to increase the data rate so that more information could be sent or to increase the transmission distance between relay stations.

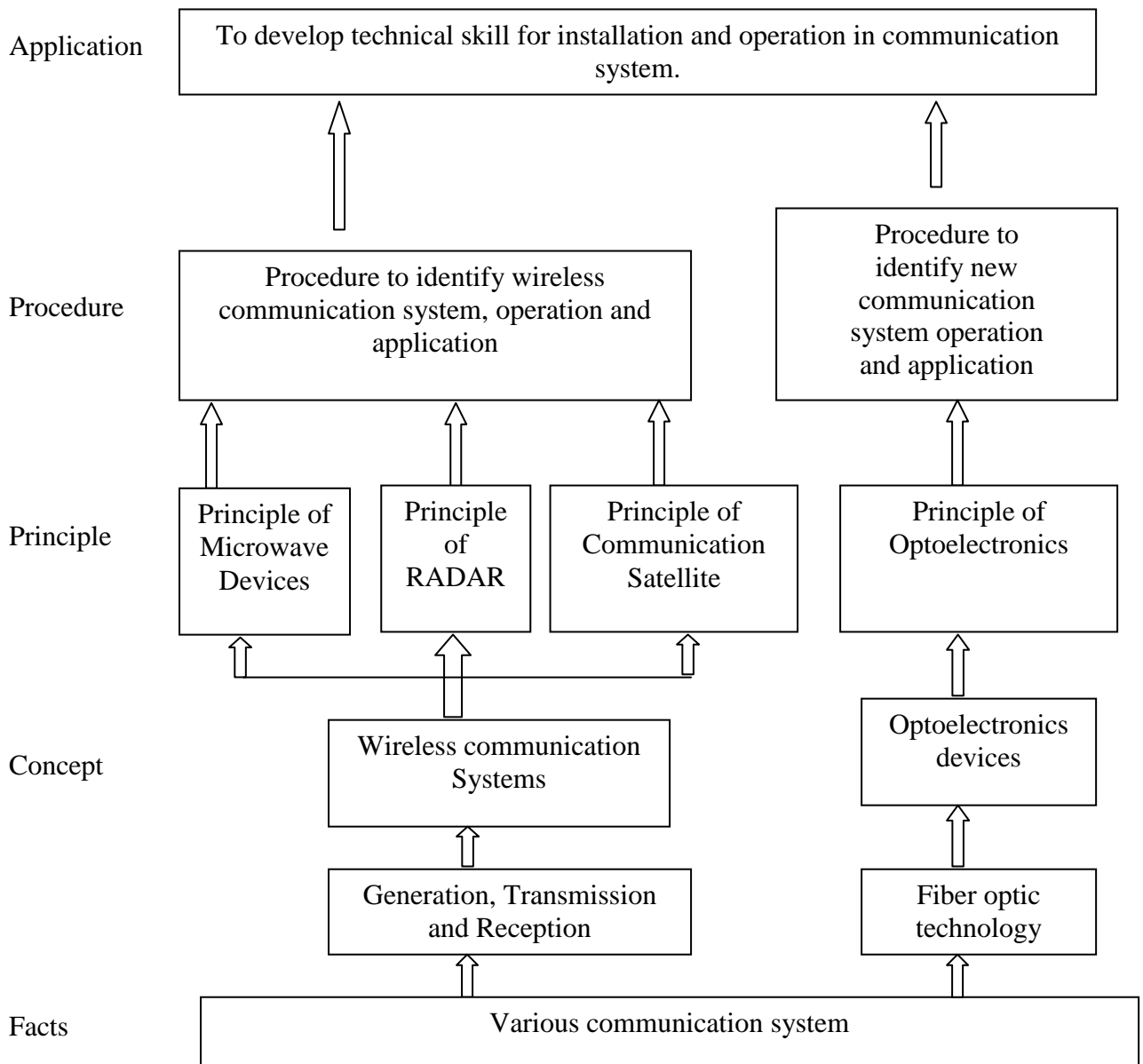
As a result & accelerating rate of growth of communication technology in research and industry students who are preparing themselves for and electronics engineers who are working in these area are faced with the need to understand the theoretical and experimental design and analysis

## Objective:

Students will be able to:

1. Recognize different communication system
2. Learn the Concept of electromagnetic wave
3. Identify Microwave spectrum (frequency)
4. Identify different wave guide components
5. State the Properties of different Tee
6. State the Concept of duplexer
7. Know the principle of light transmission through optic fiber
8. Know Splicing technique.

