

**SIXTH SEMESTER**

SUBJECT CODE	SUBJECT	HOURS PER WEEK			
		THEORY HOURS	TUTORIAL HOURS	PRACTICAL HOURS	TOTAL HOURS
4040610	Computer Hardware Servicing and Networking	5	-	-	5
4040620	Biomedical Instrumentation	5	-	-	5
	Elective Theory				
4040631	1. Television Engineering	5	-	-	5
4040632	2. Mobile and Optical Communications				
4040633	3. Embedded Systems				
4040640	Computer Hardware Servicing and Networking Practical	-	-	6	6
4040651	Elective Practical 1. Television Engineering Practical	-	-	5	5
4040652	2. Mobile and Optical Communication Practical				
4040653	3. Embedded Systems practical				
4040660	Project Work and Internship	-	-	6	6
	Physical Education	-	2	-	2
	Library	-	1	-	1
<b>Total</b>		<b>15</b>	<b>3</b>	<b>17</b>	<b>35</b>

**SIXTH SEMESTER**

Subject Code	Subject	Examination				Duration
		Marks			Total	
		Internal Assessment	Board Examinations			
4040610	Computer Hardware Servicing and Networking	25	100*	100	3 Hrs.	
4040620	Biomedical Instrumentation	25	100*	100	3 Hrs.	
	Elective Theory	25	100*	100	3 Hrs.	
4040631	1. Television Engineering	25	100*	100	3 Hrs.	
4040632	2. Mobile and Optical Communications	25	100*	100	3 Hrs.	
4040633	3. Embedded Systems	25	100*	100	3 Hrs.	
4040640	Computer Hardware Servicing and Networking Practical	25	100*	100	3 Hrs.	
4040651	Elective Practical 1. Television Engineering Practical	25	100*	100	3 Hrs.	
4040652	2. Mobile and Optical Communication Practical	25	100*	100	3 Hrs.	
4040653	3 Embedded Systems practical	25	100*	100	3 Hrs.	
4040660	Project Work and Internship	25	100*	100	3 Hrs.	
	Physical Education					
	Library					

\* Examination will be conducted for 100 marks and it will be reduced to 75 marks.

**STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TAMILNADU**  
**DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS**  
**N-SCHEME**

(To be Implemented for the students admitted from the year 2020 - 2021 onwards)

Course Name : 1040:Electronics and Communication Engineering  
Subject code : 4040610  
Semester : VI  
Subject title : COMPUTER HARDWARE SERVICING AND NETWORKING

**TEACHING AND SCHEME OF EXAMINATION**

No. of Weeks per Semester: 16 Weeks

Subject	Instruction		Examination			
	Hours /week	Hours /semester	Internal Assessment	Board Examination	Total	Duration
Computer hardware Servicing and Networking	5	80	25	100*	100	3 Hours

\* Examination will be conducted for 100 marks and it will be reduced to 75 marks.

**Topics and Allocation of Hours**

Unit	Topics	Hours
I	MOTHERBOARD COMPONENTS AND MEMORY STORAGE DEVICES	16
II	I/O DEVICES AND INTERFACE	14
III	TROUBLE SHOOTING OF DESKTOP AND LAPTOPS	15
IV	COMPUTER NETWORK DEVICES AND OSI LAYERS	14
V	802.X AND TCP/IP PROTOCOLS	14
	Tests and Model	7
	<b>Total</b>	<b>80</b>

**RATIONALE:**

Maintaining and servicing the computers, laptops and peripherals are essential requirements of the computer students. The clear understanding of computer network devices and protocols are also taught in this subject.

**OBJECTIVES:**

On completion of the following units of syllabus contents, the students can

- Identify the major components of CPU.
- Understand the principle of operations of all the interfacing boards, IO/Memory slots and interfacing devices.
- Know the use of diagnostic Software.
- Trouble shoot the problems in Laptop.
- Understand the different layers of OSI and their functions. Compare different LAN protocols.
- Identify the protocols used in TCP /IP and compare with OSI model. Use of IP addressing and TCP/ IP protocols briefly.

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**4040610 COMPUTER HARDWARE SERVICING AND NETWORKING**  
**DETAILED SYLLABUS**

Contents : Theory

Unit No.	Name of the Topic	Hours
I	<p><b><u>MOTHERBOARD COMPONENTS AND MEMORY STORAGE DEVICES</u></b></p> <p><b>1.1 Introduction:</b> Hardware, Software and Firmware. Mother board, IO and memory expansion slots, SMPS, Drives, front panel and rear panel connectors.</p> <p><b>1.2 Processors:</b> Architecture and block diagram of multicore Processor, Features of new processor (Definition only)-chipsets (Concepts only)</p> <p><b>1.3 Bus Standards:</b> Overview and features of PCI, AGP, PCMCIA</p> <p><b>1.4 Primary Memory:</b> Introduction-Main Memory, Cache memory – DDR2, DDR3, DDR4 and Direct RDRAM.</p> <p><b>1.5 Secondary Storage:</b> Hard Disk – Construction – Working Principle Specification of IDE, Ultra ATA, Serial ATA; HDD Partition - Formatting, SSD Introduction.</p> <p><b>1.6 Removable Storage:</b> CD-R, CD-RW, DVD –ROM and DVD –RW: construction and reading &amp; writing operations, Zip Drive; Blu-ray – Introduction – Disc Parameters.</p>	<p>3</p> <p>3</p> <p>2</p> <p>3</p> <p>3</p> <p>2</p>
II	<p><b><u>I/O DEVICES AND INTERFACE</u></b></p> <p><b>2.1 Keyboard:</b> Signals – operation of membrane and mechanical keyboards–troubleshooting; wireless Keyboard.</p> <p><b>2.2 Mouse:</b> Types, connectors, operation of Optical mouse and Troubleshooting.</p> <p><b>2.3 Printers:</b> Introduction – Types of printers- Dot Matrix, Inkjet, Laser, MFP (Multi-Function Printer) and Thermal printer – Operation, Construction and Features - Troubleshooting</p> <p><b>2.4 I/O Ports:</b> Serial, Parallel, USB, Game Port and HDMI.</p> <p><b>2.5 Displays:</b> Principles of LED (OLED, AMOLED, POLED), LCD &amp; TFT Displays.</p>	<p>2</p> <p>2</p> <p>2</p> <p>1</p> <p>2</p>

