


<div> MAHARASHTRA STATE BOARD OF TECHNICAL EDUCATION, MUMBAI</div> <div>TEACHING AND EXAMINATION SCHEME FOR POST S.S.C. DIPLOMA COURSES</div>																
COURSE NAME : ELECTRONICS AND VIDEO ENGINEERING																
COURSE CODE : EV																
DURATION OF COURSE : 6 SEMESTERS										WITH EFFECT FROM 2012-13						
SEMESTER : SIXTH										DURATION : 16 WEEKS						
PATTERN : FULL TIME-SEMESTER										SCHEME : G						
SR. NO	SUBJECT TITLE	Abbreviation	SUB CODE	TEACHING SCHEME			EXAMINATION SCHEME									SW (17600)
				TH	TU	PR	PAPER HRS.	TH (1)		PR (4)		OR (8)		TW (9)		
1	Management \$	MAN	17601	03	--	--	1&½	50#*	20	--	--	--	--	--	--	50
2	Video Engineering	VEN	17668	03	--	02	03	100	40	--	--	--	--	25@	10	
3	Optical Fiber & Mobile Communication	OFM	17669	04	--	02	03	100	40	25#	10	--	--	25@	10	
4	Embedded Systems β	ESY	17658	03	--	02	03	100	40	50#	20	--	--	25@	10	
5	Elective (Any One)															
	Very Large Scale Integration	VLS	17659	03	--	02	03	100	40	--	--	--	--	25@	10	
	Microwave Communication System	MCS	17670	03	--	02	03	100	40	--	--	--	--	25@	10	
6	Simulation Software β	SSO	17807	--	--	02	--	--	--	--	--	--	--	25@	10	
7	Industrial Project β	IPR	17808	--	--	04	--	--	--	--	--	50 #	20	50@	20	
Total				16	--	14	--	450	--	75	--	50	--	175	--	50
Student Contact Hours Per Week: 30 Hrs.																
THEORY AND PRACTICAL PERIODS OF 60 MINUTES EACH.																
Total Marks : 800																
@- Internal Assessment, # - External Assessment, <div></div> No Theory Examination, \$ - Common to all branches, #* - Online Theory Examination,																
β - Common to ET / EJ / EN / EX / IE / IS / IC / DE / IU / ED / EI / MU																
Abbreviations: TH-Theory, TU- Tutorial, PR-Practical, OR-Oral, TW- Term Work, SW- Sessional Work.																
➤ Conduct two class tests each of 25 marks for each theory subject. Sum of the total test marks of all subjects is to be converted out of 50 marks as sessional work (SW).																
➤ Progressive evaluation is to be done by subject teacher as per the prevailing curriculum implementation and assessment norms.																
➤ Code number for TH, PR, OR and TW are to be given as suffix 1, 4, 8, 9 respectively to the subject code.																

Course Name : All Branches of Diploma in Engineering / Technology

Course Code : EJ/EN/ET/EX/EV/IC/IE/IS/MU/DE/ME/PG/PT/AE/CE/CS/CR/CO/CM/IF/EE/EP/CH/CT/PS/CD/ED/EI/CV/FE/IU/MH/MI/TX/TC/FG

Semester : Sixth for EJ/EN/ET/EX/EV/IC/IE/IS/MU/DE/ME/PG/PT/AE/CE/CS/CR/CO/CM/IF/EE/EP/CH/CT/PS/TX/TC/FG and Seventh for MH/MI/CD/ED/EI/CV/FE/IU

Subject Title : Management

Subject Code : 17601

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
03	--	--	1&½	50#*	--	--	--	50

NOTE:

- Two tests each of 25 marks to be conducted as per the schedule given by MSBTE.
- Total of tests marks for all theory subjects are to be converted out of 50 and to be entered in mark sheet under the head Sessional Work (SW).

Rationale:

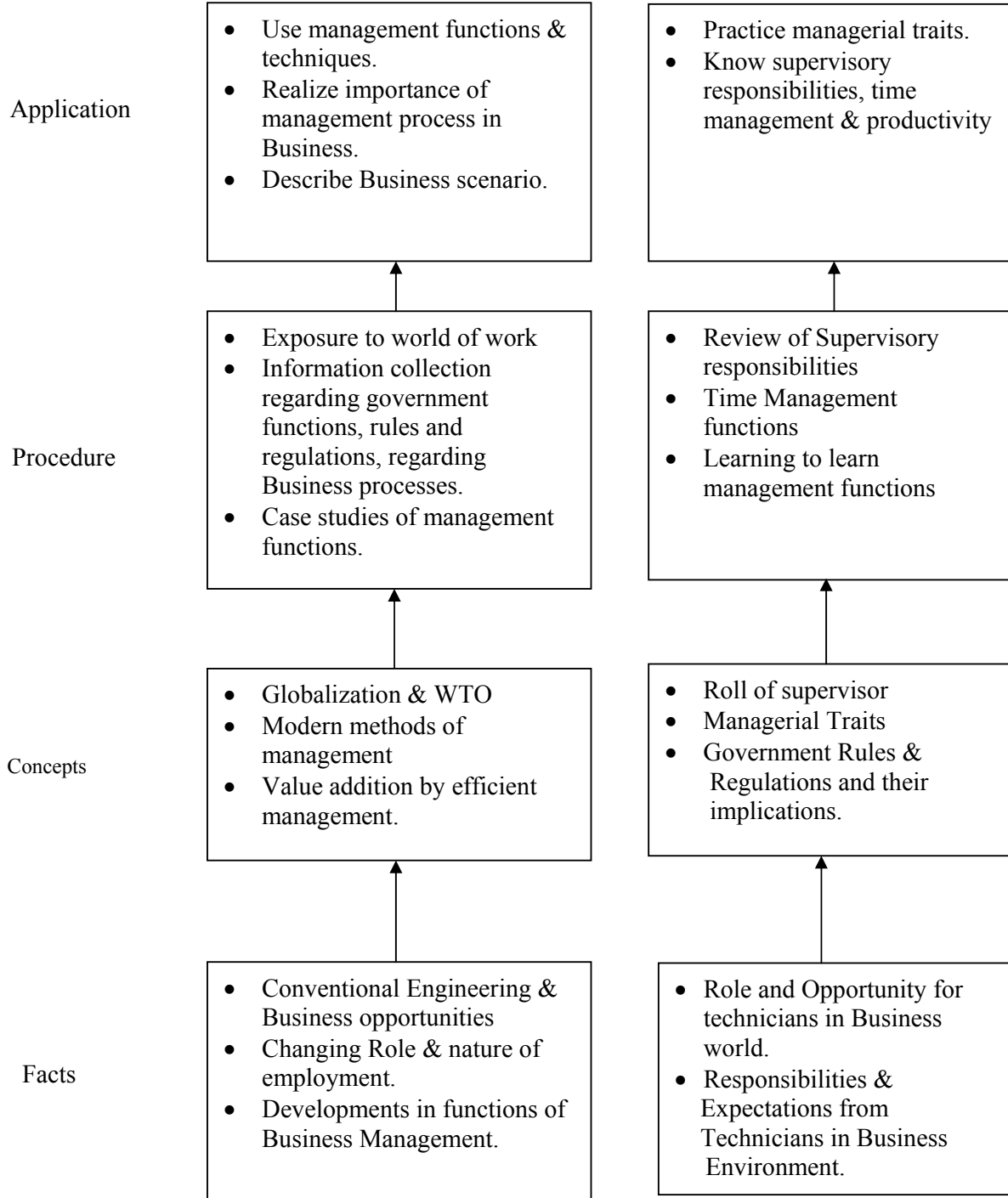
Management concepts are universal and it is a multidisciplinary subject. They are equally applicable to different types industries like Manufacturing, Service and Trade as well as different kind of business activities like industry, army, school, hospital, retail shops etc. Also, at the end of diploma course polytechnic students are expected to enter in to the Industrial Environment. This environment is altogether different and new to the students. A proper introduction and understanding of management fundamentals is therefore essential for all these students.

Contents of the this subject will enable the students to address various issues related to human resource, finance, materials, legislations etc. by use of basic principles of management. This will ensure that students will play their role effectively to enhance the quality of business output in total.

Objective:

The students will able to:

1. Get familiarized with environment related to business processes.
2. Know the management aspects of the organisations.
3. Understand Role & Responsibilities of a Diploma engineer.
4. Understand importance of quality improvement techniques.
5. Appreciate need and importance of safety in industries.
6. Understand process of Industrial finance and its management.
7. Know the latest trends in industrial management.

Learning Structure:

Contents: Theory

Topic and Contents	Hours	Marks
Topic 1: Overview of Business Specific Objectives <ul style="list-style-type: none"> ➤ State various business types and sectors ➤ Describe importance of globalisation 1.1. Types of Business <ul style="list-style-type: none"> • Service • Manufacturing • Trade 1.2. Industrial sectors Introduction to <ul style="list-style-type: none"> • Engineering industry • Process industry • Textile industry • Chemical industry • Agro industry • IT industry • Banking, Insurance, Retail, Hospitality, Health Care 1.3 Globalization <ul style="list-style-type: none"> • Introduction • Advantages & disadvantages with respect to India 	02	04
Topic 2: Management Process Specific Objectives <ul style="list-style-type: none"> ➤ State various management principles ➤ Describe different management functions 2.1 What is Management? <ul style="list-style-type: none"> • Evolution • Various definitions of management • 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 <ul style="list-style-type: none"> • Planning • Organizing • Directing • Controlling • Decision Making 	08	08
Topic 3: Organisational Management Specific Objectives <ul style="list-style-type: none"> ➤ Compare different forms of organisation, ownership for a specific business ➤ Describe types of departmentation 3.1 Organization : <ul style="list-style-type: none"> • Definition 	08	08