**Learning Structure:**



Sl.No.	Name of the Topic	Period
1	<b>Introduction</b> Introduction to Electronic Communication System. Block diagram, modulation, AM, FM, PM and its related concepts. (Mathematical)	06
2	<b>Wave Guide</b> 2.1 Microwave Region and Band Designations 2.2 Introduction to TEM/TE/TM/HE wave destination. 2.3 Comparison of wave guide with two wire transmission line. 2.4 Propagation of waves in rectangular wave guide only. ( Introduction to wave guide only) 2.5 TE & TM Modes in rectangle wave guide with field pattern. Concept of dominant mode. 2.6 Definition and interpretation of cut off frequency of a waveguide, guide wave length, phase velocity, group velocity( Simple Numerical)	07

<b>3</b>	<b>Microwave Components</b> 3.1 Construction , working Principles & Applications of : Multicavity klystron amplifier, Reflex Klystron amplifier, Travelling wave tube, Magnetron, 3.2 Construction working principle & Application, Parametric amplifier, PIN Diode & Gunn Diode	<b>07</b>
<b>4</b>	<b>Radar Theory</b> 4.1 Fundamentals: Basic concept of Radar , Block diagram of an elementary pulsed Radar, Duplexer concept 4.2 Concept of continuous Wave Radar, Doppler effect & Speed Measurement 4.3 Block diagram and explain the operation of MTI radar 4.4 Application of Radar 4.5 Block diagram of elements of a satellite Communication system. Brief introduction of communication and geostationary orbit and Satellite. Television and azimuth angles if a Satellite. Uplink and downlink frequencies used frequency bands used in satellite Communication. Definition of foot print, Altitude and angles, station keeping, look angle.	<b>07</b>
<b>5</b>	<b>Maxwell Equations</b> 5.1 Maxwell Equations, Simple idea ( Integral and differential form both)	<b>05</b>
<b>6</b>	<b>Introduction to wireless communication system</b> 6.1 Evolution of mobile radio communication 6.2 Mobile radio system around the world. ( Such as AMPS, N- AMPS, IS – 95, GSM) 6.3 Related definition base station, control channel, forward channel etc. Example of wireless communication system such as paging system, cordless telephone system, cellular telephone system, how cellular telephone call is made	<b>06</b>
<b>7</b>	<b>Mobile unit</b> 7.1 Block Diagram and operation of mobile unit 7.2 Block Diagram & Explanation frequency synthesizer 7.3 Block diagram and operation of transmitter, receiver, logic unit, control unit & handset	<b>08</b>
<b>8</b>	<b>The Cellular Concept.</b> 8.1 Introduction a basic cellular system. 8.2 Frequency reuse 8.3 Hand off, Type of hand off, hard hand off, soft hand off, delayed and queued hand off 8.4 Interference & system capacity. 8.4.1 Co channel interference & system capacity. 8.4.2 Channel planning for wireless system. 8.4.3 Adjacent channel interference. 8.4.4 Power control for reducing interference ( Closed loop, Open loop)	<b>14</b>

# DIGITAL COMMUNICATION

Subject Code 38603	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:

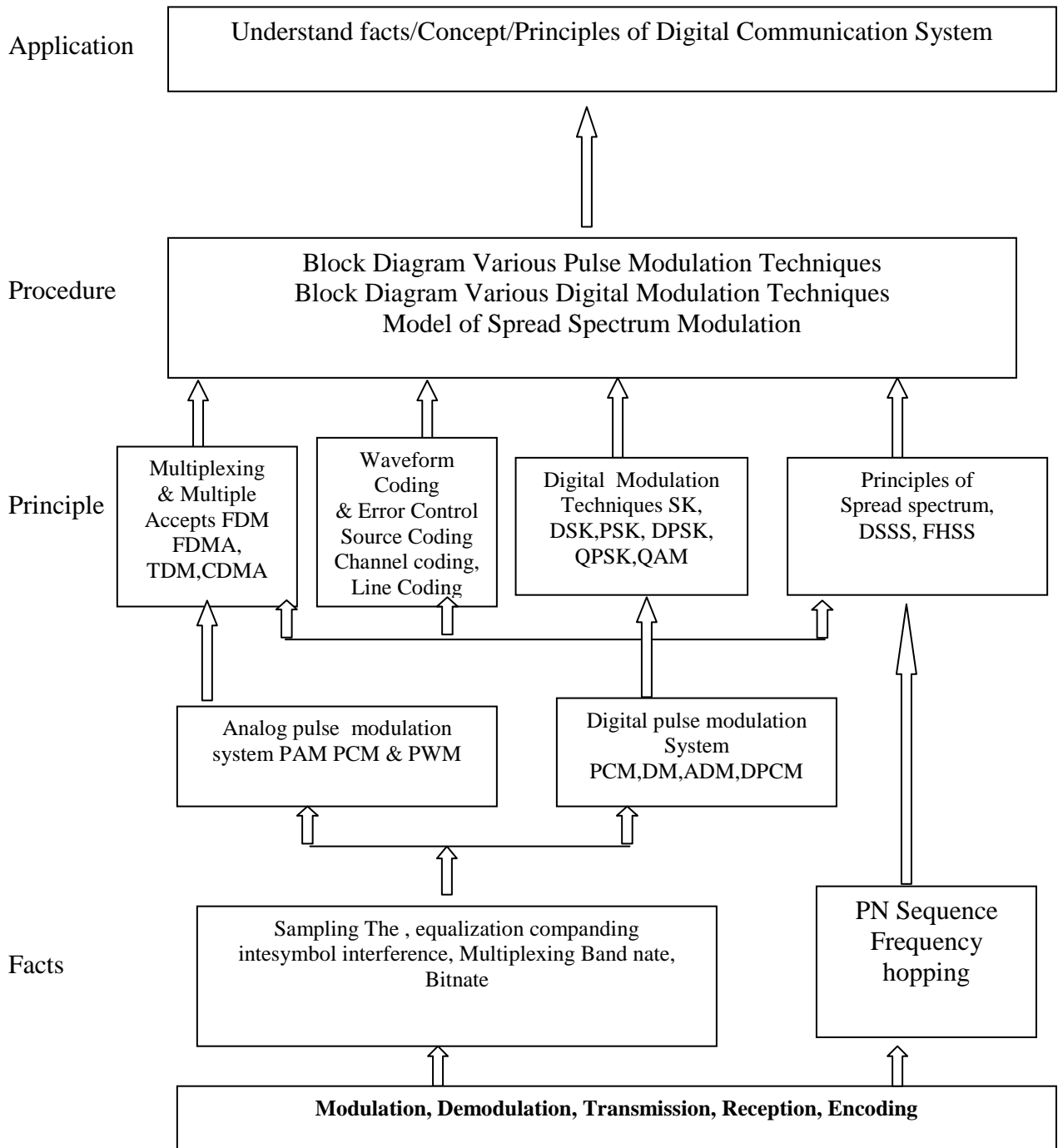
Digital communication systems are becoming increasingly attractive because of ever- growing demand for data communication. Digital transmission offers data processing option and flexibility not available with analog transmission. This is technology group subject, which will enable student to comprehend 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:**





<u>Sl.No.</u>	<u>Name of the Topic</u>	<u>Period</u>
<b>01</b>	<b>Introduction of Digital Communication</b> 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	<b>10</b>
<b>02</b>	<b>Pulse Communication</b> 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, companding, inter symbol interference 2.5 Delta modulation- block diagram of DM, slope overload, granular noise. 2.6 ADM, DPCM, block diagram and its working.	<b>14</b>
<b>03</b>	<b>Digital Modulation Techniques</b> 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.	<b>12</b>
<b>04</b>	<b>Coding methods and Error control</b> 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.	<b>12</b>
<b>05</b>	<b>Multiplexing and Multiple Access</b> 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.	<b>12</b>

### Recommended Books:

<b>Sl.No.</b>	<b>Author</b>	<b>Title</b>	<b>Publisher</b>
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

<b>Subject Code</b> <b>21604</b>	<b>Theory</b>			<b>No of Period in one session : 60</b>		
	<b>No. of Periods Per Week</b>			<b>Full Marks</b>		
	<b>L</b>	<b>T</b>	<b>P/S</b>	<b>Annual Exam.</b>	<b>:</b>	<b>100</b>
	<b>06</b>	<b>-</b>	<b>-</b>	<b>Internal Exam.</b>	<b>:</b>	<b>80</b>
					<b>20</b>	

**Rationale :**

**Objective:**

<u>S.No.</u>	<u>Topics</u>	<u>Periods</u>
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)
<b>Total :</b>		<b>(60)</b>

**CONTENTS:**

**TOPIC: 01 – 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.

**TOPIC: 02 – 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

**TOPIC: 03– 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.

**TOPIC: 04 – LAPLACE TRANSFORMS:** **[10]**

- 04.01 Introduction.
- 04.02 Conversion from F-transform to L-transform.
- 04.03 The shifting Theorem & its applications.
- 04.04 The gate function.
- 04.05 L-transform of periodic functions.
- 04.06 L-transform of operations.