	<p><b>2.6 Graphic Cards:</b> VGA and SVGA card.</p> <p><b>2.7 Modem:</b> Working principle.</p> <p><b>2.8 Power Supply:</b> Servo Stabilizers, online and offline UPS - working principles; SMPS: Principles of Operation and block diagram of ATX Power supply, Connector Specifications.</p>	2 1 2
III	<p><b><u>MAINTENANCE AND TROUBLE SHOOTING OF DESKTOP AND LAPTOPS</u></b></p> <p><b>3.1 Bios-setup:</b> Standard CMOS setup, Advanced BIOS setup, Power management, advanced chipset features, PC Bios communication – upgrading BIOS, Flash BIOS - setup.</p> <p><b>3.2 POST:</b> Definition – IPL hardware – POST Test sequence – beep codes</p> <p><b>3.3 Diagnostic Software and Viruses:</b> Computer Viruses – Precautions –Anti-virus Software – identifying the signature of viruses – Firewalls and latest diagnostic softwares.</p> <p><b>3.4 Laptop:</b> Types of laptop – block diagram – working principles – configuring laptops and power settings - SMD components, ESD &amp; precautions.</p> <p><b>3.5 Laptop components:</b> Adapter – types, Battery – types, Laptop Mother Board - block diagram, Laptop Keyboard and Touchpad.</p> <p><b>3.6 Installation and Troubleshooting:</b> Formatting, Partitioning and Installation of OS – Trouble Shooting Laptop Hardware problems - Preventive maintenance techniques for laptops.</p>	2 2 2 2 3 4
IV	<p><b><u>COMPUTER NETWORK DEVICES AND OSI LAYERS</u></b></p> <p><b>4.1 Data Communication:</b> Components of a data communication.</p> <p><b>4.2 Data flow:</b> Simplex – half duplex – full duplex;</p> <p><b>4.3 Topologies:</b> Star, Bus, Ring, Mesh, Hybrid – Advantages and Disadvantages of each topology.</p> <p><b>4.4 Networks:</b> Definition -Types of Networks: LAN – MAN – WAN – CAN – HAN – Internet –Intranet –Extranet, Client-Server, Peer to Peer Networks.</p> <p><b>4.5 Network devices:</b> Features and concepts of Switches – Routers (Wired and Wireless) – Gateways.</p> <p><b>4.6 Network Models:</b> Protocol definition - standards - OSI Model – layered architecture – functions of allayers.</p>	1 1 2 4 3 3

V	<p><b>802.X AND TCP/IP PROTOCOLS</b></p> <p><b>5.1 Overview of TCP / IP:</b> TCP/IP – Transport Layers Protocol – connection oriented and connectionless Services – Sockets - TCP &amp; UDP.</p> <p><b>5.2 802.X Protocols:</b> Concepts and PDU format of CSMA/CD (802.3) – Token bus (802.4) – Token ring (802.5) – Ethernet – type of Ethernet (Fast Ethernet, gigabit Ethernet) – Comparison between 802.3, 802.4 and 802.5</p> <p><b>5.3 Network Layers Protocol:</b> IP – Interior Gateway Protocols (IGMP, ICMP, ARP, RARP Concept only).</p> <p><b>5.4 IP Addressing:</b> Dotted Decimal Notation – Subnetting &amp; Supernetting.</p> <p><b>5.5 Application Layer Protocols:</b> FTP - Unmanageable Switch - manageable Switch – Telnet – SMTP– HTTP – DNS – pop</p>	<p>3</p> <p>4</p> <p>3</p> <p>2</p> <p>2</p>
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**REFERENCEBOOKS:**

1. IBM PC and CLONES, B. Govindrajalu, Tata McGraw-Hill Publishers, IBM PC and CLONES
2. Computer Installation and Servicing, D. Balasubramanian, Tata McGraw Hill
3. Computer Installation and Servicing
4. The complete PC upgrade and Maintenance, Mark Minasi, BPB Publication, The complete PC upgrade and Maintenance
5. Troubleshooting, Maintaining and Repairing PCs, Stephen J Bigelow, Tata McGraw Hill Publication, Troubleshooting Maintaining and Repairing PCs
6. Upgrading and repairing laptops, Scott Mueller, QUE Publication, Upgrading and repairing laptops
7. Data Communication and networking, Behrouz A. Forouzan, Tata Mc-Graw Hill, New Delhi,
8. Data and Computer Communications, William Stallings, Prentice-Hall of India, Eighth Edition
9. Computer Networks, Andrew S. Tanenbaum, Prentice-Hall of India, New Delhi,
10. Computer Networks, Achyut Godbole, Tata McGraw Hill - New Delhi
11. Principles of Wireless Networks– A unified Approach, Kaveh Pahlavan and Prashant Krishnamurty, Pearson Education, 2002

**STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TAMILNADU**  
**DIPLOMA IN ENGINEERING/TECHNOLOGY SYLLABUS**  
**N SCHEME**

(To be Implemented for the students admitted from the year 2020 - 2021 onwards)

Course Name : 1040: Electronics and Communication Engineering

Subject Code : 4040620

Semester : VI

Subject title : BIOMEDICAL INSTRUMENTATION

**TEACHING AND SCHEME OF EXAMINATION**

No of weeks/ semester: 16 weeks

Subject	Instruction		Examination			
	Hours /Week	Hours /Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
Biomedical instrumentation	5	80	25	100*	100	3 Hrs

\* Examination will be conducted for 100 marks and it will be reduced to 75 marks.

**Topics and allocation of hours**

UNIT	TOPIC	Hours
I	Bio-electric potentials, Electrodes and Clinical measurements	14
II	Diagnostic Instruments	15
III	Therapeutic Instruments	16
IV	Biotelemetry and Patient Safety	15
V	Modern Imaging Techniques	13
	Tests and Model Exam	7
	Total	80



**RATIONALE:**

Every year, there is a tremendous increase in the use of Modern Electronic medical equipment in the hospital and healthcare industry. Therefore it is necessary for every student to understand the functioning of various medical equipments.

**OBJECTIVES:**

After learning this subject the student will be able to understand the about

- The generation of Bio-potential and its measurement using various electrodes.
- The measurement of blood pressure.
- The measurement of lung volume.
- The measurement of respiration rate.
- The measurement of body temperature and skin temperature.
- The principle of operation of ECG recorder and the analysis of ECG waves
- The principle of operation of EEG recorder and the analysis of EEG waves
- The principle of operation of EMG recorder.
- The working principles of audio meter.
- The principle of operation of pacemaker.
- The basic principle of dialysis.
- The basic principle of ventilators.
- The working principles of telemetry.
- The basic principle of telemedicine.
- To learn about patient safety.
- The various methods of accident prevention.
- The basic principle of various types of lasers and their applications
- The basic principle of various types of Medical Imaging Systems.