<ul style="list-style-type: none"> • Steps in organization 3.2 Types of organization <ul style="list-style-type: none"> • Line • Line & staff • Functional • Project 3.3 Departmentation <ul style="list-style-type: none"> • By product • By process • By function 3.4 Principles of Organisation <ul style="list-style-type: none"> • Authority & Responsibility • Span of Control • Effective Delegation • Balance ,stability and flexibility • Communication 3.5 Forms of ownership <ul style="list-style-type: none"> • Proprietorship • Partnership • Joint stock • Co-operative Society • Govt. Sector 		
Topic 4: Industrial Safety and Legislative Acts Specific Objectives <ul style="list-style-type: none"> ➤ Describe types of accidents & safety measures ➤ State provisions of industrial acts. 4.1 Safety Management <ul style="list-style-type: none"> • Causes of accidents • Types of Industrial Accidents • Preventive measures • Safety procedures 4.2 Industrial Legislation - Necessity of Acts Important Definitions & Main Provisions of following acts: <ul style="list-style-type: none"> • Indian Factory Act • Workman Compensation Act • Minimum Wages Act 	08	06
Topic 5: Financial Management (No Numerical) Specific Objectives <ul style="list-style-type: none"> ➤ Explain functions of financial management ➤ State the sources of finance & types of budgets. ➤ Describe concepts of direct & indirect taxes. 5.1 Financial Management- Objectives & Functions 5.2 Capital Generation & Management <ul style="list-style-type: none"> • Types of Capitals - Fixed & Working • Sources of raising Capital - Features of Short term, Medium Term & Long Term Sources 5.3 Budgets and accounts	08	08

<ul style="list-style-type: none"> • Types of Budgets • Fixed & Variable Budget - Concept • Production Budget - Sample format • Labour Budget - Sample format • Profit & Loss Account & Balance Sheet - Meaning, sample format, meaning of different terms involved. <p>5.4 Meaning & Examples of -</p> <ul style="list-style-type: none"> • Excise Tax • Service Tax • Income Tax • Value Added Tax • Custom Duty 		
<p>Topic 6: Materials Management (No Numerical)</p> <p>Specific Objectives</p> <ul style="list-style-type: none"> ➤ Describe concept of inventory, ABC analysis & EOQ. ➤ Describe purchase functions & procedures ➤ State features of ERP & MRP <p>6.1 Inventory Concept, its classification, functions of inventory</p> <p>6.2 ABC Analysis - Necessity & Steps</p> <p>6.3 Economic Order Quantity Concept, graphical representation, determination of EOQ</p> <p>6.4 Standard steps in Purchasing</p> <p>6.5 Modern Techniques of Material Management</p> <ul style="list-style-type: none"> • Material Resource Planning (MRP) - Functions of MRP, Input to MRP, Benefits of MRP • Enterprise Resource Planning (ERP) - Concept, list of modules, advantages & disadvantages of ERP 	08	08
<p>Topic 7: Quality Management</p> <p>Specific Objectives</p> <ul style="list-style-type: none"> ➤ State Principles of Quality Management ➤ Describe Modern Technique & Systems of Quality Management <p>7.1 Meaning of Quality</p> <p>Quality Management System - Activities, Benefits</p> <p>Quality Control - Objectives, Functions, Advantages</p> <p>Quality Circle - Concept, Characteristics & Objectives</p> <p>Quality Assurance - Concept, Quality Assurance System</p> <p>7.2 Meaning of Total Quality and TQM</p> <p>Components of TQM - Concept, Elements of TQM, Benefits</p> <p>7.3 Modern Technique & Systems of Quality Management like Kaizen, 5'S, 6 Sigma</p> <p>7.4 ISO 9001:2000 - Benefits, Main clauses.</p>	06	08
Total	48	50

Learning Resources:**Books:**

Sr. No	Author	Name of Book	Publisher
01	Dr. O.P. Khanna	Industrial Engineering & Management	Dhanpat Rai & Sons New Delhi
02	Banga & Sharma	Industrial Engineering & Management	Khanna Publication
03	Dr. S.C. Saksena	Business Administration & Management	Sahitya Bhavan Agra
04	W.H. Newman E. Kirby Warren Andrew R. McGill	The process of Management	Prentice- Hall

E Source:

- nptel.iitm.ac.in
- <http://iete-elan.ac.in/subjects/amIndustrialMgmt.htm>

Course Name : Diploma in Electronics and Video Engineering**Course Code : EV****Semester : Sixth****Subject Title : Video Engineering****Subject Code : 17668****Teaching and Examination Scheme:**

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
03	--	02	03	100	--	--	25@	125

NOTE:

- Two tests each of 25 marks to be conducted as per the schedule given by MSBTE.
- Total of tests marks for all theory subjects are to be converted out of 50 and to be entered in mark sheet under the head Sessional Work (SW).

Rationale:

Today the rapid growth in field of entertainment and security video systems has major role in our daily life. Video engineering is intended to develop competencies to work with video equipments.

The topics on VCD/DVD/MP3/MP4/Blu ray player will help to understand the operation and mechanism of these systems.

The topics on High end TV system will be useful for operation of high definition Television for good quality picture.

The topics on Advance video equipments will be useful to understand the function of equipments in production studio and editing room.

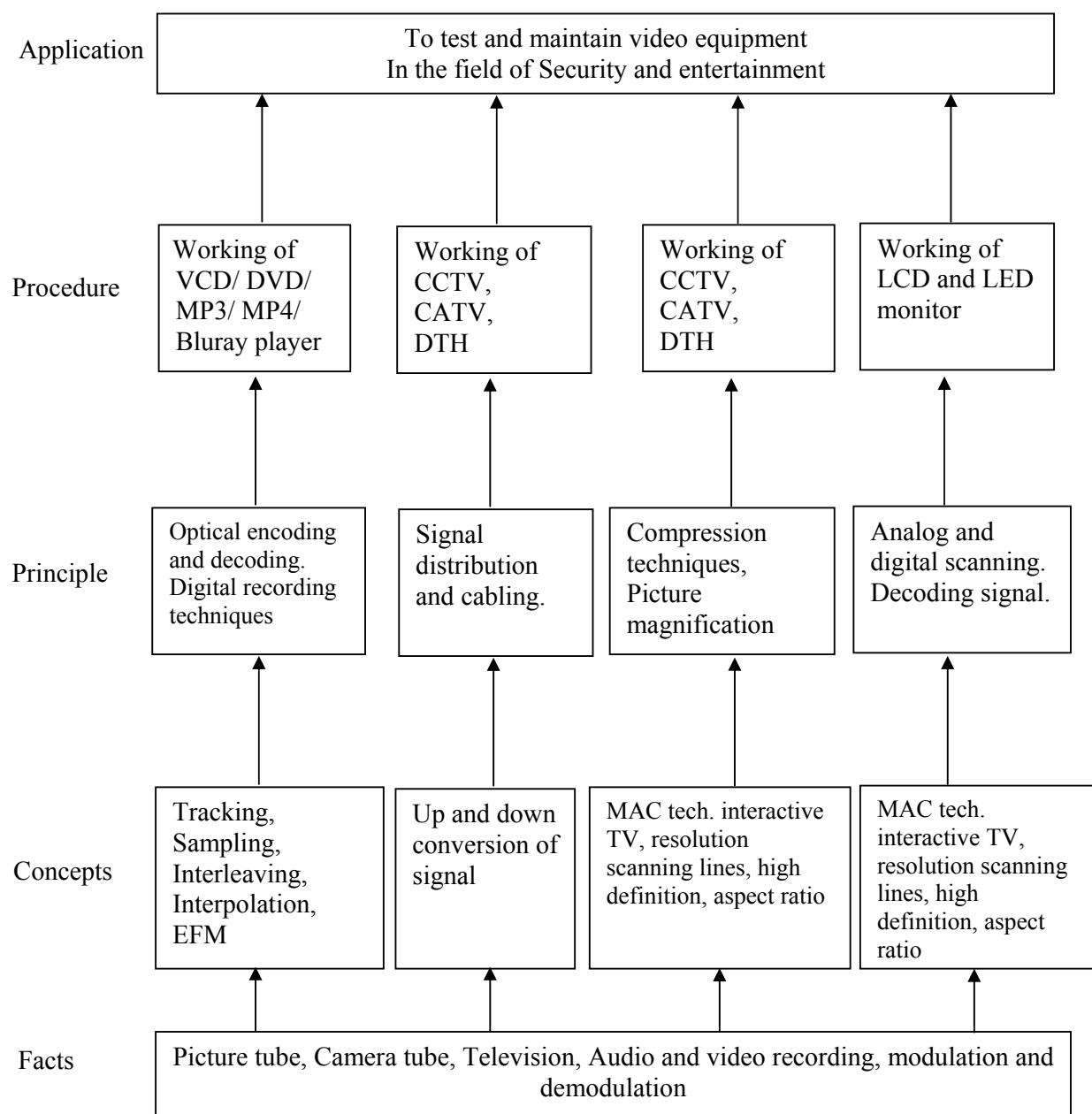
To understand this subject student must know fundamental of analog and digital communication and Television.

This subject will develop competencies to work in the field of security and entertainment. This subject develops testing and troubleshooting skill for CD player for employment.

General Objectives:

Students will able to:

1. Understand concept and working principle of modern video equipment.
2. Understand to install, test, and maintain video equipment.
3. Analyze symptoms and troubleshoot video equipment and rectify the fault.