<b><u>TOPIC: 05 - INVERSE LAPLACE TRANSFORMATIONS:</u></b>		<b>[09]</b>
05.01	Introductions.	
05.02	Heaviside's expansion Theorem.	
05.03	Analysis of system response.	
05.04	Initial & Final Value Theorem.	
05.05	The convolution integral.	
05.06	The Super position integral.	
05.07	Inverse L-transformations of some irrational functions.	

<b><u>TOPIC: 06 – SAMPLED-DATA SYSTEM &amp; THE Z-TRANSFORMATIONS:</u></b>		<b>[12]</b>
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.	

<b><u>TOPIC: 07– MATHEMATICAL MODELLING OF PHYSICAL SYSTEMS:</u></b>		<b>[09]</b>
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.	

**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.              |

# ADVANCED MICROPROCESSOR

<b>Subject Code 21605A</b>	<b>Theory</b>			<b>No of Period in one session : 60</b>		
	<b>No. of Periods Per Week</b>			<b>Full Marks</b>		
	<b>L</b>	<b>T</b>	<b>P/S</b>	<b>Annual Exam.</b>	<b>:</b>	<b>100</b>
	<b>06</b>	<b>-</b>	<b>-</b>	<b>Internal Exam.</b>	<b>:</b>	<b>80</b>
					<b>20</b>	

**Rationale :**

**Objective:**

<u>S.No.</u>	<u>Topics</u>	<u>Periods</u>
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:**

**TOPIC: 01 – 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.

**TOPIC: 02 – 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.

**TOPIC: 03– ADDRESSING MODES:**

- 03.01 Instruction set in detail and Addressing Modes.
- 03.02 Assembler directives.
- 03.03 Programming examples.

**TOPIC: 04 – 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.

**TOPIC: 05 - 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.

**TOPIC: 06 – 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.

**TOPIC: 07– 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.

**TOPIC: 08 – 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.

**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. -

# ADVANCED INSTRUMENTATION & MEASUREMENT

<b>Subject Code 21605B</b>	<b>Theory</b>			<b>No of Period in one session : 60</b>		
	<b>No. of Periods Per Week</b>			<b>Full Marks</b>		<b>: 100</b>
	<b>L</b>	<b>T</b>	<b>P/S</b>	<b>Annual Exam.</b>		<b>: 80</b>
	<b>06</b>	<b>-</b>	<b>-</b>	<b>Internal Exam.</b>		<b>: 20</b>

**Rationale :**

**Objective:**

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

**CONTENTS:**

**TOPIC: 01 – SENSORS:**

- 01.01 Electrical sensors for :
  - (a) Mechanical acquisition,
  - (b) Hydraulic acquisition,
  - (c) Pneumatic acquisition.
- 01.02 Analog sensors.
- 01.03 Digital sensors.

**TOPIC: 02 – 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.

**TOPIC: 03– 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.

**TOPIC: 04 - 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. |

## MINING ELECTRONIC

<b>Subject Code 21605C</b>	<b>Theory</b>			<b>No of Period in one session : 60</b>		
	<b>No. of Periods Per Week</b>			<b>Full Marks</b>	<b>:</b>	<b>100</b>
	<b>L</b>	<b>T</b>	<b>P/S</b>	<b>Annual Exam.</b>	<b>:</b>	<b>80</b>
	<b>06</b>	<b>-</b>	<b>-</b>	<b>Internal Exam.</b>	<b>:</b>	<b>20</b>

**Rationale :**

**Objective:**

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

**CONTENTS:**

**TOPIC: 01 – BASIC QUANTITY MEASUREMENT:**

- 01.01 Measurement of temperature.
- 01.02 Measurement of pressure.
- 01.03 Measurement of humidity.
- 01.04 Measurement of Air Velocity.