**4040620 BIOMEDICAL INSTRUMENTATION**

**DETAILED SYLLABUS**

Contents: Theory

Unit	Name of the topics	Hours
I	<p><b>BIO-ELECTRIC POTENTIALS, ELECTRODES AND CLINICAL MEASUREMENTS</b></p> <p><b>1.1: BIOPOTENTIALS AND ELECTRODES</b> Elementary ideas of cell structure, Bio-electric potentials and their origin- Resting and action potentials– Propagation of action potential - Electrodes – Micro – Skin surface– needle electrodes.</p> <p><b>1.2: CLINICAL MEASUREMENTS:</b> Measurement of Blood pressure : Sphygmomanometer– Blood flowmeter (Electromagnetic &amp; ultrasonic blood flowmeter)– Acid base balance: pH, Measurement of pH value of various body fluids- Measurement of Respiration rate : Impedance Pneumograph– Measurement of Lung volume: Spirometer– Heart rate monitor– Medical laboratory equipment: Auto analyzer</p>	7  7
II	<p><b>DIAGNOSTIC INSTRUMENTS:</b></p> <p><b>2.1: Electro- Cardio Graph (ECG) :</b> 12 Lead system of ECG– ECG recorder– Analysis of abnormal ECG waves.</p> <p><b>2.2: Nervous system:</b> Electro- EncephaloGraph (EEG) - 10-20 EEG lead system– EEG recorder– EEG wave types– Clinical uses of EEG</p> <p><b>2.3: Electro– Myo Graph (EMG) :</b> EMG waves– Measurement of conduction velocity– EMG recorder</p> <p><b>2.4: Electro- Retino Graph (ERG) :</b> ERG recorder – ERG wave</p> <p><b>2.5: Audiometer:</b> Principle– types – Basics audiometer working- Air conduction and bone conduction test</p>	3  3  3  3

III	<p><b>THERAPEUTIC INSTRUMENTS</b></p> <p><b>3.1: Cardiac pacemaker</b> Need for Pacemaker-Classification – R-wave triggered and Ventricular inhibited implantable pacemakers– Programmable pacemaker</p> <p><b>3.2: Cardiac defibrillators</b> Need for Defibrillator - Classification – AC and DC defibrillators</p> <p><b>3.3: Heart lung machine :</b> Need for Heart Lung Machine –Blockdiagram – working</p> <p><b>3.4: Dialysis</b> Need for Dialysis – Processes involved in Dialysis - Hemo dialysis– peritoneal dialysis - Comparison of Hemodialysis and Peritonael dialysis</p> <p><b>3.5: Lithitripsy</b> Need for Lithotripter- block diagram and working</p> <p><b>3.6: Ventilators</b> Need for Ventilators - Types – modern ventilator blockdiagram – Working</p>	<p>2</p> <p>3</p> <p>3</p> <p>3</p> <p>3</p> <p>2</p>
IV	<p><b>BIOTELEMETRY AND PATIENTSAFETY:</b></p> <p><b>4.1: Biotelemetry</b> Physiological parameters adaptable to biotelemetry - components of a biotelemetry system– applications of biotelemetry–Radio telemetry with sub carrier: single channel and multi channel telemetry system- Telemedicine: concept and applications.</p> <p><b>4.2: Patient safety</b> Physiological effects of electric current– Micro and macro shock–Hazardous situations of micro and macro shocks- leakage current– lethal effects of leakage current</p> <p><b>4.3: Methods of Accident Prevention</b> Grounding – Double Insulation – Ground fault circuit interrupter (GFI)– Safety aspects in electrosurgical units: burns –High frequency current hazard- explosion hazard. Precautions to minimize electric shock hazards</p>	<p>5</p> <p>5</p> <p>5</p>

V	<p><b>MODERN IMAGING TECHNIQUES:</b></p> <p><b>5.1: LASER</b> Laser beam properties – Block diagram and explanation of ND-Yag LASER – Applications of LASER in patient care.</p> <p><b>5.2: X ray</b> Properties of X-Rays - Working of X ray apparatus – Special techniques in X-ray imaging: C arm image intensifier- Computerized Axial tomography – CT scanner- Angiography</p> <p><b>5.3: Ultrasonic imaging techniques:</b> Pulse echo system - Echo Cardiography – Operating modes – Working</p> <p><b>5.4: Magnetic Resonance Imaging techniques – Working – Superiority of MRI Scan</b></p>	3  3  3  4
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**Reference Books:**

1. Leslie Cromwell – Fredj. Wibell, Erich A. Pfeither- Biomedical Instrumentation and measurements, II Edition Jacobson and Webster – Medicine and clinical Engineering.
2. R.S. Khandpur – Handbook of Biomedical Instrumentation.
3. Medical Electronics - Kumara doss
4. Introduction to Medical Electronics, B.R. Klin
5. Introduction to Biomedical Instrumentation Mandeep Singh Printice Hall India 2010.

**STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TAMILNADU**  
**DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS**  
**N-SCHEME**

(To be Implemented for the students admitted from the year 2020 - 2021 onwards)

Course Name : 1040:Electronics and Communication Engineering

Subject Code : 4040631

Semester : VI

Subject Title : Television Engineering.

**TEACHING AND SCHEME OF EXAMINATION**

No of weeks per semester: 16 weeks

Subject	Instructions		Examination			Duration
	Hours / Week	Hours / Semester	Marks			
			Internal Assessment	Board Examinations	Total	
Television Engineering	5	80	25	100*	100	3 Hrs.

\* Examination will be conducted for 100 marks and it will be reduced to 75 marks.

**Topics and Allocation of Hours**

UNIT	Topic	Hrs.
I	Television Fundamentals.	15
II	Camera Tubes and Picture Tubes.	14
III	Television Transmitter and Television Receiver.	17
IV	Modern Television Technology.	14
V	Advanced Television Systems.	13
Test & Model Exam		7
<b>Total</b>		<b>80</b>

**RATIONALE:**

This subject makes the students to understand from the basic concepts of TV to advanced techniques of TV .It also enables the students to have the knowledge about the Modern Technology including flat panel display. This subject makes the students to understand about Color TV fundamentals .The subject also introduces troubleshooting techniques. It gives the clear understanding about TV standards .

**OBJECTIVES:**

On completion of the syllabus, the students must be able to

- >Understand CVS and CCVS signal. .
- > Understand the different types of scanning.
- > Study the types of camera tubes and picture tubes.
- > Explain about TV transmitter and TV receiver(Monochrome and PAL).
- > Study the Modern TV technology.
- >Understand the use of Advanced TV systems.