Learning Structure:

Theory:

TOPIC and CONTENTS	Hours	Marks
Topic 1] VCD/DVD/MP3/MP4/Bluray player Specific Objectives: <ul style="list-style-type: none"> ➤ Draw block diagram of encoding process and write the function of each block. ➤ Describe operation of VCD/DVD/MP3/MP4 player/Bluray player. ➤ Differentiate DVD and BLU ray disc. 1.1 CD/DVD/MP3/MP4 Player [12] <ul style="list-style-type: none"> • Introduction to Compact disc, construction of CD • Block diagram of CD encoding and function of each block • Block diagram of VCD/DVD/MP3/MP4 player and function of each block • Three beam optical pickup assembly in CD player and its working • Servo system • Purpose ,Block diagram of basic servo system ,Tracking servo system ,Carriage servo system and function of each block • Need for spindle motor servo system. • Motor in VCD/DVD/MP3/MP4 player • Different motor used in VCD/DVD/MP3/MP4 player and their function only. 1.2 [12] <ul style="list-style-type: none"> • DVD player, DVD advantages, Enhancing Data storing capacity • Blue ray disc, Construction, Block diagram of blu ray disc (BD) player and function of each block. Comparison of DVD and BD 	12	24
Topic 2] TV systems Specific objectives <ul style="list-style-type: none"> ➤ Describe the operation of CCTV,CATV,DTH ➤ Apply to install CCTV and DTH Contents: <ul style="list-style-type: none"> • Closed ckt. Television (CCTV): Block diagram of CCTV and its working, Application of CCTV • Cable television (CATV): Block diagram of plan for CATV system, Head end, signal processing and distribution and function of each block, Conditional access built in scrambling system, Block diagram of two way cable systems and function of each block , Applications of CATV • Direct to home TV (DTH): Block diagram of Transponder for DTH and its working, Block diagram of DTH receiver and function of each block. 	09	20

<p>Topic 3] High end TV system</p> <p>Specific objectives:</p> <ul style="list-style-type: none"> ➤ List the standards adopted by HDTV ➤ Explain the signal processing in HDTV ➤ State concept of interactive TV ➤ State concept of projection TV. <p>3.1 HDTV system [12]</p> <ul style="list-style-type: none"> • Aspect ratio, resolution, Number of scanning lines, active lines, bandwidth, compatibility • Digital video signal VS analog signal, digital sound • Bandwidth reduction, muse system, MAC signal • Block diagram of MAC encoder and function of each block • Block diagram of HDTV and function of each block. <p>3.2 Interactive TV and projection TV systems [08]</p> <ul style="list-style-type: none"> • Principle of interactive TV • Principle and working of projection TV to get large screen • Block diagram of projection TV and function of each block • Application of projection TV 	09	20
<p>Topic 4] Video Display Unit</p> <p>Specific objectives:</p> <ul style="list-style-type: none"> ➤ Describe the working of CRT monitor. ➤ Describe the working of LCD and LED monitor. ➤ State the concept of display basics in plasma TV ➤ Describe the operation of Jumbo TV screen. <p>4.1 CRT Monitor [08]</p> <ul style="list-style-type: none"> • Classification of monitor • Specification of monitor • Block diagram of colour SVGA and function of each block • Multi sync monitor- low radiation screen • Block diagram of LCD monitor and function of each block • Block diagram of LED monitor and its working and function of each block. <p>4.2 Plasma TV [08]</p> <ul style="list-style-type: none"> • Display basics • What is plasma • Inside display gas, electrodes and phosphor • Advantages of plasma • Jumbo TV screen • Jumbo screen size, brightness • LED module • Computer system, power control system and wires 	09	16

Topic 5] Advanced Video Equipments		
Specific objectives:		
<ul style="list-style-type: none"> ➤ List equipments used in production studio and their function ➤ Describe the working of camcorder. ➤ State the concept of video phone. ➤ State the concept of video compression techniques. 		
5.1	[12]	
<ul style="list-style-type: none"> • List of different equipments used in production studio and their function • video editing techniques, editing equipments • Block diagram and working of camcorder and function of each block. • Analog format std VHS, VHS-C, super VHS, 8 mm Hi 8 • Digital format mini DV digital 8, DVD 		09
5.2	[08]	20
<ul style="list-style-type: none"> • Principle of Video phone • Video compression techniques MPEG 1/2/4 JPEG 2000 • Commonly used file formats TIFE, BMP, GIF, PNG, JPEG 		
Total		48
		100

PRACTICAL:**Intellectual Skills:**

- Read and interpret the waveform.
- Interpret the results from observations.

Motor Skills:

- Handle instruments properly.
- Measure different parameter accurately
- Adopt proper procedure while performing the experiment.
- Do proper logical analysis for fault finding.

List of Experiments:

- 1) To locate various stages, draw layout of VCD/DVD/MP3/MP4 player and record function of various IC's
- 2) A) To observe the symptom, do logical analysis and rectify the fault in front panel switches.
B) To observe the symptom, do logical analysis and rectify the fault in eject driving circuit/mechanism.
- 3) A) To observe the symptom, do logical analysis and rectify the fault in spindle motor driving circuit/mechanism.
B) To observe the symptom, do logical analysis and rectify the fault in optical pickup unit and driving circuit.
- 4) To observe the symptom, do logical analysis and rectify the fault in power supply.
(Minimum two fault).

- 5) Select different components of CCTV system, Install and operate.
- 6) To identify various stages and draw layout of monitor.
- 7) To observe the symptom, do logical analysis and rectify the fault in monitor.
- 8) Capturing of video images and recording of sound using different sources, file format and software.
- 9) Video editing and sound dubbing/adding/mixing e.g.: adding titles, transition, sound clips, grabbing picture, splitting images etc.
- 10) To Write visit report on TV Studio.

Learning Resources:

Books:

Sr. No.	Title	Author	Publisher
01	Modern Television Practice (4 rd edition)	R.R. Gulati	New age International
02	Monochrome and Colour Television	V. Rajendran	Wiley Eastern Ltd.
03	Television Engineering And Video Systems (2 nd edition)	R.G. Gupta	Tata McGraw Hill education PVT. Ltd.
04	Complete Guide to Laser Video Disc Player.	John D. Lenk	Prentice Hall of India
05	Modern all about monitors	Lotia Nair	BPB Publication
06	Modern MP3/VCD Servicing Manual	Manahar Lotia	BPB Publication

Websites

1. http://en.wikipedia.org/wiki/Compact_Disc_player
2. http://en.wikipedia.org/wiki/High-definition_television
3. http://en.wikipedia.org/wiki/Plasma_display
4. <http://www.howstuffworks.com/jumbo-tv.htm>
5. <http://en.wikipedia.org/wiki/Backlight>

Course Name : Diploma in Electronics and Video Engineering

Course Code : EV

Semester : Sixth

Subject Title : Optical Fiber and Mobile Communication

Subject Code : 17669

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
04	--	02	03	100	25#	--	25@	150

NOTE:

- Two tests each of 25 marks to be conducted as per the schedule given by MSBTE.
- Total of tests marks for all theory subjects are to be converted out of 50 and to be entered in mark sheet under the head Sessional Work (SW).

Rationale:

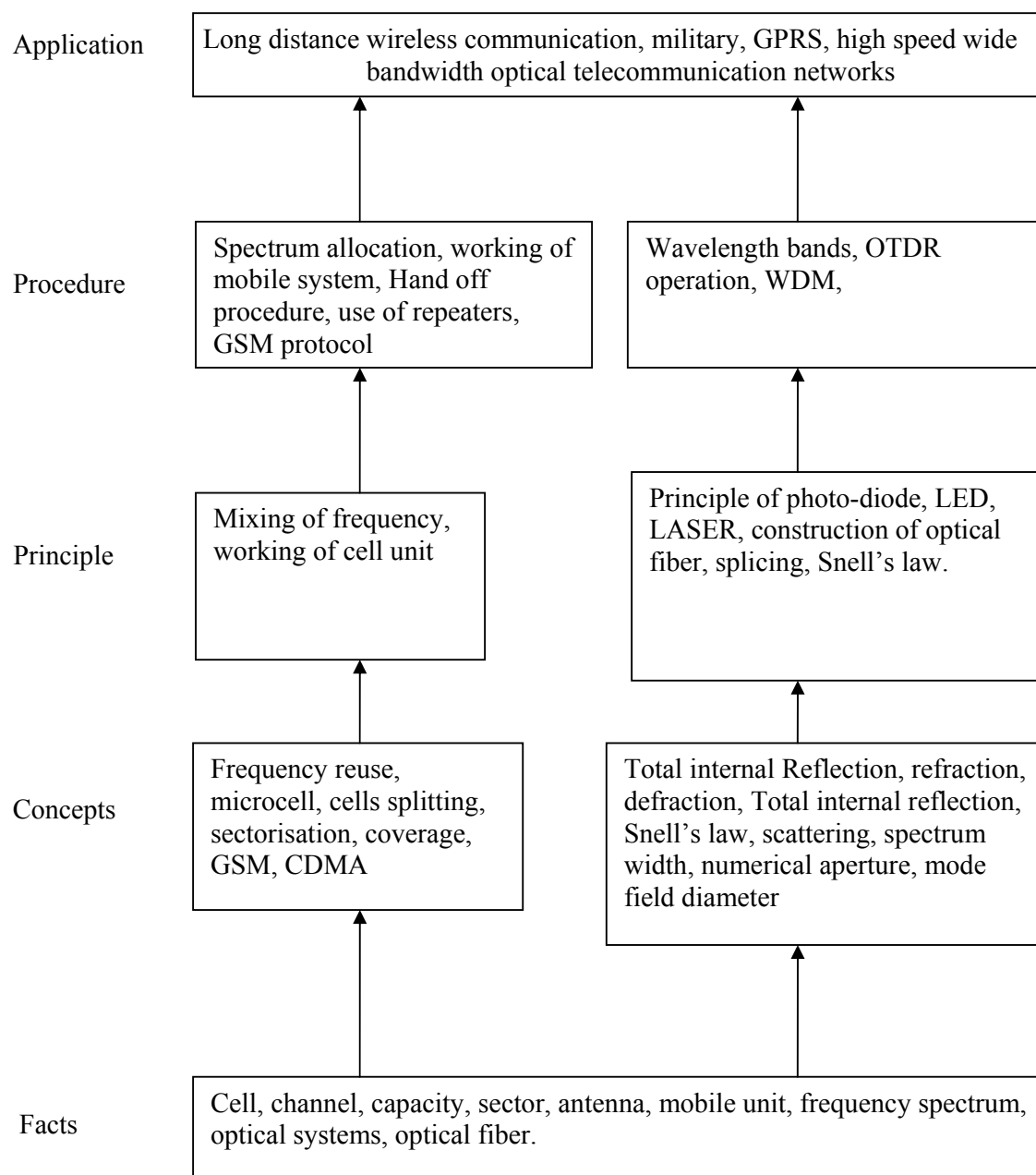
Nowadays use of High frequency has become necessary. In this context latest development of high speed telecom networks and optical communication as a solution to the limited availability of the bandwidth makes it important to know optical and mobile technologies together. Hence, it is essential for electronics engineer to possess the knowledge and knowhow of the related technology and ability to operate and maintain the concerned equipments.

The subject is useful to study the principles and operation of mobile and fiber optic communication systems.

General Objectives:

Students will be able to

1. Understand the components of optical communication systems.
2. Know the importance of bandwidth and usage.
3. Analyze the optical link and parameters.
4. Know working of mobile phone and requirements.
5. Analyze the situations of network failure and handoff procedure.

