FIFTH SEMESTER

SUBJECT CODE	SUBJECT	HOURS PER WEEK			
		THEORY HOURS	TUTORIAL HOURS	PRACTICAL HOURS	TOTAL HOURS
4040510	Analog and Digital Communication systems	5	-	-	5
4040520	Microcontroller and its Applications	5	-	-	5
4040531	Elective 1.Very Large Scale Integration	4	-	-	4
4040532	2.Consumer Electronics				
4040533	3.Basics of Digital Signal and Image processing				
4040540	Analog and Digital Communication Practical	-	-	5	5
4040550	Microcontroller Practical	-	-	4	4
4040561	Elective practical 1.Very Large Scale Integration Practical	-	-	5	5
4040562	2.Consumer Electronics Practical				
4040563	3.Signal and Image processing Practical				
4020570	Entrepreneurship and Start –ups #			4	4
	Physical Education	-	2	-	2
	Library	-	1	-	1
	Total	14	3	18	35

 # Common with Mechanical Engineering

FIFTH SEMESTER

Subject Code	Subject	Examination			
		Marks			Duration
		Internal Assessment	Board Examinations	Total	
4040510	Analog and Digital Communication systems	25	100*	100	3 Hrs.
4040520	Microcontroller and its Applications	25	100*	100	3 Hrs.
4040531	Elective Theory 1.Very Large Scale Integration	25	100*	100	3 Hrs.
4040532	2.Consumer Electronics	25	100*	100	3 Hrs.
4040533	3.Basics of Digital Signal and Image processing	25	100*	100	3 Hrs.
4040540	Analog and Digital Communication Practical	25	100*	100	3 Hrs.
4040550	Microcontroller Practical	25	100*	100	3 Hrs.
4040561	Elective practical 1.Very Large ScaleIntegration Practical	25	100*	100	3 Hrs.
4040562	2.Consumer Electronics Practical	25	100*	100	3 Hrs.
4040563	3.Signal and Image processing Practical	25	100*	100	3 Hrs.
4020570	Entrepreneurship and Start –ups #	25	100*	100	3 Hrs.
	Physical Education				
	Library				

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

 # Common with Mechanical Engineering

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING/TECHNOLOGY SYLLABUS

N SCHEME

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

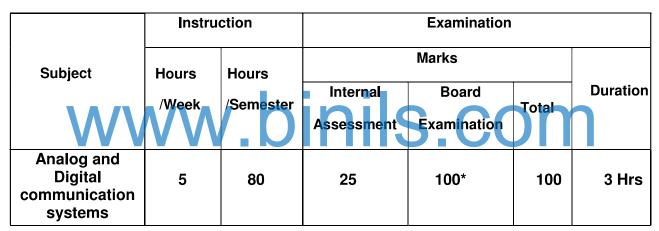Course Name   :1040: Electronics and Communication Engineering

Subject Code   :4040510

Semester   :V

Subject title   : ANALOG AND DIGITAL COMMUNICATION SYSTEMS

TEACHINGAND SCHEME OF EXAMINATION

No ofweeks/ semester: 16weeks

Subject	Instruction		Examination				
	Hours /Week	Hours /Semester	Marks				Duration
			Internal Assessment	Board Examination	Total		
Analog and Digital communication 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

Units	TOPIC	Hrs
I	Radar, Navigational Aids, Telephony	14
II	Digital Communication	14
III	Optical Communication	15
IV	Satellite Communication	15
V	Mobile Communication	15
	Tests and Model Exam	7
Total		**80**

RATIONALE:

The subject Analog and Digital communication systems will enable the students to learn about the advancement in communication systems. it will give exposure to the various modes of communication viz Radar, Telephone, digital communication, digital codes, optical communication, satellite communication, microwave communication, mobile communication and satellite multiple access techniques.

OBJECTIVES:

On completionofthefollowing units ofthe syllabus contents, the students must be   able

➢   To understand principles of Radar.

➢   To understand principles of navigational aids .

➢   To study Electronic Exchange .

➢   To study basic digital communication system and discuss the characteristics of data transmission circuits.

➢   To learn Error detection and correction codes and various digital modulation techniques

➢   To learn optical sources, optical detectors.

➢   To discuss the applications of fiber optic communication

➢   To Study satellite system, orbits, launching, Antennas

➢   To Study earth segment and space segment components

➢   To study about satellite services

➢   To study fundamental cellular concepts such as frequency reuse, handoff.

➢   To learn multiple access techniques.

➢   To learn digital cellular system-GSM

4040510 ANALOG AND DIGITAL COMMUNICATION SYSTEMS

DETAILED SYLLABUS

Contents: Theory

Unit	Name of the topics	Hours
I	**RADAR AND NAVIGATIONAL AIDS:** **1.1 RADAR :** Basic Radar System– Applications – Radar Range Equation(Qualitative Treatment Only) – Factors Influencing Maximum Range – Basic Pulsed Radar System – Block Diagram – Display Methods- A - Scope, PPI Display - Instrument Landing System –Ground Controlled Approach System. **1.2 TELEPHONY :** Telephone System–Public Switched Telephone Network (PSTN) - Electronic Switching System – Block Diagram – ISDN –Architecture, Features - Video Phone – Block Diagram	7 7
II	**DIGITAL COMMUNICATION:** **2.1 BASICS OF DIGITAL COMMUNICATION SYSTEM:** Basic Elements Of Digital Communication System – Block Diagram- Characteristics Of Data Transmission Circuits -Bandwidth Requirement – Speed – Baud Rate – Noise -Crosstalk – Distortion. **2.2 DIGITAL CODES:** ASCII Code – EBCDIC Code – Error Detection Codes – Parity Check Codes – Redundant Codes – Error Correction Codes -Retransmission- Forward Error Correcting Code – Hamming Code – Digital Modulation Techniques – ASK, FSK, PSK, QPSK Modulation/Demodulation Techniques (Only Block Diagram And Operation)	5 8