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**4040631 TELEVISION ENGINEERING**  
**DETAILED SYLLABUS**

Contents: Theory

<b>Unit</b>	<b>Name of the Topics</b>	<b>Hours</b>
<b>I</b>	<b>Television Fundamentals</b> <b>1.1 : Monochrome TV</b> Basic block diagram of monochrome TV transmitter and receiver - scanning process -horizontal, vertical and sequential scanning -Flicker-Interlaced scanning(qualitative treatment only) -need for synchronization -blanking pulses-Aspect ratio -Resolution -vertical and horizontal resolution -video bandwidth -composite video signal (CVS) -Definitions for vertical sync pulse, serrated vertical pulse, Equalizing pulse -Positive and negative modulation -TV standards .	8
	<b>1.2 : Colour TV Fundamentals</b> Additive mixing of colours -colour perception -Chromaticity diagram- Definition for Luminance, Hue, Saturation and Chrominance- Formation of chrominance signal in PAL system with weighting factors- colour composite video signal(CCVS).	7
<b>II</b>	<b>Camera tubes and Picture Tubes</b> <b>2..1 : Camera Tube</b> Characteristics-Types of camera tube-working principle of Vidicon camera tube-study of Target plate (only) of plumbicon camera tube - CCD camera-Video processing of camera pick up signal-Block diagram and principle of working of colour TV camera tube.	7
	<b>2.2 : Picture Tube</b> Magnetic deflection and Electrostatic focusing -Screen phosphor - Screen burn-screen persistence-Aluminized screen- types of colour picture tubes-Construction and working principle of Trinitron colour picture tube -Automatic degaussing.	7
<b>III</b>	<b>Television Transmitter and Receiver</b>	

	<p><b>3.1:Television Transmitter</b></p> <p>Types-Comparison-principle-Block diagram of low level IF modulated TV Transmitter -Visual Exciter-Aural Exciter -Principle of working of CIN Diplexer-colour compatibility -PAL colour Coder working operation-merits and demerits of PAL system.</p> <p><b>3.2:Television Receiver</b></p> <p>Block diagram of monochrome receiver- functions of each block-need for AGC-merits of AGC-Video Amplifier Requirements -High and low frequency compensation--Block diagram of PAL colour receiver-need for sync separator -Basic sync separator circuit- Integrator and Differentiator -AFC-need for AFC-Horizontal AFC.</p>	9
	<p><b>3.2:Television Receiver</b></p> <p>Block diagram of monochrome receiver- functions of each block-need for AGC-merits of AGC-Video Amplifier Requirements -High and low frequency compensation--Block diagram of PAL colour receiver-need for sync separator -Basic sync separator circuit- Integrator and Differentiator -AFC-need for AFC-Horizontal AFC.</p>	8
IV	<p><b>Modern Television Technology</b></p> <p><b>4.1:Modern TV</b></p> <p>Flat panel Display-Principles of operation-Large screen display -Types of TV-projection TV-plasma TV-merits of plasma TV-construction and working operation of LCD TV-LED TV -Types of LED TV -working operation of LED TV-merits of LED TV-LCD projector working operation -set top box-principles of DTH-Trouble shooting of set top box-communication cables-Types-Feeder wire-coaxial cable and optical fiber cable-RF TV Tuner card.</p>	14
V	<p><b>Advanced Television Systems</b></p> <p><b>5.1:Advanced TV</b></p> <p>Block diagram of a digital colour TV receiver -Remote control IR transmitter and receiver -closed circuit TV System -Applications of CCTV -scrambler-necessity-basic principle -types- descrambler block diagram -Telecine equipment -Digital CCD telecine system-Introduction to high definition TV(HDTV) and 3DTV.</p> <p><b>5.2:TV connector Ports</b></p> <p>HDMI port-USB port-RF in-AV Jack.</p>	10
	<p>HDMI port-USB port-RF in-AV Jack.</p>	3



**Reference Books:**

- 1."R.R. Gulati", "Modern Television Practice-Transmission, Reception, Applications ", New age international 5<sup>th</sup> Edition 2015.
- 2."A.M.Dhake" "TV and Video Engineering" , Second Edition TMH-2003
- 3."R.R Gulati" "Monochrome and Color TV ", New Age Publishers-2003
- 4."S.P.bali" "color TV, Theory and Practice" TMH-1994.
- 5." Manohar Lotia& Pradeep Nair " "Modern VCD-Video CD player Introduction, servicing and troubleshooting ", BPB Publications 2002

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**STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TAMILNADU**  
**DIPLOMA IN ENGINEERING/TECHNOLOGY SYLLABUS**  
**N SCHEME**

(To be Implemented for the students admitted from the year 2020 - 2021 onwards)

Course Name : 1040: Electronics and Communication Engineering

Subject Code : 4040632

Semester : VI

Subject title : MOBILE AND OPTICAL COMMUNICATION

**TEACHING AND SCHEME OF EXAMINATION**

No of weeks/ semester: 16 weeks

Subject	Instruction		Examination			
	Hours /Week	Hours /Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
Mobile and Optical Communication	5	80	25	100*	100	3 Hrs

\* Examination will be conducted for 100 marks and it will be reduced to 75 marks.

**Topics and allocation of hours**

UNIT	TOPIC	Hours
I	Mobile Communication concepts	14
II	Equalization, Diversity, Channel coding and Speech coding	15
III	Wireless Networking , Personal Communication Services/ Networks (PCS/PCNS) and Network data bases	16
IV	Optical Cables, Connectors, Splicers, Optical Digital and Analog link	14
V	WDM Concepts and Components	14
	Tests and Model Exam	7
	Total	80

**RATIONALE:**

Communication is one of the integral parts of science that has always been a focus point for exchanging information among parties at locations

physically apart. After its discovery, telephones have replaced the telegrams and letters. Similarly, the term 'mobile' has completely revolutionized the communication by opening up innovative applications that are limited to one's imagination. Today, mobile communication has become the backbone of the society. All the mobile system technologies have improved the way of living. Usually Mobile cellular networks have both Circuit Switching and Packet Switching for handling calls. For Circuit Switching, Optical fiber using WDM is employed. Hence in this subject, with Mobile communication, Optical communication is added.

### **OBJECTIVES:**

On completion of the following units of syllabus contents, the students must be able to:

- Know the concept of Mobile Communication
- Know the concept of Channel Assignments
- Know about the Handoff processes performed in Mobile Communication
- Know the interferences and system capacity
- Know the methods of improving coverage and capacity to avoid network congestion
- Know the concept of equalization, diversity, channel coding and speech coding
- Know the concept of LTE and VoLTE (Voice over Long Term Evolution)
- Know about wireless networking, Personal Communication Services/ Networks (PCS/PCNS) and network data bases
- Know about Universal Mobile Telecommunication System (UMTS)
- Know about Fiber optic cables
- Know about Power launching and coupling
- Know about Fiber-to-fiber joints
- Know about Fiber splicing techniques
- Know about Optical fiber connectors
- Know about Digital transmission systems
- Know about WDM concepts and components
- Know about Optical networks