Learning Structure:

Theory:

Topic and Contents	Hours	Marks
Topics 1: Theory of optics & fundamentals of optical fiber Specific Objectives: <ul style="list-style-type: none"> ➤ Draw construction sketch of fiber optic cable ➤ Classify optical fibers Contents: <ul style="list-style-type: none"> • Optical spectrum: Band and their ranges. • Definition & concept of reflection, refraction dispersion, diffraction, absorption & scattering with help of light theory • Critical angle, total internal reflection, Snell's law, numerical aperture, acceptance angle, acceptance cone, angle. • Block diagram of Fiber Optic communication system • Advantages & disadvantages of Fiber Optic communication 	04	10
Topics 2: Optical communication system Specific Objectives: <ul style="list-style-type: none"> ➤ Explain construction & working of LED, Laser and avalanche photo diode. ➤ Explain splicing techniques ➤ Know causes of losses in fiber optic system and minimize them. Contents: <p>2.1 Types of optical fiber and losses in optical fiber [08]</p> <ul style="list-style-type: none"> • Optical fiber types & characteristics. • Losses and optical fiber. <ol style="list-style-type: none"> a. Absorption loss. b. Scattering loss. c. Dispersion loss. d. Radiation loss. e. Coupling loss. <p>2.2 Optical sources and detectors [06]</p> <ul style="list-style-type: none"> • Optical sources: Sources requirements, Physical properties of detectors, Edge emitter and Surface emitter LED, Laser construction & working principle. • Photo Detector: detector requirements, physical properties of detector, Review of PIN photo diode, avalanche photo diode- construction & working principle. <p>2.3 Splices and connectors [06]</p> <ul style="list-style-type: none"> • Splicing techniques-Fusion splice and V-groove splice • Fiber connector-properties of connector • Ferrule connector <p>2.4 Attenuation measurements [04]</p> <p>OTDR block schematic, principle, operation and working, OTDR trace, eye patterns.</p>	16	24
Topic 3: Introduction to wireless communication system Specific Objectives: <ul style="list-style-type: none"> ➤ State a need and application of mobile communication. ➤ State technological evolution in radio communication ➤ State basic features of AMPS, N AMPS, IS 95, GSM standards along with Global geographical utility. ➤ Explain working of Paging system, cordless telephone system, cellular telephone system and call processing. 	12	14

<p>➤ Explain operation of mobile unit.</p> <p>Contents:</p> <p>3.1 Different wireless communication system [06]</p> <ul style="list-style-type: none"> • Evolution of mobile radio communications (2G,2.5G and 3G wireless system) • Mobile radio system around the world (AMPS, IS 95,GSM, N - AMPS) • Examples of wireless communication systems <ul style="list-style-type: none"> i. Paging System. ii. Cordless telephone system. iii. Cellular telephone system. Call processing in cellular telephone system. <p>3.2 Mobile Unit [08]</p> <ul style="list-style-type: none"> • Block diagram and operation of mobile Unit. • Block Diagram and operation of frequency synthesizer, Transmitter, Receiver, Logic Unit and Control unit. Essential features of hand set. • Definition of mobile base station, Mobile control station. 		
<p>TOPIC 4 : The cellular concept</p> <p>Specific objective.</p> <p>➤ Explain cell structure and its importance.</p> <p>➤ State need and process of Frequency reuse, Handoff and its types.</p> <p>➤ State types of interference and how channel capacity can be increased.</p> <p>➤ State how to improve coverage and capacity in cellular system.</p> <p>Contents:</p> <p>4.1 Introduction to cellular system. [08]</p> <ul style="list-style-type: none"> • Frequency reuse concept. • Multiple Access Technologies for Cellular systems. • Cellular system operation and planning principles. <ul style="list-style-type: none"> ○ System Architecture ○ Location updating and call setup. ○ Hand off strategies and power control. <p>4.2 Interference and system capacity. [04]</p> <ul style="list-style-type: none"> • Co channel interference & system capacity. • Channel planning for wireless system. • Adjacent channel Interference. <p>4.3 Improving coverage and capacity in cellular system. [04]</p> <ul style="list-style-type: none"> • Cell splitting. • Sectoring. • Repeater • Micro cell zone concept. 	10	16
<p>Topics 5: Digital cellular mobile systems.</p> <p>Specific Objective:</p> <p>➤ Explain GSM system architecture and State Features and services and channel types. of GSM</p> <p>➤ Explain CDMA System architecture, radio aspects and state key features.</p> <p>Contents:</p> <p>5.1 G.S.M : Concept of GS M The European TDMA Digital Cellular standard. [10]</p> <ul style="list-style-type: none"> • GSM Standardization and service aspects 	12	18

<ul style="list-style-type: none"> • GSM Reference Architecture. • GSM Radio Aspects. • Security Aspects. • GSM Protocol Model • Typical flow sequence in GSM 		
5.2 IS 95: Concept of IS 95 The North American CDMA Digital Cellular standard. [08] <ul style="list-style-type: none"> • Introduction • Service Aspects • Network reference Model and Security aspects. • Radio aspects • Key features of IS 95 CDMA systems 		
Topics 6: Modern Wireless Communication system Specific Objective: <ul style="list-style-type: none"> ➤ List out features of 2.5 G GSM Standards HSCSD, GPRS and IS-136, EDGE ➤ State features of IMT 2000 Radio spectrum, vision and Evolution. Contents: 6.1 Evolution for 2.5 G TDMA standards [04] <ul style="list-style-type: none"> • HSCSD for 2.5 G GSM • GPRS for 2.5 G GSM and IS-136 • EDGE for 2.5vg GSM and IS-136 6.2 IMT 2000 [06] <ul style="list-style-type: none"> • IMT 2000 Vision and Evolution Aspects. • Radio Spectrum for IMT -2000 • Architecture of IMT 2000 • Security aspect [08] 6.3 Third generation wireless Networks: <ul style="list-style-type: none"> • 3GW-CDMA Universal Mobile Telecommunication system (UMTS) • 3G CDMA 2000 • 3G-TD –SCDMA(Synchronous) • Wireless Local Loop and LMDS (Local multipoint Distribution system) 	10	18
Total	64	100

Practical:**Skills to be developed:****Intellectual Skills:**

1. Draw and interpret characteristics.
2. Identify and select devices.
3. Calculate different parameters.

Motor Skills:

1. Classify different parameters related to mobile.
2. Verify characteristics of fiber optic sources and detectors.
3. To operate different controls in mobile.

List of Practical:

Sr. No.	Title of the Experiment
1	Establish PC to PC communication using FOC and measure the numerical apertures (NA) for the same cable. Using trigonometric method (Visual method)
2	Measure the band loss and attenuation for a given FOC
3	To plot V-I characteristics and light output power against forward current characteristics for optical source Led.
4	To plot the V-I characteristics of optical detector photo diode (Detector) at different luminance
5	Identify different sections of mobile trainer Kit. Observe wave forms and measure voltages at the output of different sections.
6	To measure voltage and draw wave forms at different test points of SIM cards.
7	Perform charging of handset and measure voltages at different test points in charging section
8	Identify different add-on accessories for mobile unit (Handsfree datacable,/ Bluetooth)
9	Perform experiment based on AT commands.
10	Visit to a telecom company and prepare visit report.

Learning Resources:**Books:**

Sr. No.	Author	Title	Publisher
1	Keiser	Optical Fiber Communication	TMH International
2	A. Selvarajan	Optical Fiber Communication	TMH
3	Frenzel	Communication Electronics 3 rd Edition	TMH
4	T.S. Rappaport	Wireless Communication Principles & Practice	Pearson Education
5	William Lee	Mobile Cellular Tele communication	Tata McGraw Hill

Course Name : Electronics Engineering Group
Course Code : ET/EN/EJ/IE/IS/IC/DE/EV/MU/IU/ED/EI
Semester : Sixth for ET/EN/EX/EJ/IE/IS/IC/DE/EV/MU and Seventh for IU/ED/EI
Subject Title : Embedded System
Subject Code : 17658

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
03	--	02	03	100	50#	--	25@	175

NOTE:

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- Total of tests marks for all theory subjects are to be converted out of 50 and to be entered in mark sheet under the head Sessional Work (SW).

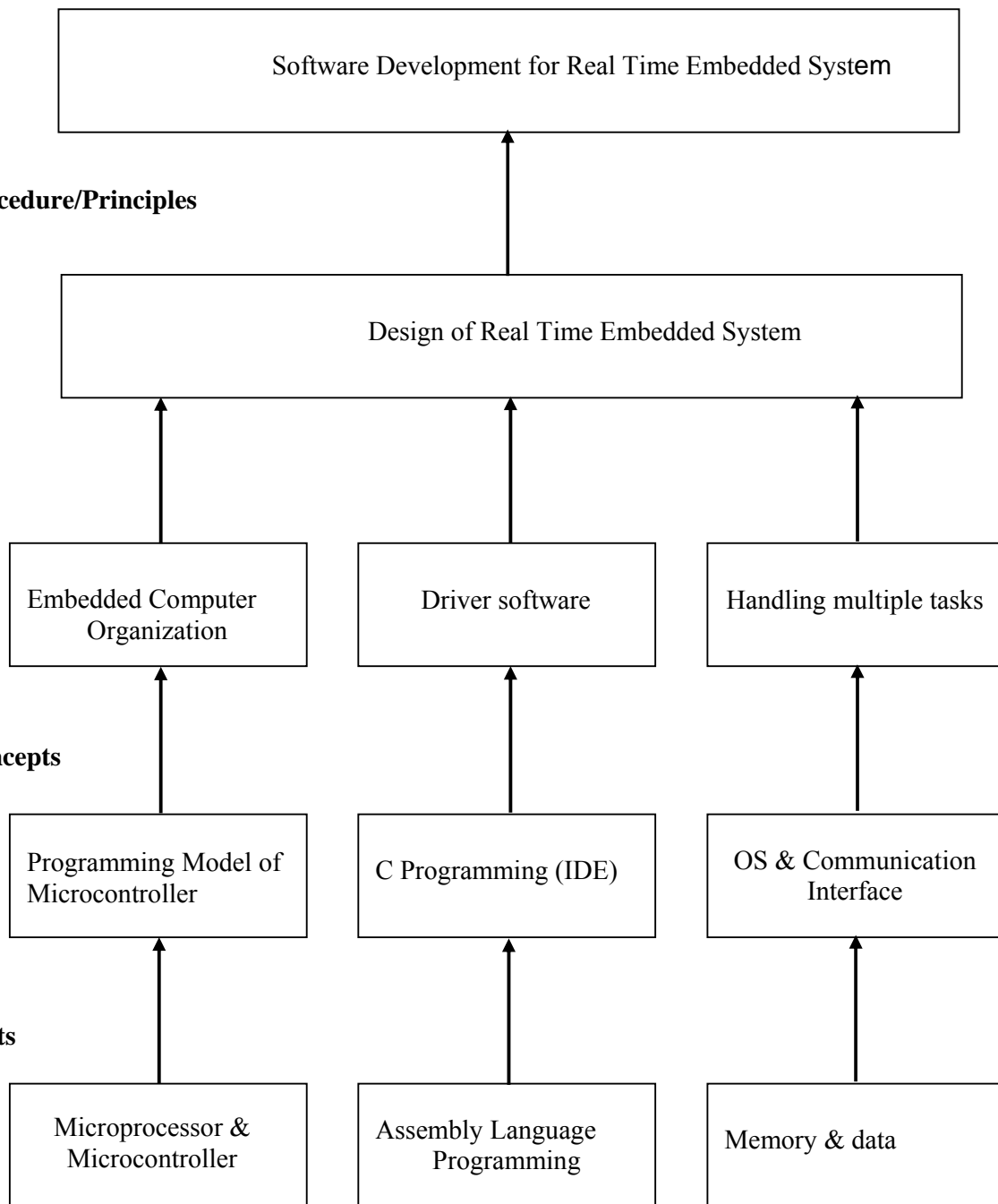
Rationale:

In the age of computer we are surrounded by the Embedded System – at home, office, colleges, canteen, toys, cell phones, transit, aerospace technology, military application. Out of millions of processor manufactured every year, nearly 95% processors are used in Embedded System. The Embedded Systems design is with or without OS. Most of them are Real Time Embedded Systems.

Due to such tremendous growth of Embedded Systems in recent years, one needs to be familiar with its design aspects, characteristics. Also the knowledge and programming of Real Time Embedded System is must. This subject is the advanced part of the subject Microcontroller.

General Objectives:

1. Differentiate and decide the architectures of processors for application.
2. Define communication media.
3. Design and development of small Embedded Systems.
4. Development of software.
5. Understand architecture of RTOS.

Learning Structure:**Application****Procedure/Principles****Concepts****Facts**

Theory:

Topic and Contents	Hours	Marks
Topic 1: Architecture of Microprocessor and Microcontroller Specific Objectives: <ul style="list-style-type: none"> ➤ Study of Architecture of microcontroller 89C51. ➤ Distinguish Microprocessor and Microcontroller architectures. Contents: <p>1.1 Architecture of Microcontroller 89C51 GPR, SFR</p> <ul style="list-style-type: none"> • Address, Data & Control bus generation. • Memory structure (Data and Program memory) • IO Ports, Interrupts, • Timer/Counter, Serial Communication <p>1.2 Block diagram and description of architectures of Processors:</p> <ul style="list-style-type: none"> • Von Neumann • Harvard • RISC • CISC • DSP • Multi Core Processor 	08	08
Topic 2: Programming Microcontroller 89C51 with 'C' <ul style="list-style-type: none"> ➤ Use Integrated Development Tools ➤ Develop Program logic with 'C'. Contents: <p>2.1 Software Development Tools: Operation and selection (08 Marks)</p> <ul style="list-style-type: none"> • Integrated Development Environment (IDE): Cross-Compiler, Emulator and Flash/OTP Programmer. • In-Circuit Emulator (ICE), debugger, JTAG port • Embedded C: Assembly Language V/S Embedded C. • Programming Microcontroller 89C51 with C. • 'C' Compiler for Microcontroller 89C51: SPJ Systems, Keil • Program downloading tools: ISP/IAP <p>2.2 Programming with 'C': (16 Marks)</p> <ul style="list-style-type: none"> • Input/output operation. • Bit/Byte operations. • Arithmetic and Logical operations on data. • Time delay routines. • Timer/Counter operations. • Generation of patterns on port lines. • Serial Communication. • Use of Assembly Instruction in 'C' program. 	12	24
Topic 3: Communication Protocols <ul style="list-style-type: none"> ➤ Use of communication modes and protocols. Contents: <ul style="list-style-type: none"> • Need of communication interface in embedded system. • Serial V/S Parallel Communication, Synchronous V/S Asynchronous Communication • RS232: DB9-pin functions, MAX 232, MAX 233, Microcontroller 8051 connection with RS232 and RS485 • Communication protocols 	06	16

<ul style="list-style-type: none"> Serial Communication Protocol: I2C, CAN, USB, Serial Peripheral Interface (SPI), Synchronous Serial Protocol (SSP). Parallel Communication Protocol: PCI, PCI-X Wireless Communication Protocol: IrDA, Bluetooth, Zigbee, IEEE802.11 		
Topic 4: I/O interfacing <ul style="list-style-type: none"> ➤ Interface different devices to Microcontroller 89C51. ➤ Develop logic of program to work with different devices. Contents: Interfacing: <ul style="list-style-type: none"> Interfacing Keys, LEDs and relay and its programming with 'C'. Interfacing matrix keyboard and its programming with 'C'. Interfacing LCD and its programming with 'C'. Interfacing ADC and its programming with 'C'. Interfacing DAC and its programming with 'C' for generation of different patterns. Interfacing Stepper Motor and its programming with 'C'. Interfacing DC Motor and its programming with 'C'. 	10	24
Topic 5: Embedded System Design <ul style="list-style-type: none"> ➤ Classify and specify characteristics of embedded system. Contents: <ul style="list-style-type: none"> Embedded System: Introduction, block diagram, applications, advantages and disadvantages. Classification of Embedded System: Small scale, medium scale, sophisticated, stand-alone, reactive/real time (soft and hard real time), Networked, Mobile, Single functioned, Tightly constrained, Design Metrics/Specifications/Characteristics of Embedded System: Processor power, memory, operating system, Reliability, performance, power consumption, NRE cost, unit cost, size, flexibility, time-to-prototype, time-to-market, maintainability, correctness and safety. 	06	12
Topic 6: Real Time Operating System <ul style="list-style-type: none"> ➤ Define, understand and classify operating system. ➤ Define, describe and applications of real time operating system. Contents: Operating System: <ul style="list-style-type: none"> Operating System, functions of operating system. Architecture of Real Time Operating System (RTOS). Scheduling architecture. Multitasking. Share data problem. Semaphore. Dead lock. Inter-task Communication. 	06	16
Total	48	100

Intellectual Skills:

- 1) Use IDE for Microcontroller programming with 'C'.
- 2) Develop Logic of program.
- 3) Write 'C' Program.

Motor Skills:

- 1) Use of IDE for Microcontroller programming.
- 2) Interface Microcontroller Evaluation boards & peripherals.

List of Practical:

1. Develop and execute C language program to input and output operation via ports of 8051.
2. Develop and execute C language program for arithmetic and logical operations.
3. Develop and execute C language program to blink a LED connected on port pin. Use assembly language instructions to generate delay.
4. Develop and execute C language program to generate square wave on port of 8051.
5. Develop and execute C language program to read the status of key and turn ON/OFF a LED connected to port pins of 8051.
6. Develop and execute C language program to ON/OFF a bulb through a relay connected to port pin of 8051.
7. Interface 16 x 2 LCD to 8051. Develop and execute C language program to display string on it.
8. Interface a 4 x 4 matrix keyboard and 16 x 2 LCD to 8051. Develop and execute C language program to read and display key code on LCD.
9. Interface 8 bit ADC and 16 x 2 LCD to 8051. Develop and execute C language program to read and display data of ADC on LCD.
10. Interface a 8 bit DAC to 8051. Develop and execute C language program to generate square, ramp and triangular waveforms.
11. Interface stepper motor to 8051. Develop and execute C language program to rotate stepper motor with different speed in clockwise and counter clockwise direction.

Learning Resources:**1. Books:**

Sr. No.	Author	Title	Publisher
1	Frank Vahid & Tony Givargis	EMBEDDED SYSTEM DESIGN A Unified Hardware/Software Introduction	Wiley
2	Raj Kamal	Embedded System Architecture, Programming and Design	Tata McGraw Hill
3	Dr K.V.K.K. Prasad	Embedded/Real-Time Systems: Concept, Design & Programming	Dreamtech Press
4	Jean J Labrosse	MicroC/OS-II The Real Time Kernel	CPM Books
5	Mazidi, Mazidi & McKinlay	THE 8051 MICROCONTROLLER AND EMBEDDED SYSTEM Using Assembly and C	Prentice Hall
6	Ajay V. Deshmukh	Microcontrollers (Theory and Applications)	Tata McGrawHill

2. Websites:

1. <http://developer.apple.com/documentation/mac/devices-313.html>
2. http://en.wikipedia.org/wiki/Integrated_development_environment
3. http://en.wikipedia.org/wiki/communication_protocol
4. <http://en.wikipedia.org/wiki/RS-232>
5. http://en.wikipedia.org/wiki/Embedded_system
6. http://en.wikipedia.org/wiki/Real_time_operating_system

Course Name : Electronics Engineering Group
Course Code : EJ/ET/EX/EN/EV/ED/EI
Semester : Sixth Semester for EJ/ET/EX/EN/EV and Seventh for ED/EI
Subject Title : Very Large Scale Integration (Elective)
Subject Code : 17659

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
03	--	02	03	100	--	--	25@	125

NOTE:

- Two tests each of 25 marks to be conducted as per the schedule given by MSBTE.
- Total of tests marks for all theory subjects are to be converted out of 50 and to be entered in mark sheet under the head Sessional Work (SW).