III	**OPTICAL COMMUNICATION :**	
	3.1 BASICS OF OPTICAL COMMUNICATION AND LOSSES: Optical Communication System – Block Diagram – Advantages Of Optical Fiber Communication Systems – Principles Of Light Transmission In A Fiber Using Ray Theory – Single Mode Fibers, Multimode Fibers – Step Index Fibers, Graded Index Fibers (Basic Concepts Only) – Attenuation In Optical Fibers -Absorption Losses, Scattering Losses, Bending Losses, Core And Cladding Losses	7
	3.2 OPTICAL SOURCES AND APPLICATIONS: Optical Sources – LED – Semiconductor LASER – Principles – Optical Detectors – PIN And APD Diodes - Optical Transmitter – Block Diagram – Optical Receiver – Block Diagram – Application Of Optical Fibers – Networking, Industry And Military Applications.	7
IV	**SATELLITE COMMUNICATION:** **4.1SATELLITE SYSTEM:** Kepler's I,II,II laws – orbits – launching orbits – types - Geostationary synchronous satellites - Advantages – Apogee – Perigee - Active and passive satellite - Earth eclipse of satellite	4
	4.2ANTENNA: Parabolic reflector antenna	1
	4.3SPACE SEGMENT: Space segment: Power supply- Attitude control- station keeping – Transponders – TT and C subsystem – Antenna subsystem.	3
	4.4 EARTH SEGMENT: Earth segment: Block diagram of Transmit receive earth station - Satellite mobile services - Basics of GPS.	3
	4.4 MICROWAVE COMMUNICATION: Microwave frequency ranges - microwave devices – Parametric amplifiers – Travelling wave tubes – simple block diagram of microwave transmitter, receiver	4

	and microwave link repeater		
V	**MOBILE COMMUNICATION AND MUTIPLE ACCESS TECHNIQUES:** **5.1MOBILE COMMUNICATION:** (Qualitative Treatment only) Cellular telephone– fundamental concepts – Simplified Cellular telephone system - frequency reuse – Interference – Co-channel Interference – Adjacent Channel Interference – Improving coverage and capacity in cellular systems – cell splitting – sectoring – Roaming and Handoff – Basics of blue tooth technology		7
	5.2SATELLITE MULTIPLE ACCESS TECHNIQUES: TDMA, FDMA, CDMA. Digital cellular system – Global system for mobile communications (GSM) –GSM services – GSM System Architecture – Basics of GPRS.		7

Reference Books:

1. Electronic communication systems - Kennedy - Davis - fourth Edition – Tata McGraw Hill - 1999.

2. Electronics communication - Dennis Roddy and John coolen – Third Edition - PHI – 1988

3. Optical fiber communication - Gerd Keiser - Third Edition - McGraw Hill – 2000

4. Satellite communication - Dr. D.C. Agarwal - Third Edition –Khannapublishers– 1995

5. Satellite communication - Dennis Roddy - Third Edition - McGraw Hill – 2001

6. Electronic communication systems-Fundamentals through Advanced –Wayne Tomasi-fifth Edition –pearson Education-2005

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 : 4040520

Semester : V

Subject Title : Microcontroller and its applications

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		
Microcontroller and its Applications	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	Architecture of 8051 Microcontroller	15
II	8051 Instruction set and Programming	16
III	Peripherals of 8051	15
IV	Interfacing techniques	16
V	Advanced Microcontrollers	11
	Test & Model Exam	7
	Total	**80**

RATIONALE:

The introduction of this subject will enable the students to learn about microcontroller 8051 architecture, Pin details, Instruction sets, Programming and interfacing. This subject enables the students to do the project effectively. It also helps the students to choose the field of interest. If the student is aiming for higher studies, this subject is foundation.

OBJECTIVES:

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

-> Know the difference between microprocessor and microcontroller.

-> Understand the architecture of 8051.

-> Write programs using 8051 ALP.

-> Understand the programming of I/O ports, Timer, Interrupt and Serial Programming.

-> Use the interfacing techniques

-> Know the types of microcontrollers

-> Explain IoT.