**TOPIC: 02 – 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.

**TOPIC: 03– SENSORS:**

- 03.01 Classification of gas sensors.
- 03.02 Solid state sensors.
- 03.03 Gas analysis.
- 03.04 Ionisation chamber.

**TOPIC: 04 - 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.

**TOPIC: 05 – TRANSPORT SYSTEM MONITORING:**

- 05.01 Introduction & Classification.
- 05.02 Tub transport system.
- 05.03 Conveyer belt transport system.
- 05.04 NDT for wire ropes.

**TOPIC: 06– 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.

**TOPIC: 07 – 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.



# MEDICAL ELECTRONICS

<b>Subject Code 21605D</b>	<b>Theory</b>			<b>No of Period in one session : 60</b>		
	<b>No. of Periods Per Week</b>			<b>Full Marks</b>	<b>:</b>	<b>100</b>
	<b>L</b>	<b>T</b>	<b>P/S</b>	<b>Annual Exam.</b>	<b>:</b>	<b>80</b>
	<b>06</b>	<b>-</b>	<b>-</b>	<b>Internal Exam.</b>	<b>:</b>	<b>20</b>

**Rationale :**

**Objective:**

<u>S.No.</u>	<u>Topics</u>	<u>Periods</u>
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:**

**TOPIC: 01 – 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.

**TOPIC: 02 – MUSCLE PHYSIOLOGY:**

- 02.01 Function of Skeleton & Smooth Muscle.
- 02.02 Function of Cardiac Muscle.
- 02.03 Cardiac Rhythmic Contraction.

**TOPIC: 03– HEART PHYSIOLOGY:**

- 03.01 Introduction to Heart function.
- 03.02 Blood flow.
- 03.03 Arterial Pressure.
- 03.04 E C G.

**TOPIC: 04 – RESPIRATION.**

**TOPIC: 05 - NEURO PHYSIOLOGY:**

- 05.01 Introduction.
- 05.02 Function of Spinal Cord.
- 05.03 Cord Reflexes.

**TOPIC: 06 – RECORDING TECHNIQUES:**

- 06.01 Introduction.
- 06.02 Electro-Cardiac Graph.
- 06.03 Electro Mypho Graph.
- 06.04 Electro Encyclo Graph.

**TOPIC: 07– 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.

**TOPIC: 08 – 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.

**Books Recommended:**

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

# MICTROWAVE ENGINEERING

<b>Subject Code 21605E</b>	<b>Theory</b>			<b>No of Period in one session : 60</b>		
	<b>No. of Periods Per Week</b>			<b>Full Marks</b>		<b>: 100</b>
	<b>L</b>	<b>T</b>	<b>P/S</b>	<b>Annual Exam.</b>		<b>: 80</b>
	<b>06</b>	<b>-</b>	<b>-</b>	<b>Internal Exam.</b>		<b>: 20</b>

**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:**

**TOPIC: 01 – MICROWAVE TUBES:**

- 01.01      Introduction.
- 01.02      Microwave frequency band spectrum.
- 01.03      Klystron.
- 01.04      Reflex Klystron.
- 01.05      Travelling Wave tubes.
- 01.06      Magnetron.

**TOPIC: 02 – 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.

**TOPIC: 03– 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.

**TOPIC: 04 – 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 and guide wavelength.
- 04.05        Phase and group velocity.

**TOPIC: 05 - DETECTORS:**

- 05.01        Measurement of impedance.
- 05.02        Measurement of frequency.
- 05.03        Voltage standing wave ratio.

**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.

<b>Subject Code 38606</b>	<b>Practical</b>			<b>No of Period in one session : 60</b>		
	<b>No. of Periods Per Week</b>			<b>Full Marks</b>	<b>:</b>	<b>50</b>
	<b>L</b>	<b>T</b>	<b>P/S</b>	<b>Annual Exam.</b>	<b>:</b>	<b>40</b>
	<b>-</b>	<b>-</b>	<b>8</b>	<b>Internal Exam.</b>	<b>:</b>	<b>10</b>

**Rationale :**

**Objective:**

**List of Practical:**

1. Verify the characteristics of Reflex Klystron
2. Verification of characteristics of Circulator
3. Indirect measurement of frequency using cavity resonator
4. Verification of Characteristics of Photodiode, LED, tunnel diode
5. Application of CRO, for different communication parameters.
6. Operational amplifier as subtractor, adder, integrator etc.
7. Verification of  $V - I$  characteristics of SCR.