Rationale:

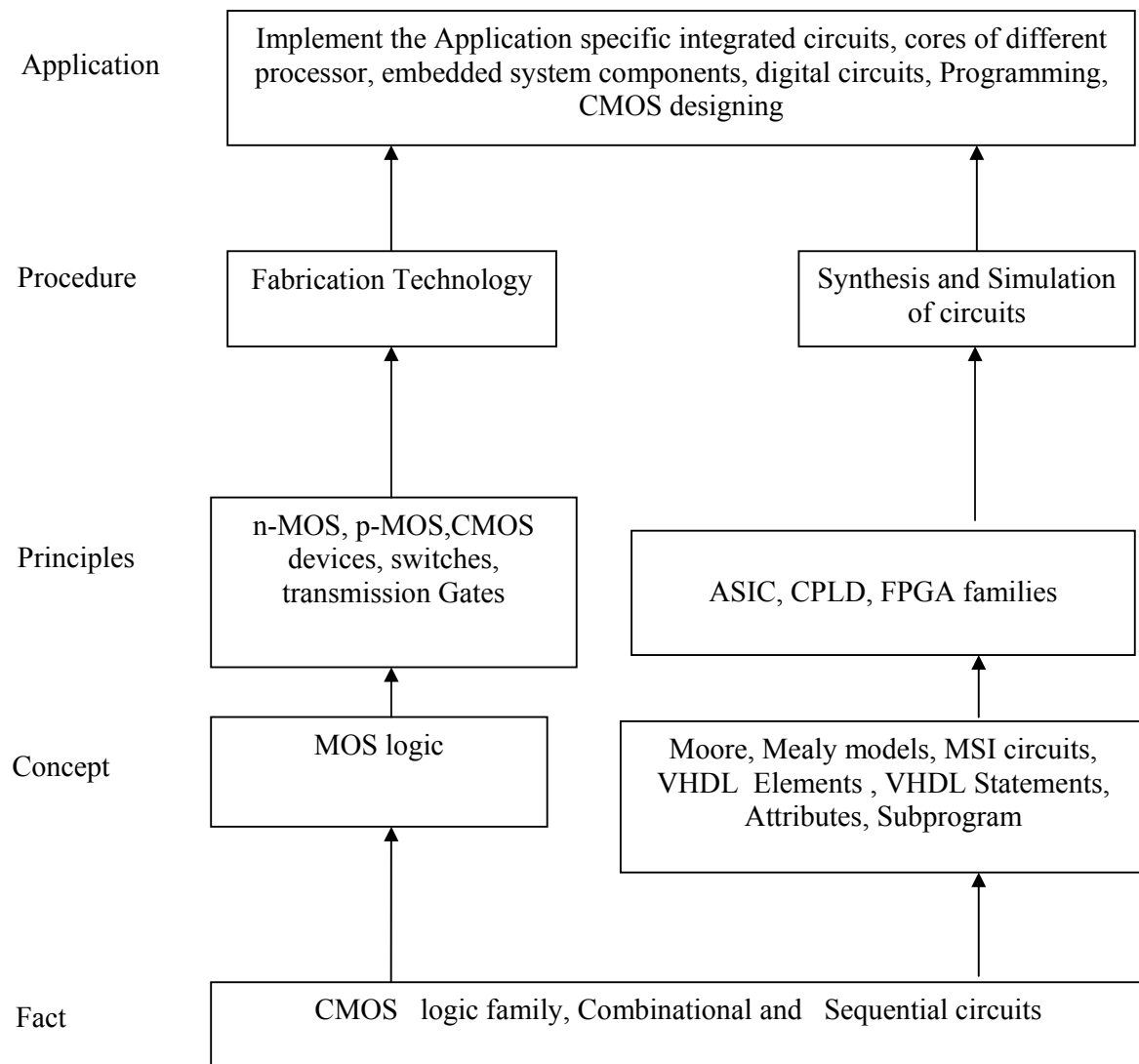
Very-Large-Scale Integration (VLSI) is the process of creating integrated circuits by combining thousands of transistors into a single chip. VLSI began in the 1970s when complex semiconductor and communication technologies were being developed. The microprocessor is a VLSI device. VLSI design is effective in providing potential engineers with exposure to both front-end and back-end processes. **Very-Large-Scale Integration** is an emerging technology trend in the industry. VLSI design and verification is done using the RTL Coding and verification tools.

VLSI design tools eventually included not only design entry and simulation but eventually cell-based routing, ROM compilers, and a state machine compiler. The tools were an integrated design solution for IC design and not just point tools, or more general purpose system tools.

The VLSI is intended for the students having prerequisite of principles of analog and digital electronics. Students can use this knowledge in the digital design field to implement combinational and sequential logic circuit, ASIC, cores of various processors using HDL. They also design CMOS Logics at foundry levels. Students can utilize the basics of VLSI design tools as programmer, designers in IT, embedded systems in industrial sector.

General Objectives:
The student will be able to

1. Develop the state diagram, state table and built Moore and Mealy models
2. Implement logical equations using CMOS technology
3. Develop program to implement combinational and sequential logic circuit using VHDL and synthesize and optimum coding style.
4. Act as industry logic designers for imparting standard ICs, ASIC libraries.

Learning Structure:

Theory:

Name of the Topic	Hours	Marks
Topic 1: Introduction to Advanced Digital Design Specific Objectives: <ul style="list-style-type: none"> ➤ Develop the state diagram, state table ➤ Develop model of Moore and Mealy machine Contents : <ol style="list-style-type: none"> 1. Review of Sequential Logic : Asynchronous and Synchronous, Metastability, Noise margins, Power Fan-out, Skew (Definitions only) 2. Moore and Mealy Models, state machine notation, examples on Moore and mealy: counter, sequence detector only 	04	14
Topic 2: Introduction to CMOS Technology <ul style="list-style-type: none"> ➤ Implement CMOS logic and logical equations. ➤ Comprehend CMOS processing Technology Contents : <ul style="list-style-type: none"> • Comparison of BJT and CMOS parameters • Design of Basic gates using CMOS: Inverter, NOR, NAND, MOS transistor switches, transmission gates. • Drawing of complex logic using CMOS (building of logic gate as per the Boolean equation of three variable) • Estimation of layout resistance and capacitance, switching characteristics, • Fabrication process: Overview of wafer processing, Oxidation, epitaxy, deposition, Ion-Implementation and diffusion, silicon gate process. • Basics of NMOS, PMOS and CMOS: nwell, pwell, twin tub process. 	12	20
Topic 3: Introduction to VHDL <ul style="list-style-type: none"> ➤ Comprehend Hardware description language , its components and programming syntax Contents : <ul style="list-style-type: none"> • Introduction to HDL: History of VHDL, Pro's and Con's of VHDL • VHDL Flow elements of VHDL(Entity, Architecture, configuration, package, library only definitions) • Data Types, operators, operations • Signal, constant and variables(syntax and use) 	08	14
Topic 4: VHDL Programming <ul style="list-style-type: none"> ➤ Develop program to implement combinational and sequential logic circuit using VHDL. Contents : <ul style="list-style-type: none"> • Concurrent constructs (when, with, process) • Sequential Constructs (process, if, case, loop, assert, wait) • Simple VHDL program to implement Flip Flop, Counter, shift register, MUX, DEMUX, ENCODER, DECODER, MOORE, MEALY machines • Test bench and its applications 	08	16
Topic 5: HDL Simulation and Synthesis <ul style="list-style-type: none"> ➤ Comprehend VHDL simulation and synthesis. Contents : <ul style="list-style-type: none"> • Event scheduling, sensitivity list, zero modeling, simulation cycle, 	12	20

<ul style="list-style-type: none"> comparison of software and hardware description language, delta delay, Types of simulator event based and cycle based HDL Design flow for synthesis Efficient Coding Styles, Optimizing arithmetic expression, sharing of complex operator 		
Topic 6: Introduction to ASIC, FPGA, PLD ➤ Comprehend ASIC, FPGA and PLDs. Contents : <ul style="list-style-type: none"> ASIC design flow CPLD -Xilinx and Atmel series architecture, Details of internal block diagram Introduction to FPGA like Xilinx (FPGA), SPARTAN 3 series and Atmel 	04	16
Total	48	100

Practical:**Intellectual Skills:**

1. Use the different VLSI design Software tools for programming, simulation and synthesis.
2. Learn different Programmable logic devices (CPLD, FPGA, etc) and selection for target implementation

Motor Skills:

1. Write and test and debug the VHDL programming
2. Make the different connections for programming PLDs as a target device
3. Simulate and implement different programming modules on PLDs

List of Practical:

1. Write VHDL program for any two basic gates.
2. Write VHDL program for full adder / subtractor & Synthesize using FPGA
3. Write VHDL program for 8:1 multiplexer & Synthesize using FPGA
4. Write VHDL program for 2:4 Decoder & Synthesize using FPGA
5. Write VHDL program for 8:3 Encoder & Synthesize using FPGA
6. Write VHDL program for synchronous counter & Synthesize using FPGA
7. Write VHDL program for binary to gray code converter & synthesize using FPGA
8. Interfacing of DAC and ADC using FPGA
9. Interfacing Stepper motor controller using FPGA
10. Implement four Bit ALU or sequence generator.

Learning Resources:**Books:**

Sr. No.	Author	Title	Publisher
1	Gaganpreet Kaur	VHDL Basics to programming	Pearson
2	John M. Yarbrough	Digital Logic: Application and design	Thomson
3	William I. Fletcher	An Engineering approach to digital design	Prentice-Hall of India
4	Neil H. E. Weste Kamran Eshraghian	Principals Of CMOS VLSI Design: A Systems Perspective	Pearson Education
5	Douglas Perry	VHDL Programming by example	Tata McGraw-Hill
6	Sarkar & Sarkar	VLSI design and EDA tools	Scitech Publication India Ltd

Web Sites:

- www.xilinx.com
- www.altera.com

Course Name : Diploma in Electronics and Video Engineering

Course Code : EV

Semester : Sixth

Subject Title : Microwave Communication System (Elective)

Subject Code : 17670

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
03	--	02	03	100	--	--	25@	125

NOTE:

- Two tests each of 25 marks to be conducted as per the schedule given by MSBTE.
- Total of tests marks for all theory subjects are to be converted out of 50 and to be entered in mark sheet under the head Sessional Work (SW).