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4040520 MICROCONTROLLER AND ITS APPLICATIONS
DETAILED SYLLABUS

Contents: Theory

Unit	Name of the Topics	Hours
I	**Architecture Of 8051 Microcontroller** **1.1 : Architecture** Microprocessor-Microcontroller-Comparison of microprocessor and microcontroller-Architecture diagram of microcontroller 8051-Functions of each block-Pin details of 8051-ALU- ROM-RAM-Memory organization of 8051- Special function registers-Program counter-PSW register-Stack- I/O ports-Timer-Interrupt-serial port-External memory- Oscillator and Clock-Reset-Power on reset-Clock cycle-machine cycle-Instruction cycle-Overview of 8051 family.	15
II	**8051 Instruction set and programming** **2.1: Instruction Set Of 8051** Instruction set of 8051-Classification of 8051 instructions-data transfer instructions-Arithmeticinstructions-Logical instructions-Branching instructions-Bit manipulation instructions- Assembling and running an 8051 program-Structure of Assembly language-Assembler directives-Different Addressing modes of 8051-Time delay routines.	8
	2.2: Assembly language programs 16 bit addition and 16 bit subtraction-8 bit multiplication and 8 bit division-BCD to HEX code conversion-HEX to BCD code conversion.-Smallest number/ Biggest number.	8
III	**Peripherals of 8051** **3.1: I/O Ports** Bit addresses for I/O ports-I/O port programming-I/O bit manipulation programming.	3
	3.2: Timer/Counter SFRS for Timer- Modes of Timers/counters- Programming 8051 Timer(Simple programs).	4
	3.3: Serial Communication Basics of serial communication-SFRs for serial communication-RS232	4

		standard-8051 connection to RS 232-8051 serial port programming.. **3.4: Interrupts** 8051 interrupts-SFRs for interrupt-Interrupt priority.	
			4
IV	**Interfacing Techniques**		8
	4.1: IC 8255		3
	IC 8255-Block diagram-Modes of 8255-8051 interfacing with 8255		
	4.2: Interfacing		
	Interfacing external memory to 8051-Relay interfacing- Sensor interfacing -Seven segment LED display interfacing-Keyboard interfacing-Stepper motor interfacing-ADC interfacing- DAC interfacing-DC motor interfacing using PWM-LCD interfacing.		13
V	**Advanced Microcontrollers**		8
	5.1: Types of microcontrollers		
	PIC microcontroller-General Block diagram-Features-Applications-Arduino- General Block diagram-Variants-Features-Applications-Raspberry pi-General Block diagram-Features-Applications-Comparison of microcontrollers.		
	5.2: IoT		
	Introduction to IoT-Block diagram of home automation using IoT.		3

Reference Books :

1. "Ajit pal" "Microcontrollers, Principles and Applications ",PHI Ltd,-2011.
2 ."Mazidi,Mazidi and D.MacKinlay" "8051 Microcontroller and Embedded Systems using Assembly and C",2006 Pearson Education Low Price Edition.
3. "R. Theagarajan" "Microprocessor and Microcontroller", Sci Tech Publication,Chennai.
4. www.microchip.com, www.raspberrypi.org,www.arduino.org.
5. "J.B. Peatman" "Design with PIC microcontrollers".
6. "Michael McRoberts", "beginning Arduino.
7. "Matt Richardson", "Getting started with Raspberry Pi".
8."Samuel Greengard", "The Internet of Things".

STATE BOARD OF TECHNICAL EDUCATION ANDTRAINING, TAMILNADU

DIPLOMAINENGINEERING / TECHNOLOGY SYLLABUS

N SCHEME

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

Course Name : 1040: Electronics and Communication Engineering

Subjectcode: 4040531

Semester:V

SubjectTitle:VERYLARGESCALEINTEGRATION

TEACHINGANDSCHEMEOFEXAMINATION

Noofweekspersemester:16weeks

Subject	Instructions		Examination				
	Hours/ Week	Hours/ Semester	Marks				Duration
			Internal Assessment	Board Examination	Total		
VERYLARGES CALEINTEGR ATION	4	64	25	100*	100		3Hours

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

TopicsandAllocationofHours

Unit	Topic	Hours
I	INTRODUCTION TO VLSI	12
II	INTRODUCTION TO VHDL	10
III	COMBINATIONAL CIRCUIT DESIGN	12
IV	SEQUENTIAL CIRCUIT DESIGN	12
V	PROGRAMMABLE LOGIC DEVICES	11
	Test& Model Exam	7
	Total	**64**

RATIONALE:

Very Large Scale Integration technology, when especially used fordesigning digital systems, it is mandatory that thebehaviorof therequired system to be described (modeled) and verified (simulated)before synthesis, translate the design into real hardware fabricationin the foundry (gates and wires).Hardware DescriptionLanguage (HDL)allows designs to be described using any methodology- top down,bottomup approach. VHDLcan be used to describe hardware atthe gatelevel or in a more abstract way. This course is to introduce the digital system design conceptsthrough hardware descriptionLanguage,VHDL programming, design flow of VLSI andarchitectures ofCPLD, FPGA.Itis mainlyaimedatdesignofcombinational andsequentialfunctions and simulates or verifiestheirfunctionalityusingtheHardwaredescriptionLanguage(HDL).

OBJECTIVES:

Onsuccessfulcompletionofthecourse,thestudentsmustbeableto

➢ Understand the concepts of VLSIdesignprocess.

➢ DevelopaVHDLcodeforcombinationalcircuit

➢ DevelopaVHDLcodeforsequentialcircuit.

➢ ExplaintheimportanceofPROM,PLA,and PAL.

➢ DifferentiatePROM, PLAandPAL.

➢ Developthecircuitusing PROM, PALandPLA.

➢ Understand CPLDandFPGAhardware.

➢ Differentiate ASIC, CPLD, FPGA.