**4040632 MOBILE AND OPTICAL COMMUNICATION**

**DETAILED SYLLABUS**

Contents:Theory

Unit	Name of the topics	Hours
I	<b>MOBILE COMMUNICATION</b>	3
	<b>1.1: CELLULAR CONCEPTS</b>	
	<b>CHANNEL ASSIGNMENT STRATEGIES</b>	3
	<b>1.2: HANDOFF STRATEGIES</b> Prioritizing Handoffs-Practical Handoff Considerations	4
	<b>1.3: INTERFERENCE AND SYSTEM CAPACITY</b> Co-channel interference and System Capacity- Channel Planning for wireless Systems- Adjacent Channel Interference-Power Control for Reducing Interference	4
	<b>1.4: IMPROVING COVERAGE AND CAPACITY</b> Cell splitting and Cell sectoring - Repeaters for Range Extension – Micro cell Zone Concept	
II	<b>EQUALIZATION, DIVERSITY , CHANNEL CODING AND SPEECH CODING</b>	
	<b>2.1: FUNDAMENTALS OF EQUALIZATION</b> Introduction – Training a Generic Adaptive Equalizer – Equalizers in Communication Receiver – Survey of Equalization Techniques	3
	<b>2.2: DIVERSITY TECHNIQUES</b> Practical considerations in space diversity – Polarization diversity – Frequency diversity – Time diversity – RAKE Receiver - Interleaving.	3
	<b>2.3: FUNDAMENTALS OF CHANNEL CODING</b>	
	<b>2.4: SPEECH CODING</b> Introduction – Characteristics of Speech signals – Probability Density Function – Autocorrelation function – Frequency Domain Coding of Speech – Sub band Coding – Adaptive Transform Coding – Vocoders – The GSM Codec.	3
	<b>2.5: LTE AND VoLTE(Voice over Long Term Evolution)</b>	3

III	<p><b>WIRELESS NETWORKING , PERSONAL COMMUNICATION SERVICES/ NETWORKS(PCS/PCNs) AND NETWORK DATA BASES</b></p> <p><b>3.1: INTRODUCTION TO WIRELESS NETWORKS</b></p> <p><b>3.2: DIFFERENCE BETWEEN WIRELESS NETWORKS AND FIXED NETWORKS</b></p> <p>Limitations in wireless networking – Merging wireless network and PSTN Development of Wireless Networks</p> <p><b>3.3: WIRELESS DATA SERVICES</b></p> <p>Cellular Digital Packet Data (CDPD) – Advanced Radio Data Information Systems (ARDIS) – RAM Mobile Data (RMD)</p> <p><b>3.4: PERSONAL COMMUNICATION SERVICES/ NETWORKS(PCS/PCNs)</b></p> <p>Packet Vs Circuit Switching for PCN – Cellular Packet Switched Architecture</p> <p><b>3.5: NETWORK DATABASES</b></p> <p>Distributed Database for Mobility Management</p> <p><b>3.6: UNIVERSAL MOBILE TELECOMMUNICATION SYSTEM (UMTS)</b></p>	<p>3</p> <p>3</p> <p>3</p> <p>3</p> <p>2</p> <p>2</p>
IV	<p><b>OPTICAL COMMUNICATION</b></p> <p><b>4.1: FIBER OPTIC CABLES</b></p> <p><b>4.2: POWER LAUNCHING AND COUPLING</b></p> <p>Source to Fiber Power Launching - Source Output Pattern- Schematic diagram of an optical source coupled to an optical fiber-Lensing scheme for coupling improvement</p> <p><b>4.3: FIBER-TO-FIBER JOINTS</b></p> <p><b>4.3: FIBER SPLICING TECHNIQUES</b></p> <p><b>4.4: OPTICAL FIBER CONNECTORS</b></p> <p><b>4.5: DIGITAL TRANSMISSION SYSTEMS</b></p> <p>Simplex point to point transmission link – System consideration</p> <p><b>4.6: ANALOG TRANSMISSION SYSTEMS</b></p> <p>Over view of Analog links</p>	<p>2</p> <p>3</p> <p>2</p> <p>2</p> <p>2</p> <p>3</p>

V	<p><b>WDM CONCEPTS AND COMPONENTS</b></p> <p><b>5.1: OPERATIONAL PRINCIPLES OF WDM</b></p> <p><b>5.2: WDM COMPONENTS</b> 2x2 Fiber couplers - Star matrix representation - 2x2 Waveguide couplers - Star couplers</p> <p><b>5.3: OPTICAL NETWORKS</b> Basic Networks - Network topologies – Performance of Star Architecture</p> <p><b>5.4: SONET / SDH</b> Basic concepts - Transmission Formats and Speeds - Optical Interfaces - SONET/SDH rings - SONET/SDH Networks</p> <p><b>5.5: WAVELENGTH - ROUTED NETWORKS</b> Optical Cross – connects</p> <p><b>5.6: OPTICAL CDMA</b></p> <p><b>5.7: ULTRAHIGH CAPACITY NETWORKS</b> Ultrahigh Capacity WDM Systems – Bit- interleaved Optical TDM-Time-Slotted Optical TDM</p>	<p>2</p> <p>2</p> <p>2</p> <p>2</p> <p>2</p> <p>2</p> <p>2</p> <p>2</p>
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**REFERENCE BOOKS:**

1. Wireless Communication Principles and Practice Theodore S. Rappaport Pearson Education, 2003
2. Mobile Cellular Communications W.C.Y. Lee 2nd Edition, MC GrawHill, 1995
3. Mobile Communications Jochen Schiller Pearson Education, 2009, Second edition
4. Optical fiber communication- Gerd Keiser - Third Edition – McGraw Hill -2000

**STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TAMILNADU**  
**DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS**  
**N-SCHEME**

(To be Implemented for the students admitted from the year 2020 - 2021 onwards)

Course Name : 1040:Electronics and Communication Engineering

Subject Code : 4040633

Semester : VI

Subject Title : Embedded Systems

**TEACHING AND SCHEME OF EXAMINATION**

No of weeks per semester: 16 weeks

Subject	Instructions		Examination			Duration
	Hours / Week	Hours / Semester	Marks			
			Internal Assessment	Board Examinations	Total	
Embedded Systems	5	80	25	100*	100	3 Hrs.

\* Examination will be conducted for 100 marks and it will be reduced to 75 marks.

**Topics and Allocation of Hours**

UNIT	Topic	Hrs.
I	Introduction to Embedded systems and ARM processor	16
II	ARM Instruction Set	16
III	LPC 2148 controller	16
IV	LPC 2148 peripherals	15
V	Operating System	10
Test & Model Exam		7
<b>Total</b>		<b>80</b>

**RATIONALE:**

This subject makes the students to understand the definition for Embedded Systems. It also enables the students to have the knowledge about the different architectures, RISC and CISC processors. This subject makes the students to understand about RTOS. To specific, the subject deals with ARM7 RISC processor and the on chip peripherals of LPC2148 .

**OBJECTIVES:**

On completion of the syllabus, the students must be able to

- > Understand ARM7 processor .
- > Understand the architecture of LPC 2148.
- > Understand ARM7 instruction set.
- > Understand the types of buses.
- > Explain On chip peripherals.
- > Have clear knowledge about RTOS concepts.