Rationale:

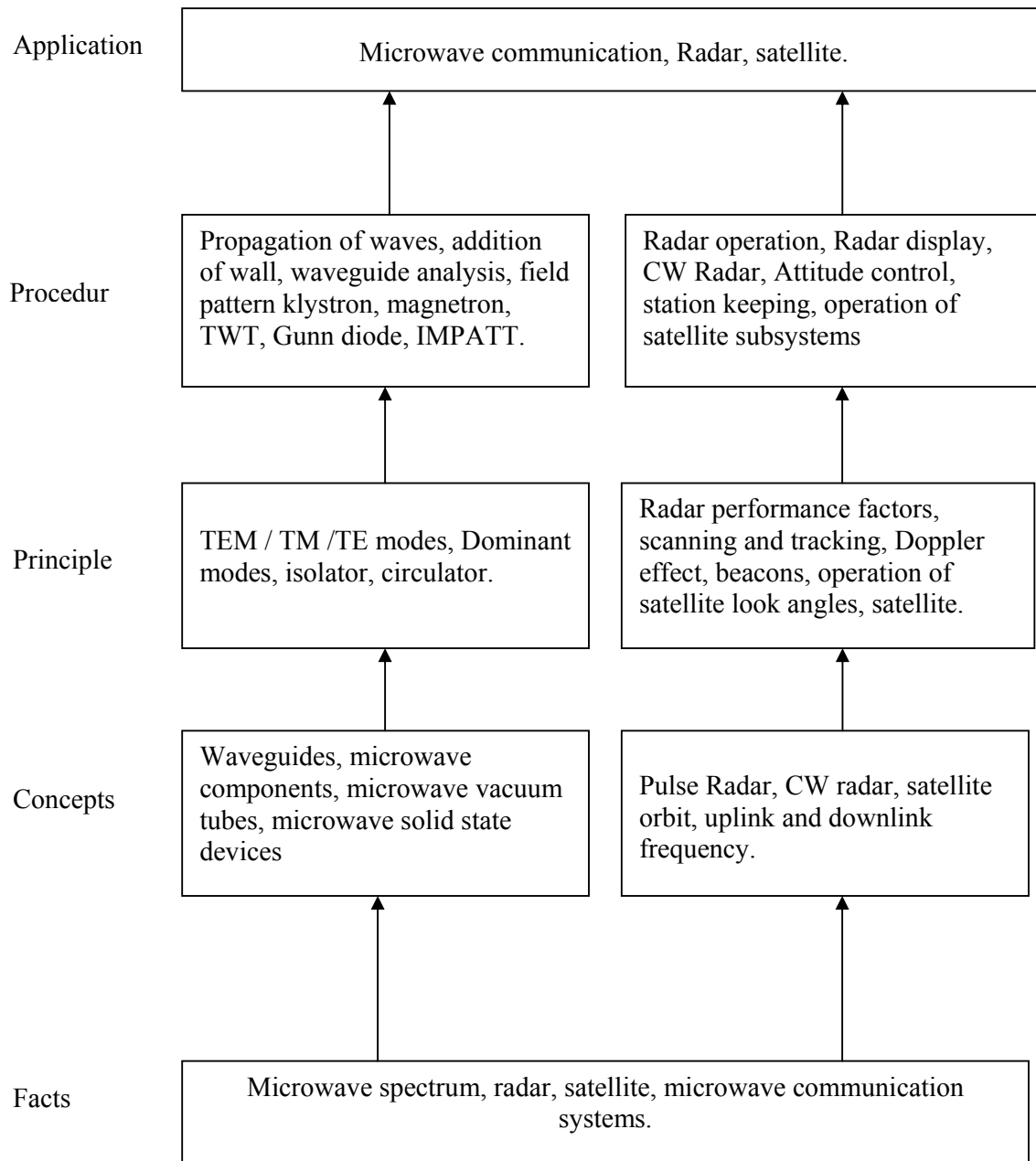
Microwave communication system is an application of devices and basic communication techniques. It is useful to understand principles, working, use of microwave devices and systems. Study of satellite and radar communication system is important for understanding operation, maintenance and monitoring of these systems.

This subject is also useful as a basis to acquire in depth knowledge of advanced communication systems and for analysis of these systems.

General Objectives:

Students will be able to:

- Understand concepts and applications of microwave and optical spectrum.
- Understand construction and working of microwave components and devices.
- Understand basic principle & operation of radar systems.
- Understand the construction, working and uses of optical communication system components.
- Know the concept, working and application of satellite communication system.

Learning Structure:

Theory:

Topic and Contents	Hours	Marks
Topic 1: Wave Guide and Components: Specific Objectives: <ul style="list-style-type: none"> ➤ Sketch the microwave spectrum. ➤ Identify band designation with range in microwave spectrum. ➤ Compare waveguide with two wire transmission line. ➤ Plot the field pattern for dominating modes (Lower) of rectangular waveguide. Contents: 1.1 Introduction to basics of microwave transmission. [08] <ul style="list-style-type: none"> • Microwave spectrum and band designations. • Concept of TEM/TE/TM/modes of wave propagation. • Comparison of wave guide with transmission line. • Rectangular waveguides: Propagation of waves through rectangular wave guide. • Reflection of waves from a conducting plane- Basic behaviour, dominant mode at the conducting surface, dominant mode of operation, plane waves at conducting surface, parallel and normal wavelength, phase velocity. • The parallel plane waveguide addition of second wall, cut off frequency, group and phase velocity. • Rectangular waveguide modes, $TE_{m,0}$ modes, $TE_{m,n}$ modes, $TM_{m,n}$ modes field patterns. 1.2 Circular waveguide [04] <ul style="list-style-type: none"> • Analysis of behavior • field patterns for dominant mode, • Advantages and applications. 1.3 Waveguide components [08] <ul style="list-style-type: none"> • Flanges, Rotating coupling, Bends & corners, Taper & Twist. • Multiple Junctions - E plane, H- plane and Hybrid junction. • Cavity resonators - operation, types and applications • Auxiliary components - Directional coupler, Isolator and circulators, Detector mounts, switches - Duplexer. 	10	20
Topic 2: Microwave Vacuum Tube Devices. Specific Objectives: <ul style="list-style-type: none"> ➤ Sketch the constructional details of klystron , TWT & magnetron ➤ Explain working principle of klystron, TWT and magnetron. Contents: <ul style="list-style-type: none"> • Advantages of microwave tube over conventional vacuum tubes. • Construction, working, specifications and applications of <ul style="list-style-type: none"> ▪ Two cavity Klystron amplifier, ▪ Reflex Klystron, ▪ Magnetron (Hole and slot), ▪ TWT (slow wave structure) 	08	20
Topic 3: Microwave Solid State Devices. Specific Objectives: <ul style="list-style-type: none"> ➤ Sketch the construction of semi conductor microwave devices. ➤ Explain working principles of solid state microwave devices. ➤ Identify different microwave devices. 	08	16

<p>Contents:</p> <ul style="list-style-type: none"> Construction, working and applications of <ul style="list-style-type: none"> ▪ Gunn diode, ▪ IMPATT diode ▪ TRAPATT ▪ PIN diode ▪ Microwave bipolar transistors. 		
<p>Topic 4: Radar Systems:</p> <p>Specific Objectives:</p> <ul style="list-style-type: none"> ➤ Interpret the radar range equation ➤ Compare different radar systems ➤ Interpret the position of target by observing displays <p>Contents:</p> <ul style="list-style-type: none"> • Basic block diagram of radar system. • Radar performance factors: Radar range equation, factors influencing max. range, effect of noise. • Basic pulse Radar system: Block diagram & description . • Antenna scanning & Tracking • Display Methods: A-Scope, PPI, Automatic target detection • Pulsed Radar system: Search radar system • MTI radar: Fundamentals, block diagram, operation • Radar Becons. • Block Diagram, operation, application of CW Doppler radar, Frequency modulated C.W. Radar. • Antenna used in radar 	12	20
<p>Topic 5: Satellite Communication System:</p> <p>Specific Objectives:</p> <ul style="list-style-type: none"> ➤ Draw block diagram of various subsystems of satellite ➤ Explain the operation of satellite earth station <p>Contents:</p> <p>5.1 Basics of satellite communication systems. [10]</p> <ul style="list-style-type: none"> • Importance of satellite communication system. • Concept of orbit & its types • Microwave spectrum used for satellite communication (band designation, up link & down link range and bandwidth) • Communication orbit: uplink & downlink frequency, • look angle, longitude, latitude, elevation angle, footprint & station keeping • Block diagram & function of each block of satellite earth station <p>5.2 Subsystems of satellite-block diagram of following subsystem:[14]</p> <ul style="list-style-type: none"> • Power subsystem • Communication channel subsystem and its types. • Telemetry, tracking & control subsystem • Main & auxiliary propulsion subsystem • Attitude and orbital subsystem. • Antenna subsystem 	10	24
Total	48	100

Practical:**Skills to be developed:****Intellectual Skills:**

1. Draw and interpret characteristics.
2. Identify and select devices.
3. Calculate different parameters.

Motor Skills:

1. Measure different quantities related to waveguides and microwave devices.
2. Verify characteristics of microwave devices.
3. Observe different components of earth station.

List of Practical:

1. To collect specifications of Microwave Test Bench and Microwave components.
2. To verify the characteristics of Reflex Klystron.
3. To verify characteristics of microwave tees E-plane, H-plane and E-H plane.
4. To verify characteristics of the isolator.
5. To verify characteristics of circular.
6. To calculate attenuation of Multi-Hole Directional Coupler.
7. To verify the principle of Doppler radar.
8. To determine the velocity of moving object in the Radar range.
9. To count the number of object in the radar range.
10. To visit the satellite earth station to understand various subsystems.