4040531 VERY LARGE SCALE INTEGRATION
DETAILEDSYLLABUS

Contents:Theory

Unit	NameoftheTopic	Hours
I	**INTRODUCTION TO VLSI:** 1.1 NMOS,CMOS logic: NOT, AND, OR, NAND, and NOR Gates using NMOS – NOT, AND, OR, NAND, and NOR Gates using CMOS – Implementation of logic function (SOP, POS) in CMOS. 1.2 VLSI design process: Different level of abstractions in VLSI design – steps involved in VLSI design process: Design Entry,Simulation, Synthesis, Placement and Routing – Layout rules, Stick diagram.	6 6
II	**INTRODUCTION TO VHDL**: 2.1 Introduction: HDL – Different types of modeling – General format for VHDL program . 2.2 VHDL statements: Syntax for process statement, if statement, if else statement, if elsif else statement, case statement –Syntax for signal declaration and signal assignment statement –Syntax for variable declaration and variable assignment statement, component declaration. 2.3 VHDL code example: VHDL code for Logic gatesAND, OR, NOT, NAND, NOR gate and XOR gates.	2 4 4
III	**COMBINATIONAL CIRCUIT DESIGN:** 3.1 Combinational circuit: Half adder, Full adder , Half subtractor and Full subtractor – 4 to 1 Mux, 1 to 4 Demux, 4 to 2 Encoder, 2 to 4 decoder andcomparator – FourbitArithmeticadder – FourbitArithmeticsubtractor . 3.2 VHDL program for Combinational circuit: VHDL program for Half adder, Full adder – VHDL program for Hall subtractor and Full subtractor – 4 to 1 Mux, 1 to 4 Demux, 4 to 2 Encoder, 2 to 4 decoder andcomparatorinVHDL – VHDL program forFourbitArithmeticadder (structural) – VHDL program forFourbitArithmeticsubtractor (structural) .	6 6

IV	**SEQUENTIAL CIRCUIT DESIGN:**	
	4.1 Sequential circuit: Flip-flops: D,JKandTFlip-flops – counters:3 bit up Counter,3 bit down counter and 3 bit up/down counter,Decadecounter, ring counter and JohnsonCounter.	6
	4.2 VHDL program for Sequential circuit: VHDLprogramforD,JKandTFlip-flopswith resetinput, withoutresetinput – VHDL program for 3 bit up Counter,3 bit down counter and 3 bit up/down counter,Decadecounter, ring counter and JohnsonCounter.	6
V	**PROGRAMMABLE LOGIC DEVICES:** 5.1 PROM, PLA and PAL : Introduction to PROM, PLA and PAL – ImplementationofcombinationalcircuitswithPROM,PALandPLA (upto4variables) – ComparisonbetweenPROM,PALandPLA.	5
	5.2 CPLD,FPGA and ASIC : Architecture of Complex Programmable Logic device (CPLD) – Architecture of FieldProgrammableGateArrays(FPGA) – Introduction to Application Specific Integrated Circuit(ASIC) – TypesOf ASIC – ASIC design flow.	6

ReferenceBooks:

1. "M.MorrisMano,MichaelDCiletti ""DigitalDesign"PearsonEducation2008.

2. "BhaskerJ ""VHDLPrimer"PrenticeHallIndia-2009.

3. "NEIL H.E.WESTE, KAMRAN ESRHAGHIAN" "Principles of CMOS VLSI design", Addison – Wesley professional, second edition 1994.

4. "NigelP.Cook" "DigitalElectronicswithPLDIntegration",Pearson 2000.

5. "Ashok K.Sharma" "ProgrammableLogicHandbook:PLDs,CPLDs,andFPGAs",Mcgraw-Hill,1998.

6. "Michael John Sebastian Smith""Application Specific Integrated Circuits",Addison – Wesley professional,first edition 1997.

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STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

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

Course Name	: 1040:Electronics and Communication Engineering
Course Code	: 4040532
Semester	: V Semester
Subject Title	: CONSUMER ELECTRONICS

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	
Consumer Electronics	4	64	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	Audio system	11
II	Audio recording and reproducing system	12
III	Colour TV	12
IV	Digital Transmission and reception	12
V	Consumer Appliances	10
	Test & Model Exam	7
	Total	**64**

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RATIONALE:

The objective of teaching this subject is to give students in depth knowledge of various electronic audio and video devices and systems. Further, this subject will introduce the students with working principles, block diagram, main features of consumer electronics Gadgets/goods/devices. This in-turn will develop in them capabilities of assembling, fault Diagnosis and rectification in a systematic way.

OBJECTIVES:

- ➢ Understand the various types of microphones and loud speakers.
- ➢ To identify the various digital and analog signal.
- ➢ Describe the basis of television and composite video signal.
- ➢ Describe the various kinds of colour TV standards and system.
- ➢ Compare the various types of digital TV system.
- ➢ Understand the various types of consumer goods.
- ➢ Maintain various consumer electronic appliances.