## PROFESSIONAL STUDIES & ENTREPRENEURSHIP

<b>Subject Code</b> <b>00607</b>	<b>Sessional</b>			<b>No of Period in one session : 50</b>		
	<b>No. of Periods Per Week</b>			<b>Full Marks</b>		
	<b>L</b>	<b>T</b>	<b>P/S</b>	<b>Annual Exam.</b>	<b>:</b>	<b>30</b>
	<b>-</b>	<b>-</b>	<b>04</b>	<b>Internal Exam.</b>	<b>:</b>	<b>20</b>

### Rationale:

The paper has been introduced to achieve dual purpose for the students.

Firstly, this course provides the basics of Professional management and secondly it also prepares the student to undertake independent venture by becoming an entrepreneur.

This makes them conversant with their duties and responsibility to make them successful in their career building.

### Objectives:

With the input provided in this paper, the students will be able to :-

- Acquire basic knowledge of management.
- Understand the area of management such as human resources, marketing, finance and commercial aspect.
- Understand the benefit of becoming an entrepreneur.
- Handle a project efficiently and independently.

**To prepare a Project Report on any of the followings:**

<u>S.No.</u>	<u>Topics</u>
01	Project Identification and formulation Report.
02	Project Profile/Pre-feasibility Report.
03	Techno-economical Feasibility Report (TEFR).
04	Market Survey Report.

### CONTENTS

#### S.NO.                      TOPICS

#### **TOPIC – 01 : PROJECT IDENTIFICATION AND FORMULATION REPORT:**

- ◆ Introduction.
- ◆ Collection of Data.
- ◆ Compilation of Data.
- ◆ Analysis and Assimilation of Data.
- ◆ Product Selection.
- ◆ Report Finalisation and Report Writing.

#### **TOPIC - 02 : PROJECT PROFILE/PRE-FEASIBILITY REPORT :**

- ◆ Introduction of the product.
- ◆ Market.
- ◆ Man Power (Personnel Required).
- ◆ Manufacturing Process.

- ◆ Plant and Machinery.
- ◆ Cost of Project.
- ◆ Means of Finance.
- ◆ Cost of Production.
- ◆ Annual Turnover.
- ◆ Profit.
- ◆ Profit on Investment.

**TOPIC – 03: TECHNO-ECONOMICAL FEASIBILITY REPORT (TEFR).**

- ◆ Introduction on product.
- ◆ Market Prospects and Marketing.
- ◆ Location.
- ◆ Manufacturing Programme and Annual Turnover.
- ◆ Manufacturing Process.
- ◆ Cost of Project.
- ◆ Means of Finance.
- ◆ Requirement of Raw materials, Consumables, Utilities and Working Capital.
- ◆ Organisational Structure, Management and Man Power.
- ◆ Project Implementation Schedule.
- ◆ Profitability and Cash Flow.

**TOPIC - 04 : MARKET SURVEY REPORT:**

- ◆ Data Collection & Processing through Primary & Secondary Sources- Questionnaire method, e-mail, by post, by phone.
- ◆ Present Status.
- ◆ Growth of the Industry.
- ◆ Import and Export.
- ◆ Present market Demand.
- ◆ Forecast.
- ◆ Future Prospect/Scope.
- ◆ Market Segmentation.

**Books Recommended:**

1. Essential of Management, Tata McGraw Hill, - Herald Koonz & Cyril O' Donnel. Publishing Company Ltd., New Delhi.
2. Business Organisation and Management, S. C. Chand - M. C. Shukla and Company (Pvt.) Ltd., Ram Nagar, New Delhi
3. Managerial Economics, Sultan Chand & Sons, New - R. L. Vashney & K. L. Maheshwari Delhi
4. Project Appraisal and Follow up, Govind Prakashan, - D. P. Sharda Mumbai.