List of Assignments:

1. Assignment on Radar.
2. Assignment on Satellite.
3. A Visit to TV station, Earth station, GMRT, Telephone Exchange

List of Major Equipments:

1. Microwave test bench
2. Radar trainer kit
3. DSO
4. Digital power supply

Learning Resources:**Books:**

Sr. No.	Author	Title	Publisher
01	John F Kennedy	Electronic Communication System	Tata McGraw Hill
02	William Schewber	Electronic Communication System	PHI Publication
03	Wayne Tomasi	Advanced Electronic Communication system	PHI / Pearson Publication
04	M. Kulkarni	Microwave Engg. and Radar	Umesh Publication

Course Name : Electronics Engineering Group
Course Code : ET/EN/EJ/IE/IS/IC/DE/EV/MU/IU/ED/EI
Semester : Sixth for ET/EN/EX/EJ/IE/IS/IC/DE/EV/MU and Seventh for IU/ED/EI
Subject Title : Simulation Software
Subject Code : 17807

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
--	--	02	--	--	--	--	25@	25

NOTE:

- Two tests each of 25 marks to be conducted as per the schedule given by MSBTE.
- Total of tests marks for all theory subjects are to be converted out of 50 and to be entered in mark sheet under the head Sessional Work (SW).

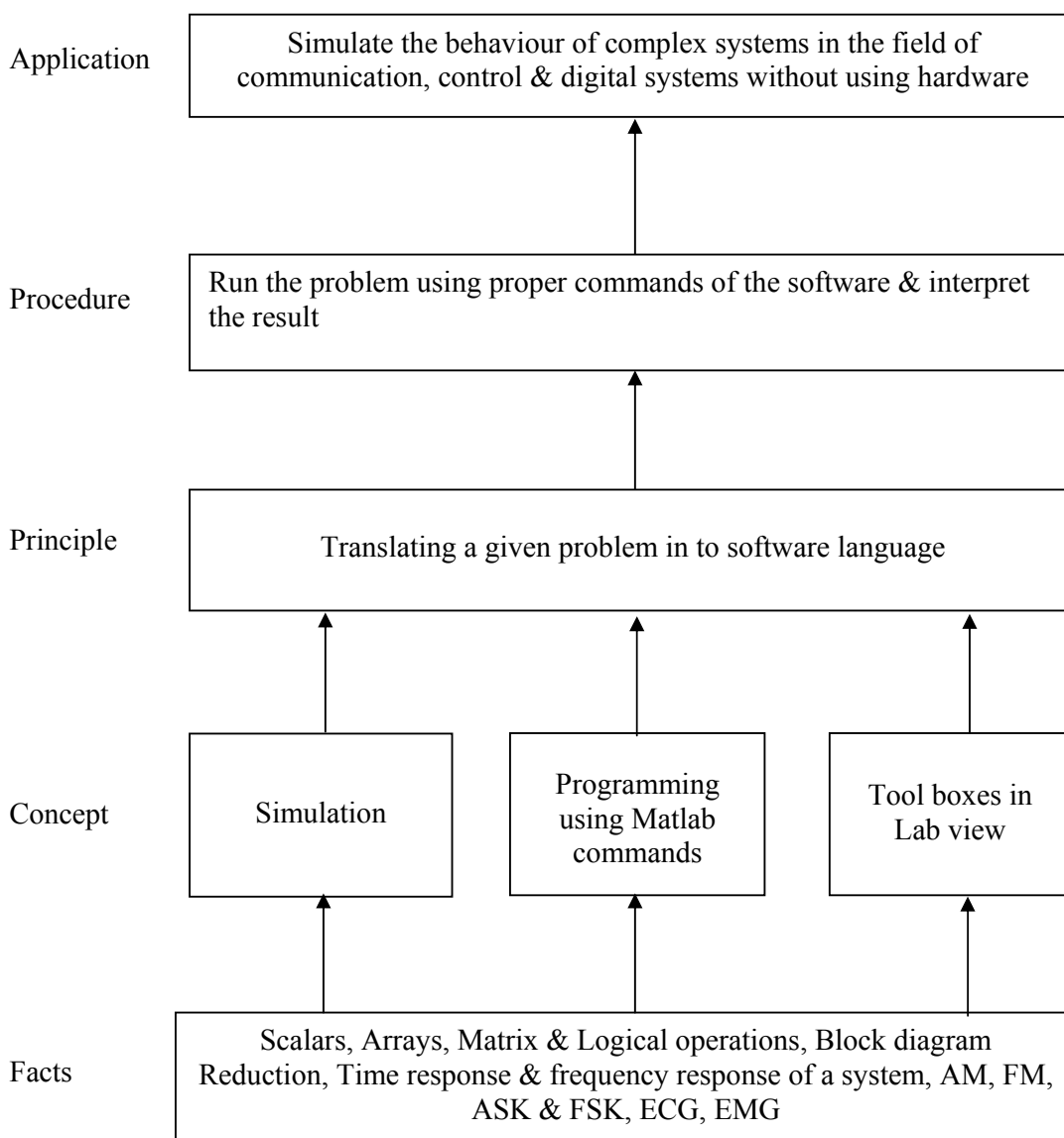
Rationale:

Recent development in technology has put a lot of emphasis on awareness of analytical tools available in the market. The ready to use library functions available in different simulation software enable the user to design circuits without knowing the complex mathematical details. Under this subject students will be taught softwares like Labview & MATLAB which are commonly used by electronics engineers, worldwide.

General Objectives:

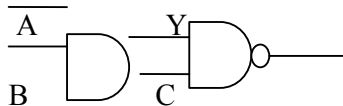
Students will be able to:

1. Learn the use of various library functions available in the software.
2. Construct given circuit diagram using these library functions.
3. Study the working of the circuit for various inputs.

Learning Structure:

List of Experiments

1. Verify simple mathematical operations of all elements in row/column vector. Using MATLAB
 - a. Sum
 - b. Mean
 - c. Length
 - d. Max
 - e. Min
 - f. Prod
 - g. Sign
 - h. Round
 - i. Sort
 - j. Fix
2. Use commands to
 - a. convert centigrade to Fahrenheit
 - b. Given the radius of circle. Find the circumference & its area
3. Calculate the output for all the eight conditions of A,B,C



4. Use of commands to
 - a. Find the determinant, inverse & transpose of the given 2X2 matrix
 - b. Evaluate the following expression
- $$Y = 1 + \frac{x^2}{2} + \frac{x^3}{3} + \frac{x^4}{4} + \frac{x^5}{5}$$
5. Calculate the natural frequency of oscillators for the given RLC circuit. Assume $L=0.01\text{mH}$, $R=100\Omega$ & C varying from 0.1 to 0.5 in steps of 0.1 μF using following equation
- $$F = \sqrt{\frac{1}{LC} - \frac{R^2}{4C^2}}$$
6. A series R-L-C circuit connected across 100V peak, 50 Hz supply, consists of $R=10\Omega$, $L=0.2\text{H}$, $C=100\mu\text{F}$. Write a MATLAB script to determine the resonant frequency & current at resonance
[hint: $f = \frac{1}{2\pi\sqrt{LC}}$; $I = \frac{V}{R}$; $V_{\text{rms}} = \frac{V_{\text{peak}}}{\sqrt{2}}$]
 7. Connect three sine wave sources of given amplitude and frequency but with a phase shift of 0, $2\pi/3$, and $-2\pi/3$ to a 3X1 multiplexer and observe the waveforms on scope. Also, de multiplex these waveforms and observe on the scope.
 8. Create a VI that produces a sine wave with a specified frequency and displays the data on a Waveform chart until stopped by the user.

9. Simulation of amplitude and frequency modulation
10. Design a low pass filter with $R = 1 \text{ K } \Omega$ and $C = 0.1 \text{ } \mu\text{F}$ and calculate the cut off frequency.

Course Specific Simulation Programs (using either Matlab / Labview / Open source free downloadable software)

For Instrumentation Course

1. Observe step & impulse response of first & second order system & calculate time response parameters- t_d , t_r , t_p , M_p , t_s , e_{ss}
2. Characteristics equation of a system is given by $S^5 + 2S^4 + 4S^3 + 8S^2 + 3S + 1$ Check their stability with routh Hurwitz criterion
3. Observe the characteristics of linear, equal percentage and quick opening control valves

For Electronics and Industrial Electronics Course

1. Simulation of R-L-C series circuit
2. Single phase half wave phase controlled converter
3. Observe step & impulse response of first & second order system

For Medical Electronics Course

1. Calculate Body Mass Index, given the height and weight
2. Given the Heart Rate and display whether the person is having tachicardia and bradycardia
3. Design a scope for patient monitoring with at least four different parameters and observe the waveform by changing these parameters.

For EJ/ET/EX/EV Courses

1. Simulation of Sampling theorem
2. Simulation of Amplitude shift keying
3. Simulation of TDM

Course Name : Electronics Engineering Group
Course Code : ET/EN/EJ/IE/IS/IC/DE/EV/MU/IU/ED/EI
Semester : Sixth for ET/EN/EX/EJ/IE/IS/IC/DE/EV/MU and Seventh for IU/ED/EI
Subject Title : Industrial Project
Subject Code : 17808

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
--	--	04	--	--	--	50#	50@	100

Rationale:

Diploma holder need to be capable of doing self-Study throughout their life as the technology is developing with fast rate. Student will be able to find out various sources of technical information and develop self-study techniques to prepare a project and write a project report.

This subject is intended to teach students to understand facts, concepts and techniques of electrical equipments, its repairs, fault finding and testing, estimation of cost and procurement of material, fabrication and manufacturing of various items used in electrical field. This will help the students to acquire skills and attitudes so as to discharge the function of supervisor in industry and can start his own small-scale enterprise.

Objectives:

The students will be able to,

1. Work in Groups, Plan the work, and Coordinate the work.
2. Develop leadership qualities.
3. Analyse the different types of Case studies.
4. Develop Innovative ideas.
5. Develop basic technical Skills by hands on experience.
6. Write project report.
7. Develop skills to use latest technology in Electronics field.

Contents:

During fifth semester students will collect information, analyse the information and select the project. They will also prepare the List of the components required, PCB design, Testing

Procedure, Design of the Cabinet or Box or Board as the case may be. They will also prepare a synopsis of the project.

So at sixth semester they have to execute the project. A tentative Schedule is proposed below:

Proposed Schedule:	Weeks
Procuring components, component testing and circuit testing	02
PCB making and onboard testing	06
Trouble shooting and cabinet making	04
Documentation	04

References: Books/Magazines:

Name of the Magazines

1. Industrial Automation
2. Electronics for You
3. Electronics Projects
4. Computer World
5. Chip
6. Any Journal Related to Electronics/Computer/Information Technology

Website:

Using any search engine, such as <http://www.google.co.in/> the relevant information can be searched on the Internet.