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4040532 CONSUMER ELECTRONICS
DETAILED SYLLABUS

Contents: Theory

UNIT	NAME OF THE TOPICS	HOURS
I	**INTRODUCTION TO AUDIO SYSTEM** **1.1 Audio System** Microphones and Loudspeakers: Carbon, moving coil, cordless microphone,Direct radiating and horn loudspeaker, Multi-speaker system. **1.2 Sound Recording** Magnetic Recording, Digital Recording, Optical Recording (CD system, DVD, Blu-ray Disc).	6 5
II	**2.1 Reproducing system** Sound reproducing Systems: Monophonic, Stereophonic, Surround System. Hi-Fi system, block diagram and use of Home Theatre Systems . **2.2 Audio recording** Sound Recording: Principles of Sound recording: Magnetic Recording/ Reproduction. Audio CD Recording/ Reproduction, Study of working principle of audio and VCD, Digital sound recording on CD system, MP3.	6 6
III	**3.1 Colour TV** Primary colours, concepts of additive and subtracting mixing of colours, concepts of luminance, Hue and Saturation, Representation of a colour in colour triangle, non-spectral colour, visibility curve. **3.2 TV ENCODERS**:Compatibility of colour TV system with monochrome system. Basic colour TV system-NTSC, SECAM, and PAL their advantages and disadvantages. Construction and working principles of Trinitron and PIL types of colour picture tubes.	6 6
IV	**4.1 DIGITAL TRANSMISSION** Digital satellite television, Direct-To-Home (DTH) satellite television, Introduction to: Video on demand, CCTV, High Definition (HD)-TV. **4.2 RECEPTION** Introduction to Liquid Crystal and LED Screen Televisions Basic block diagram ofLCD and LED Television and their comparison.	6 6

V	**5.1 CONSUMER APPLIANCES** Basics principle and working of Microwave Oven and Photostat Machine and Digital Camera, Cam CorderWashing Machine: wiring diagram, electronic controller for washing machine, technical specifications, types of washing machine, fuzzy logic .	10

REFERENCE BOOKS:

1. Consumer Electronics- Bali S.P.- Pearson Education India,2010 , latest edition
2. Colour TV by A.Dhake
3. Audio Video Systems by R. G. Gupta; McGraw Hill Education System.
4. Consumer Electronics by Yagnik & Jain – Ishan Publication.

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STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING/TECHNOLOGY SYLLABUS

N SCHEME

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

Course Name   :1040: Electronics and Communication Engineering

Subject Code   : 4040533

Semester   :V

Subject title   : BASICS OF DIGITAL SIGNAL AND IMAGE PROCESSING

TEACHING AND SCHEME OF EXAMINATION

No ofweeks/ semester: 16weeks

Subject	Instruction		Examination			
	Hours /Week	Hours /Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
Basics of Digital Signal and Image Processing	4	64	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	Classification of Signals and systems	10
II	Analysis of continuous time Signals	13
III	Digital Image Fundamentals	10
IV	Image Enhancement and Image Restoration	12
V	Image Segmentation and compression	12
	Tests and Model Exam	7
Total		**64**

RATIONALE:

The subject basic of digital signal and image processing introduce visualization and mathematical representation of continuous time and discrete time signals and ability to analyses LTI system and give clear explanation of image compression, restoration, enhancement, segmentation. The student will have depth of knowledge about signal and image processing which will help in industries and in bio medical field.

OBJECTIVES:

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

- Know about basic knowledge of signals and system
- Know fourier representation of periodic signals
- Be able to characterize LTI system
- Steps in image processing
- Simple image fundamental
- Various image enhancement techniques
- Histogram processing
- Spatial filtering
- Understand various compression models
- Study JPEG techniques
- Detection of point, line, edge in images

4040533 BASICS OF DIGITAL SIGNAL AND IMAGE PROCESSING
DETAILED SYLLABUS

Contents: Theory

Unit	Name of the topics	Hours
I	**CLASSIFICATION OF SIGNALS AND SYSTEMS** **1.1 SIGNALS:** Standard signals- Step, Ramp, Pulse, Impulse, Real and complex exponentials and Sinusoids_ Classification of signals – Continuous time (CT) and Discrete Time (DT) signals, Periodic & Aperiodic signals, Deterministic & Random signals, Energy & Power signals **1.2 SYSTEMS:** Classification of systems- CT systems and DT systems- – Linear & Nonlinear, Time-variant & Time-invariant, Causal & Non-causal, Stable & Unstable.	5 5
II	**ANALYSIS OF CONTINUOUS TIME SIGNALS** **2.1 FOURIER TRANSFORM:** Fourier series for periodic signals – Fourier Transform – properties **2.2 LAPLACE TRANSFORM:** Laplace Transforms and properties	7 6
III	**DIGITAL IMAGE FUNDAMENTALS** **3.1 BASICS OF IMAGE PROCESSING;** Steps in Digital Image Processing – Components – Elements of Visual Perception – Image Sensing and Acquisition – Relationships between pixels **3.2 IMAGE SAMPLING AND QUANTIZATION** **3.3 COLOR IMAGE FUNDAMENTALS** RGB, HSI models.	6 2 2

IV	**IMAGE ENHANCEMENT AND IMAGE RESTORATION** **4.1 IMAGE ENHANCEMENT:** Spatial Domain: Gray level transformations – Histogram processing Basics of Spatial Filtering–Smoothing and Sharpening Spatial filtering. **4.2 IMAGE RESTORATION :** Image Restoration – degradation model, Noise models	7 5
V	**IMAGE SEGMENTATION AND COMPRESSION** **5.1 IMAGE SEGMENTATION:** Edge detection, Region based segmentation – Region growing – Region splitting and merging **5.2 IMAGE COMPRESSION:** Need for data compression, Huffman, Run Length Encoding, Shift codes, Arithmetic coding, JPEG standard, MPEG	6 6