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**4040633 EMBEDDED SYSTEMS**

**DETAILED SYLLABUS**

**Note: Bit level details in registers should not be asked in board theory examination.**

Contents: Theory

Unit	Name of the Topics	Hours
I	<b>Introduction to Embedded Systems and ARM Processor</b>	
	<b>1.1 : Embedded Systems</b> Definition of Embedded System – Features of Embedded System – Types of Embedded System – List of Embedded System Devices- Harvard and Von-Neumann architectures-RISC and CISC Processors.	8
	<b>1.2: ARM Processor Architecture Fundamentals</b> Block diagram of ARM based embedded system with hardware components - Pipeline-Data Flow Model-CPU registers – Modes of Operation – PSW -Processor State and Instruction Set-Exceptions- Interrupts-Vector table-Little Endian and Big Endian.	8
II	<b>ARM Instruction Set</b> <b>2.1: Instruction Set</b> ARM state instruction set- Thumb State Instruction sets (Brief introduction only)-Data processing instructions-Branch instructions-Load-store instructions-Software interrupt instruction-Program status register instructions-stack instructions-Conditional execution.	12
	<b>2.2: Simple programs</b> Addition, Subtraction and Multiplication using ARM processor assembly language.	4
III	<b>LPC 2148 Controller</b> <b>3.1: Introduction to LPC 2148 ARM controller</b> LPC 2148 ARM Controller – Features-Block diagram – Memory and on chip peripheral devices – ARM 7 TDMI-S Nomenclature– Memory Map – Memory re-map and boot block-Types of buses.	8
	<b>3.2: System control functions</b> Crystal oscillator-PLL-Power control-RESET-VPB Divider-Wakeup timer-Vector Interrupt controller-(VIC)-Register description-External Interrupts.	8
IV	<b>LPC 2148 Peripherals</b> <b>4.1: Peripherals</b>	

	Pin connect block-Features-pin connect block register description-GPIO (Slow)- Features-register description -- Timer/Counter – Block diagram – Register description --PWM-features-register description-ADC -features-register description-DAC-features-register description. <b>4.2:Serial communication in LPC 2148</b> UART features – UART0 Block diagram—UART0 register description.	10  5
V	<b>Operating System</b> <b>5.1:Embedded OS and RTOS</b> Introduction to OS- -Functions of OS-Embedded OS- Foreground/background systems -Real time system concepts- Resources-shared resources-Critical section- multitasking-Tasks-kernel- Scheduler-Round Robin-Non Pre-emptive and Pre-emptive scheduling- Context switch- re-entrancy- task priorities- Event flag-mutual exclusion- semaphores and types-Message mail box-Message Queues.	10

**Reference Books**

- 1."Andrew N Sloss""ARM System Developer's Guide Designing and Optimizing" Elsevier publication,2004.
- 2."B.Kanta Rao" "Embedded systems", PHI publishers.
- 3."TammyNoergaard" "Embedded Systems Architecture",Newness edition.
- 4."SteveFurbe " "ARM System on chip Architecture", 2<sup>nd</sup>edition,Pearson Education,2000.
- 5."Dr.K.V.K.K Prasad""Embedded Real Time Systems",Dream tech press,2009.
- 6."David Seal" "ARM Architecture Reference Manual".
- 7.LPC 2148 User Manual.

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**DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS**  
**N-SCHEME**

(To be Implemented for the students admitted from the year 2020 - 2021 onwards)

Course Name : 1040:Electronics and Communication Engineering  
Subject Code : 4040640  
Semester : VI Semester  
Subject Title : COMPUTER HARDWARE SERVICING AND NETWORKING PRACTICAL

**TEACHING AND SCHEME OF EXAMINATION**

No. of weeks per semester: 16 weeks

Subject	Instructions		Examination			Duration
	Hours / Week	Hours / Semester	Marks			
			Internal Assessment	Board Examinations	Total	
Computer Hardware Servicing and Networking Practical	6	96	25	100*	100	3 Hrs.

\* Examination will be conducted for 100 marks and it will be reduced to 75 marks.

**RATIONALE:**

The course aims at making the students familiar with various parts of computers and laptops and how to assemble them and the different types of peripherals desired. In addition, the course will provide the students with necessary knowledge and skills in computer and laptop software installation and maintenance and to make him diagnose the software faults. This subject also gives the knowledge and competency to diagnose the problems in computer hardware and peripherals and gives the knowledge for trouble shooting for systematic repair and maintenance of computers and laptops

**OBJECTIVES:**

On completion of the following exercises, the students must be able to

- Know the various indicators, switches, SMPS, motherboard, connectors and various disk drives used in Computers. .
- Install various secondary storage devices with memory partition and formatting.
- Acquire the practical knowledge about the installation of various devices like printer, scanner, web camera and bio-metric devices.
- Assemble PC system and laptop and checking
- Install Dual OS in a system.
- Enable to perform different cabling in a network.
- Configure Internet connection and able to debug network issues.

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**4040640 COMPUTER HARDWARE SERVICING AND NETWORKING PRACTICAL**  
**DETAILED SYLLABUS**

Contents:Practical

**Exercises**

**Part A – Computer Hardware servicing**

**1.IDENTIFICATION OF SYSTEMLAYOUT**

- i) Identify front panel indicators & switches and Front side & rear side connectors
- ii) Familiarize the computer system layout by marking positions of SMPS, Motherboard, FDD, HDD, CD, DVD and add on cards.

**2.HARDDISK**

- i) Configure bios setup program and troubleshoot the typical problems using BIOS utility.
- ii) Install, Configure, Partition and Format Hard disk.

**3.DVD/BLU-RAYWRITER**

- i) Install and Configure a DVD Writer and record a blank DVD.
- ii) Install and Configure a Blu-ray Writer and record a blank Blu-ray Disc.

**4.Printer Installation**

- i) Install and configure Dot matrix printer
- ii) Install and configure Laser printer

**5. i) Install and configure Scanner**

- ii) Install and configure Web cam and bio-metric device

**6. i) Assemble a system with add on cards and check the working condition of the system**

- ii) Install OS in the assembled system.

**7. Install Dual OS in a system**

**8. i) Assemble and Disassemble a Laptop to identify the parts.**

- ii) Installation of different device drivers and Installation of different Application Software.

**Part B – Computer networking**

**9. Do the following Cabling works for establishing a network**

- i) Crimp the network cable with RJ 45 connector in Standard cabling mode and cross cabling mode.
- ii) Test the crimped cable using a cable tester.

**10. Use IPCONFIG, PING, TRACERT and NETSTAT utilities to debug the network issues.**

11. Interface two PCs to form Peer To Peer network using the connectivity devices Switch or Router in a LAN.
12. i) Share the files and folders in a LAN  
ii) Share a printer in a LAN.
13. Remote Desktop, Remote Assistance, Telnet, HyperTerminal, TeamViewer
14. Configure DNS to establish interconnection between systems and describe how a name is mapped to IP Address
15. i) Install and configure Network Devices: HUB, Switch (4/8/16/24 ports), Routers  
ii) Install and Configure NIC.