5. Modern Marketing Management, Progressive - Dr. Rustam S. Davar  
Corporation Pvt. Ltd., P51, Mahatma Gandhi Road,  
Bombay-400 001



6. A hand book for new entrepreneurs (with special reference to science and technology target group) - Entrepreneurship Development Institute of India, 83-A, Swastic Society Navrangpura, Ahmedabad, PIN-380 009.
7. Student discipline - Published by I.S.T.E. Mysore
8. Communication Skill - Published by I.S.T.E. Mysore
9. Decision Making - Published by I.S.T.E. Mysore
10. Pollution Control in Industry - Published by I.S.T.E. Mysore
11. S.S.M. in Environmental Engineering - Published by I.S.T.E. Mysore
12. Leadership in Organisation - Published by I.S.T.E. Mysore
13. Small Enterprise Management - Published by I.S.T.E. Mysore
14. Motivation - Published by I.S.T.E. Mysore
15. Fundamentals of Environmental Pollution - Krishnan and Kannan
16. Enviromental Engineering, T.T.T.I., Madras - Tata Mcgraw Hill
17. Motivation I.I.T. Kanpur - Published by I.S.T.E. Mysore
18. Mine Management - V.N. Singh, Bangle Prining Press Ranchi
19. Hand book on Project Appraisal and follow up, Govind Prakashan, 204, Saraswati Kunj, 90, S. V. Road, Goregoan, Bombay-400 062. - D. P. Sarda
20. Bihar Industrial Policy - Government of Bihar, Department of Industries.
21. Entrepreneurship Guide - Bihar State Financial Corporation, Fraser Road, Patna-800 001.
22. Management Economics, S. Chand & Sons, 4792/23, Dariaganj, New Delhi-110 002. - R. L. Varshney & G. L. Maheshwari
23. Management Principles & Practices, S. Chand & Sons, 4792/23, Dariaganj, New Delhi-110002. - L. Prasad & S. S. Gulshan

## DIGITAL COMMUNICATION LAB

<b>Subject Code</b> <b>38608</b>	<b>Sessional</b>			<b>No of Period in one session : 50</b>		
	<b>No. of Periods Per Week</b>			<b>Full Marks</b>	<b>:</b>	<b>50</b>
	<b>L</b>	<b>T</b>	<b>P/S</b>	<b>Annual Exam.</b>	<b>:</b>	<b>30</b>
	<b>-</b>	<b>-</b>	<b>-</b>	<b>Internal Exam.</b>	<b>:</b>	<b>20</b>

### CONTENTS

#### S.No.

#### Topics

- 01 Observe waveforms of Pulse Amplitude modulation (using natural sampling & flat top sampling).
- 02 Observe waveforms of Pulse width modulation (using natural sampling & flat top sampling)
- 03 Observe waveforms of Pulse Position modulation (using natural sampling.)
- 04 Observe waveforms of Pulse code modulation and demodulation.
- 05 Observe waveforms of ASK modulation & demodulation.
- 06 Observe waveforms of FSK modulation & demodulation.
- 07 Observe waveforms of PSK modulation & demodulation

# PROJECT WORK AND ITS PRESENTATION IN SEMINAR

<b>Subject Code 21609</b>	<b>Sessional</b>			<b>No of Period in one session : 50</b>		
	<b>No. of Periods Per Week</b>			<b>Full Marks</b>		<b>: 100</b>
	<b>L</b>	<b>T</b>	<b>P/S</b>	<b>Annual Exam.</b>		<b>: 60</b>
	-	-	-	<b>Internal Exam.</b>		<b>: 40</b>

**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**

<u>S.No.</u>	<u>Topics</u>
01	To make a bridge rectifier.
02	To make/assemble a voltage stabilizer.
03	To make/assemble stabilizer for refrigerator.
04	To make a timer circuit IC 555.
05	Electronic Regulator for Ceiling Fan.
06	To fabricate a circuit for characteristics for NPN/PNP transistors.
07	Bi-stable Multivibrator
08	Half & Full adder, subtractor & Comparator.
09	8:1 Multiplexer.
10	Realising Railway Signaling System.

**REPORT WRITING:**

A report must include

<u>S.No.</u>	<u>Topics</u>
01	Introduction.
02	Design.
03	Estimating of materials.
04	Calculation of cost of the materials.
05	Operation time estimation.
06	Cost of Operation.
07	Process of Manufacture / Assembly / fabrication.
08	List of tools/equipments used with specification.

**OR**

A project on live industrial problems that may be—

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

The Project Report should consist of :-

- |    |                                 |
|----|---------------------------------|
| 01 | Introduction.                   |
| 02 | Problem statement.              |
| 03 | Background of Industry.         |
| 04 | Organisational set –up.         |
| 05 | Plant Lay –out.                 |
| 06 | Reason for selecting a problem. |
| 07 | Analysis of Problem.            |
| 08 | Probable solution.              |
| 09 | Best solution possible.         |
| 10 | Any other.                      |

Project work/ project report should be presented in the form 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 given 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 within 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.