REFERENCE BOOKS:

1. Signals, System and communication -B.P.Lathi, B.S Publication 2003
2. Signals and Systems – A.V. Oppenheim, A.S. willsky and S.H. Nawab, PHI 2nd Edition
3. Signals and Systems – Simon Haykin and van. Veen.Wiley, 2nd Edition
4. RafelC.Gonzalez and Richard Ewoods – Digital Image processing –Pearson Inc- 4th Edition – 2018
5. Anil K-Jain – Fundamental of Digital Image processing – Pearson Education, Inc – 2002

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

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

Course Name : 1040:Electronics and Communication Engineering

Subject code : 4040540

Semester : V

Subject title : ANALOG AND DIGITAL COMMUNICATION PRACTICAL

TEACHINGAND SCHEME OFEXAMINATION

No. of weeks/ Semester: 16weeks

Subject	Instruction		Examination				
	Hours /week	Hours /semester	Marks				Duration
			Internal Assessment	Board Examination	Total		
ANALOG AND DIGITAL 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:

This laboratory is based on communication system based on analog and digital system. The Student will able to test various communication equipments including transmitter and receiver. This lab system enable students to apply many experiments and activities covers various topics in analog and digital communication system of different types which gain the various skill in day today life.

OBJECTIVES:

On completion ofthefollowing experiments, the students must be able to

➢ know the concept of analog transmitter and receiver

➢ know the concept of digital (ASK/ FSK/ PSK)

➢ know about TDM

➢ Knowthe fiber optical link

➢ know the losses in optical fiber

➢ Test the performance of Manchester encoder and decoder

➢ know about DTH system

4040540 ANALOG AND DIGITAL COMMUNICATION PRACTICAL
DETAILED SYLLABUS

Contents: Practical
Exercises

1. Construct a sample and hold circuit, test and trace its waveforms.

2. Test the performance of ASK modulator and demodulator &drawits input and output waveform

3. Test the performance of FSK modulator and demodulator &drawits input and output waveform

4. Test the performance of PSK modulator and demodulator &drawits input and output waveform

5. Test the performance of Time Division Multiplexer and draw its input and output waveforms

6. Test the performance of analog transmitter and receiver and draw its input and output waveforms

7. Test the performance of a fiber optic analog link and draw its input and output waveforms

8. Test the performance of a fiber optic digital link and draw its input and output waveforms

9. Find the bending loss and propagation loss in fiber with two different fiber lengths

10. Test the performance of Manchester encoder and decoder using optical communication.

11. Test the performance of a voice link using optical fiber.

12. Test the Horizontal and Vertical deflection sensitivity of CRT.

13. Install a DTH system and test its performance.

BOARD EXAMINATION

DETAILED ALLOCATION OF MARKS

CIRCUIT DIAGRAM/BLOCK DIAGRAM: 25

CONNECTION   :   30

EXECUTION & HANDLING OF EQUIPMENT :   20

OUTPUT / RESULT   :   15

VIVA – VOCE   :   10

TOTAL   :   100

MODEL QUESTION PAPER

4040540 ANALOG AND DIGITAL COMMUNICATION PRACTICAL

1. Construct a sample and hold circuit, test and trace its waveforms.

2. Test the performance of ASK modulator and demodulator & drawits input and output waveform

3. Test the performance of FSK modulator and demodulator & drawits input and output waveform

4. Test the performance of PSK modulator and demodulator & drawits input and output waveform

5. Test the performance of Time Division Multiplexer and draw its input and output waveforms

6. Test the performance of analog transmitter and receiver and draw its input and output waveforms

7. Test the performance of a fiber optic analog link and draw its input and output waveforms

8. Test the performance of a fiber optic digital link and draw its input and output waveforms

9. Find the bending loss and propagation loss in fiber with two different fiber lengths

10. Test the performance of Manchester encoder and decoder using optical communication.

11. Test the performance of a voice link using optical fiber.

12. Test the Horizontal and Vertical deflection sensitivity of CRT

13. Install a DTH system and test its performance.

LIST OF EQUIPMENTS

S.NO	Name oftheEquipments	Range	RequiredNos.
1	DualtraceCRO	100MHz	2
2	PSK Modulation Kit		1
3	PSK Demodulation Kit		1
4	Fiber optic demonstration kit		2
5	DTH		1

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STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

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

Course Name   : 1040:Electronicsand Communication Engineering

Subject Code   : 4040550

Semester   : V

Subject Title   : Microcontroller 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	
Microcontroller Practical	4	64	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 have hands on experience in using 8051 trainer kit. The students are exposed to learn simple programs using assembly language. They can also get familiar with the C compiler platform. They also gain knowledge by using application specific interfacing boards .

OBJECTIVES:

The students are able to

    -> Understand the use of instruction set by writing and executing simple ALP.

    -> Know the connection details between microcontroller and peripherals.

     .