## **BOARD EXAMINATION**

### **DETAILED ALLOCATION OF MARKS**

CONTENT	Max. Marks	
	Part A	Part B
Procedure	20	20
Execution	20	20
Result with printout	5	5
Viva	10	
Total	100	

### **MODEL QUESTION PAPER**

#### **4040640 COMPUTER HARDWARE SERVICING AND NETWORKING PRACTICAL**

##### **1. IDENTIFICATION OF SYSTEM LAYOUT**

- i) Identify front panel indicators & switches and Front side & rear side connectors
- ii) Familiarize the computer system layout by marking positions of SMPS, Motherboard, FDD, HDD, CD, DVD and add on cards.

##### **2. HARD DISK**

- i) Configure bios setup program and troubleshoot the typical problems using BIOS utility.
- ii) Install, Configure, Partition and Format Hard disk.

##### **3. DVD/BLU-RAY WRITER**

- i) Install and Configure a DVD Writer and record a blank DVD.
- ii) Install and Configure a Blu-ray Writer and record a blank Blu-ray Disc.

**4. Printer Installation**

- i) Install and configure Dot matrix printer
- ii) Install and configure Laser printer

5. .i) Install and configure Scanner  
ii) Install and configure Web cam and bio-metric device

6. i) Assemble a system with add on cards and check the working condition of the system.  
ii) Install OS in the assembled system.

**7. Install Dual OS in a system**

8. i) Assemble and Disassemble a Laptop to identify the parts.  
ii) Installation of different device drivers and Installation of different Application Software.

9. Do the following Cabling works for establishing a network  
i) Crimp the network cable with RJ 45 connector in Standard cabling mode and cross cabling mode.  
ii) Test the crimped cable using a cable tester.

10. Use IPCONFIG, PING, TRACERT and NETSTAT utilities to debug the network issues.

11. Interface two PCs to form Peer To Peer network using the connectivity devices Switch or Router in a LAN.

12. i) Share the files and folders in aLAN  
ii) Share a printer in a LAN.

13. Remote Desktop, Remote Assistance, Telnet, HyperTerminal, TeamViewer.

14. Configure DNS to establish interconnection between systems and describe how a name is mapped to IP Address

15. i) Install and configure Network Devices: HUB, Switch (4/8/16/24 ports), Routers  
ii) Install and Configure NIC.

**LIST OF EQUIPMENTS**

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**Hardware Requirements :**

Computer with Pentium / Core processors with inbuilt NIC	-30 Nos
Hard disk drive	-02 Nos
CD / DVD Writer	-02Nos
Blu Ray writer	-01 No
Blank DVD,Blu-ray disk	-30 Nos
Web camera	-02 Nos
Laser Printer Dot matrix Printer	-02 Nos
Blank DVD	-30Nos
Scanner	-02Nos
Laptop	-02Nos
Biometric device	-02Nos
Crimping Tool	-06Nos
Network Cables	
RJ45Tester	-06Nos
Modem with internet connection	-02Nos
Hub	-02Nos
Switch 2x2/4x4	-02Nos
Router	-02 Nos

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**Software Requirements:**

Windows XP operating system/ Windows 7 OS  
DVD/ CD Burning S/W (Ahead Nero or latest S/W)



**STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TAMILNADU**  
**DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS**  
**N-SCHEME**

(To be Implemented for the students admitted from the year 2020 - 2021 onwards)

Course Name : 1040: Electronics and Communication Engineering.

Subject Code : 4040651

Semester : VI

Subject Title : Television Engineering Practical

**TEACHING AND SCHEME OF EXAMINATION**

No of weeks per semester: 16 weeks

Subject	Instructions		Examination			Duration
	Hours / Week	Hours / Semester	Marks			
			Internal Assessment	Board Examinations	Total	
Television Engineering Practical	5	80	25	100*	100	3 Hrs.

\* Examination will be conducted for 100 marks and it will be reduced to 75 marks.

**RATIONALE:**

The introduction of this subject will enable the students to get familiar with basic methods used for trouble shooting, servicing and measurement. The Simple methods are used to find the faults in the servicing of TV. The students can find the career in servicing.

**OBJECTIVES:**

The students are able to

- > Understand the assembling of Antenna.
- > Construct and test the deflection circuits.
- > Construct and test the sync circuits.
- >Service TV remote.
- > Check faults in power supply.
- > Find the faults in video section and audio section
- > Understand about DTH connection
- > Study the use of set of box
- > Service the monitors.

**4040651 TELEVISION ENGINEERING PRACTICAL**

**DETAILED SYLLABUS**

Contents: Practical

**Exercises**

- 1.Assembling of yagiuda antenna.
- 2.Construct and test the sync separator circuit.
- 3.Construct a horizontal sawtooth generator and measure its frequency .
- 4.Construct a vertical sawtooth generator and measure its frequency.
- 5.Trouble shooting of IR TV Remote control unit.
6. Fault finding in SMPS and measure its different voltage levels.
- 7.Trouble shooting of EHT section in TV.
- 8.Trouble shooting of sound section in TV.
- 9.Study of RF Tuner.
- 10.Trouble shooting of deflection yoke with controls.
- 11.Servicing of computer monitors (observe the VGA signals using CRO)
- 12.Servicing of LED /LCD monitors.
- 13.Measure the dc voltages at various points in TV receiver .

## **BOARD EXAMINATION**

**Note:** All the experiments to be kept for the examination.

### **DETAILED ALLOCATION OF MARKS**

Circuit Diagram	:	25 marks
Connection / Procedure	:	25 marks
Execution and handling of equipment	:	30 marks
Output / Result	:	10 marks
Viva	:	10 marks
<b>TOTAL</b>	:	<b>100 marks</b>

### **MODEL QUESTION PAPER**

#### **4040651 TELEVISION ENGINEERING PRACTICAL**

1. Construct a vertical sawtooth generator for the frequency of 50 hz and verify its output.
2. Troubleshoot the sound section in TV receiver and observe the values.
3. Troubleshoot the deflection yoke of TV receiver and draw the observed waveforms.
4. Troubleshoot the EHT section of TV receiver and measure the values.
5. Construct and test the sync separator circuit and observe the waveforms and draw.
6. Assemble the Yagi-uda antenna with the given antenna elements.
7. Service the given computer monitor and observe the VGA signals using CRO.
8. Service the TV remote and find the fault.
9. Troubleshoot the given LED / LCD monitor and find the faults.
10. Service the given SMPS and measure the voltage levels.
11. Construct the horizontal sawtooth generator for the frequency of 15,625 hz and verify its output.
12. Measure and write down the Voltage levels of the TV receiver given for troubleshooting .
13. Study the given RF tuner and explain the function of sections of RF tuner.