4040550 MICROCONTROLLER PRACTICAL
DETAILED SYLLABUS

Contents:Practical

Exercises

Part A

The following experiments should be written using 8051 assembly language program and should be executed in the 8051 microcontroller trainer kit.

1. 8 / 16 bit addition
2. 8 / 16 bit subtraction
3. 8 bit multiplication
4. 8 bit division
5. BCD to Hex code conversion
6. Hex to BCD code conversion
7. Smallest / Biggest number
8. Time delay routine (Demonstrate by Blinking LEDS).
9. Using Timer/ counter of 8051

Part B (Interfacing Application Boards)

The following experiments can be written using C compiler or 8051 assembly language and to be executed.

10. Interfacing Digital I/O board
11. Interfacing DAC
12. Interfacing Stepper motor
13. Interfacing Seven segment LED display or LCD
14. Sending data through the serial port between microcontroller kits
15. Interfacing DC motor using PWM.

BOARD EXAMINATION

Note:

1.Students are provided with Hex code sheet for manual hand assembly.

DETAILED ALLOCATION OF MARKS

I.	Algorithm or Flow chart	:	20 marks
II.	Program	:	30 marks
III.	Execution	:	30 marks
IV.	Result	:	10 marks
V.	Viva	:	10 marks
		TOTAL	:100 marks

MODEL QUESTION PAPER
4040550 MICROCONTROLLER PRACTICAL

1.Write an assembly language program for adding two 8 bit / 16 bit numbers and execute the same using 8051 trainer kit. Store the output result in memory. Input numbers can be given as immediate data or can be stored in the memory.

2.Write a program to interface stepper motor with microcontroller 8051 and execute. Check the execution for varying the speed of the motor and also the forward/reverse rotation of the motor.

3.Write a 8051 Assembly Language program to use Timer/ Counter of 8051 microcontroller to generate time delay and observe the output.

4.Write a 8051 Assembly language program to generate 1 second time delay using Time delay routine and verify the output at LEDS.

5.Write a program to interface DAC interface board with microcontroller and verify the analog output.

6. Write a program to interface LCD interface board with microcontroller and observe the output at LCD.

7.Write a program to interface Digital I /O board with microcontroller and verify all input and output operations.

8. Write an assembly language program using 8051 to convert the given BCD number to hexadecimal number and store the result in memory. The input can be given as an immediate data or can be stored in the memory.

9. Write an assembly language program using 8051 to convert the given hexadecimal number to BCD number and store the result in memory. The input can be given as an immediate data or can be stored in the memory.

10. Write an assembly language program using 8051 to find the smallest number of the array of given numbers and store the result in the memory. The size of the array and the input numbers can be stored in the memory.

11. Write an assembly language program using 8051 to perform 8 bit multiplication and store the result in the memory. The input numbers can be given as immediate data or can be stored in the memory.

12. Write an assembly language program for subtracting two 8 bit / 16 bit numbers and execute the same using 8051 trainer kit. Store the output result in memory. Input numbers can be given as immediate data or can be stored in the memory.

13. Write an assembly language program using 8051 to perform 8 bit division and store the result in the memory. The input numbers can be given as immediate data or can be stored in the memory.

14. Write a program to perform serial communication between two 8051 microcontroller kits and verify the output.

15. Write a program to interface seven segment LED interface with microcontroller and verify the output at seven segment display .

16. Write a program to interface a DC motor with microcontroller and verify the rotation of motor in both directions using PWM method.

LIST OF EQUIPMENTS

S.NO	Name of the Equipments	Required Nos
1.	8051 Microcontroller kit	14
2.	Digital I/O Interface board	2
3.	Seven segment LED display interface board	2
4.	8 bit DAC interface board	2
5.	Stepper motor control interface board	2
6.	DC motor control interface board	2
7.	RS 232 serial port cable	2
8.	LCD interface board	2
9.	Laptop / Desktop Computer	6

STATE BOARD OF TECHNICAL EDUCATION ANDTRAINING,TAMILNADU

DIPLOMAINENGINEERING / TECHNOLOGY SYLLABUS

N SCHEME

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

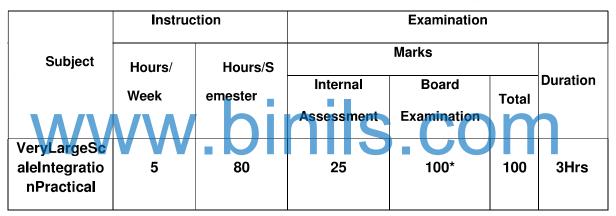Course Name:1040:Electronics and Communication Engineering

SubjectCode: 4040561

Semester   :V

SubjectTitle: VeryLarge Scale IntegrationPractical

TEACHINGANDSCHEMEOFEXAMINATION

Noofweekspersemester:16weeks

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

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

RATIONALE:

VHDL is a versatile and powerful hardware description language which isuseful for modeling digital systems at various levels of design abstraction.This language is mainly for describing the hardware. Execution of a VHDL program results in asimulation of the digital system allows us to validate the design prior tofabrication of Digital Integrated circuit. This practical will enable the students to have hands on experience in using FPGA kit. The students are exposed to do programming in VHDL.

OBJECTIVES:

Thestudentswillbeableto

➢ Understand the use of VHDL statements by writing program in VHDL.

➢ DevelopaVHDLcodeforany digital circuits.