**LIST OF EQUIPMENTS**

1. Antenna elements ( dipole , reflector, director ) - 2 Sets.
2. Audio oscillator -5 Nos.
3. CRO – 2 Nos.
4. Power Supply ( 0 – 30v) – 5 Nos.
5. Multi meters-5.
6. SMPS-4 Nos.
7. IR TV remote receivers – 2 Nos.
8. B/W Television Receiver Trainer kit.
9. Color TV Receiver Trainer kit.
10. VGA Monitors- 2 Nos.
11. LCD / LED monitors -2 Nos.

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**STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TAMILNADU**  
**DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS**  
**N-SCHEME**

(To be Implemented for the students admitted from the year 2020 - 2021 onwards)

Course Name : 1040:Electronics and Communication Engineering

Subject code : 4040652

Semester : VI

Subject title : MOBILE AND OPTICAL COMMUNICATION PRACTICAL

**TEACHING AND SCHEME OF EXAMINATION**

No. of weeks/ Semester: 16 weeks

Subject	Instruction		Examination			Duration
	Hours /week	Hours /semester	Marks			
			Internal Assessment	Board Examination	Total	
Mobile and Optical Communication Practical	5	80	25	100*	100	3 Hours

\* Examination will be conducted for 100 marks and it will be reduced to 75 marks.

**RATIONALE:**

All types of Mobile Communication circuits are merged with Optical fiber links to get Broad band services to Home and all working environments. Hence in this subject Mobile Communication and Optical Communication related practical circuits are going to be tested by the students. By Practicing the following experiments the students can develop their skill which could be helpful for their self employment in future.

**OBJECTIVES:**

On completion of the following experiments, the students must be able to

- Understand the concept of Mobile Communication
- Know the working principle of Mobile Networks
- Know the working of Transmitter and Receiver in GSM

- Study the working of SIM card in GSM handset and SIM card detection.
- Study and observe Transmitted/Received RF signal.
- Study and observe Transmitted(I&Q)/Received(I&Q) signals constellations.
- Study and analyze the Buzzer in 4G LTE Smart Phone Tech Book.
- Study and Analyze the Vibrator in 4G LTE Smart phone Tech Book
- Study of switch faults in User Interface Section of 4G LTE Smart Phone Tech Book
- Study and analyze the Power Management Unit in 4G LTE Smart Phone Tech Book
- Generate the Pseudo random binary sequence
- Test the VI characteristics of LED (Light emitter) and Photo diode (Light detector)
- Test the VI Characteristics of an Opto - coupler
- Test the performance of Time Division Multiple Access in Fiber optical communication link
- Determine the Numerical aperture of the given optical fiber

## **4040652 MOBILE AND OPTICAL COMMUNICATION PRACTICAL**

### **DETAILED SYLLABUS**

Contents: Practical

#### **Exercises**

#### **MOBILE COMMUNICATION**

(To understand the Basic circuit of Mobile phone (Transmitter, Receiver and Baseband control Section).

1. To study the working of SIM card in GSM handset and SIM card detection.
2. To Study and observe Transmitted/Received RF signal.
3. Study and observe Transmitted(I&Q)/Received(I&Q) signals constellations.
4. Study and analyze the Buzzer in 4G LTE Smart Phone Tech Book.
5. To study and Analyze the Vibrator in 4G LTE Smart phone Tech Book
6. Study of switch faults in User Interface Section of 4G LTE Smart Phone Tech Book
7. Study and analyze the Power Management Unit in 4G LTE Smart Phone Tech Book
8. Generation of Pseudo random binary sequence

#### **OPTICAL COMMUNICATION**

9. Construct a circuit to test the VI characteristics of LED (Light emitter) and Photo diode

(Light detector)

10. Construct a circuit to test the VI Characteristics of an Opto - coupler
11. Test the performance of Time Division Multiple Access in Fiber optical communication link
12. Determine the Numerical aperture of the given optical fiber

### **BOARD EXAMINATION**

#### **DETAILED ALLOCATION OF MARKS**

CIRCUIT DIAGRAM	:	25
CONNECTION	:	25
EXECUTION & HANDLING OF EQUIPMENT	:	25
OUTPUT / RESULT	:	15
VIVA – VOCE	:	10

TOTAL : 100

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### **MODEL QUESTION PAPER**

#### **4040652 MOBILE AND OPTICAL COMMUNICATION PRACTICAL**

1. Study the working of SIM card in GSM handset and SIM card detection.
2. Study and observe Transmitted/Received RF signal.
3. Study and observe Transmitted(I&Q)/Received(I&Q) signals constellations.
4. Study and analyze the Buzzer in 4G LTE Smart Phone Tech Book.
5. Study and Analyze the Vibrator in 4G LTE Smart phone Tech Book
6. Study of switch faults in User Interface Section of 4G LTE Smart Phone Tech Book
7. Study and analyze the Power Management Unit in 4G LTE Smart Phone Tech Book
8. Generate Pseudo random binary sequence
9. Construct a circuit to test the VI characteristics of LED (Light emitter) and Photo diode (Light detector)

10. Construct a circuit to test the VI Characteristics of an Opto - coupler
11. Test the performance of Time Division Multiple Access in Fiber optical communication link
12. Determine the Numerical aperture of the given optical fiber

#### LIST OF EQUIPMENTS

S.NO	Name of the Equipment	Range	Required No.
1.	Regulated Power Supply	0 – 30V	2
2.	Dual trace CRO	60 MHz	5
3.	Signal Generator	-	5
4.	Desk Top Computer	-	2
5.	Smart phone Techbook	-	3
6.	Digital Trainer Kit	-	2
7.	Digital Multimeter	-	5



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**DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS**  
**N-SCHEME**

(To be Implemented for the students admitted from the year 2020 - 2021 onwards)

Course Name : 1040:Electronics and Communication Engineering

Subject Code : 4040653

Semester : VI

Subject Title : Embedded Systems Practical

**TEACHING AND SCHEME OF EXAMINATION**

No of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours / Week	Hours / Semester	Marks			Duration
			Internal Assessment	Board Examinations	Total	
<b>Embedded Systems Practical</b>	<b>5</b>	<b>80</b>	<b>25</b>	<b>100*</b>	<b>100</b>	<b>3 Hrs.</b>

\* Examination will be conducted for 100 marks and it will be reduced to 75 marks.

**RATIONALE:**

The introduction of this subject will enable the students to have hands on experience in using ARM Based trainer kit. The students are exposed to use the on chip peripherals using embedded C language. They can also get familiar with the use of ARM instruction set. They are learning the different methods for providing time delay and use of serial communication. 32 bit ARM is a RISC processor which makes the students to expose to the new dimension in the field of embedded systems.