➢ Understand the concepts of digital circuits / logic function by simulating VHDL programs through XILINX software.

➢ Understand the concepts of digital circuits by using FPGA kit.

➢ To know the usage of input switches, output LEDs and seven segment display in FPGA kit.

4040561VERYLARGESCALEINTEGRATIONPRACTICAL
DETAILED SYLLABUS

Contents: Practical

Exercises

NOTE: Behavioral or structural model can be used for allexperiments

1.SIMULATIONOFVHDLCODEFOR LOGIC GATES (AND GATE,OR GATE)
Develop code for logic gates. Simulate the code in the software.

2.SIMULATIONOFVHDLCODEFORCOMBINATIONALFUNCTION
Optimize a 4 variable combinational function (SOP), describe it inVHDL codeandsimulateit.Example:F=(0,1,4,5,8,9,12)insop

3.SIMULATIONOFVHDLCODEFOR HALF ADDER AND FULL ADDER
Develop code for half adder and full adder. Simulate the code in the
software .

4.SIMULATIONOFVHDLCODEFOR HALF SUBTRACTOR AND FULL SUBTRACTOR
Develop code for half subtractor and full subtractor. Simulate the code in
the software.

5.SIMULATIONOFVHDLCODEFOR SINGLE BIT DIGITAL COMPARATOR
Develop Boolean expression for A>B, A=B, A<B, write a VHDL code and
simulate the code in the software.

6.VHDLIMPLEMENTATIONOF8 TO 1 MULTIPLEXER
Develop the code for a 8 to 1 multiplexer and implement it in FPGA kit in which switches are connected for select inputs and for data inputs, a LED is connected to the output.

7.VHDLCODE FOR JK FLIPFLOP (SIMULATION/IMPLEMENTATION)
 Develop the code for JK flipflop and simulate using software or implement it in FPGA kit.

8.VHDLIMPLEMENTATIONOF 1 TO 8 DEMULTIPLEXER
Develop the code for a 1 t0 8 Demultiplexer and implement it in FPGA kit in which Switches are connected for select inputs and a data input, Eight LEDs are connectedtotheoutputofthe circuit.

9.VHDLIMPLEMENTATIONOF7SEGMENTDECODER – BOOLEAN EXPRESSION
DevelopBooleanexpressionfor4inputvariablesand7outputvariables.Develop a seven segment decoder in VHDL for 7 equations. A seven segment display is connected to the output of the circuit. Four switches areconnectedtotheinput.The4bitinputisdecodedto7segmentequivalent.

10.VHDLIMPLEMENTATIONOF7SEGMENTDISPLAY - WITH COUNTER
Design and develop a seven segment decoder in VHDL. Design and developa 4 bit BCD counter, the output of the counter is given to seven segment decoder.A seven segment display is connected to the output of the decoder. The displayshows0,1,2..9foreveryonesecond

11.VHDLIMPLEMENTATIONOF 8 TO 3ENCODER
Develop code for 8 to 3 encoder. There willbe 8 switches and 3 LEDs in the FPGA kit. The input givenfrom switches and it is noted that any one of the switch is active. The binaryequivalentforthecorrespondinginputswitchwillbeglowingintheLEDasoutput.

12.VHDLIMPLEMENTATION OF2 TO 4 DECODER
Develop code for 2 to 4 decoder and implement it in FPGA kit in which 2 Switches are connected for inputs , four LEDs foroutput.

13.VHDLIMPLEMENTATIONFORBLINKINGALED
Develop a VHDL Code for delay .Delay is adjusted in such a way that LED blinks for every 1 or 2seconds.

14.VHDLIMPLEMENTATIONFORBLINKINGANARRAYOFLEDS
Design and develop a VHDL Code for 4 bit binary up counter. Four LEDs areconnected at the output of the counter. The counter should up for every onesecond.
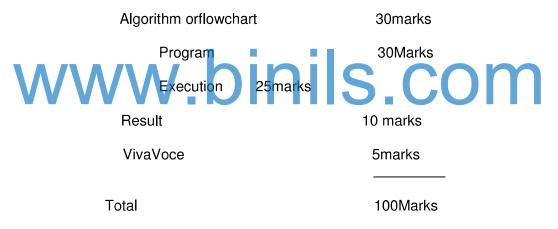
15.VHDLIMPLEMENTATIONOFASPELLERWITHANARRAYOFLEDS
Design and develop VHDL Code for a 5 bit Johnson ring counter 4 bit TheLEDs are connected at the output of the counter. The speller should work foreveryonesecond.

BOARD EXAMINATION

NOTE:

1. All the experiments given in the list of experiments should be completed andgivenfortheendsemesterpracticalexamination.

2. In order to develop best skills in handling Instruments/Equipment practical classes, every three students should be provided with a separateexperimentalsetupfor doingexperimentsinthelaboratory.

3. The external examiners are requested to ensure that a single experimentalquestion should not be given to more than three students while admitting abatchof30studentsduringBoardExaminations.

DETAILED ALLOCATIONOFMARKS

Algorithm orflowchart	30marks
Program	30Marks
Execution	25marks
Result	10 marks
VivaVoce	5marks
Total	100Marks

MODEL QUESTION PAPER
4040561 VERYLARGESCALEINTEGRATIONPRACTICAL

1. Write aVHDLcodefor logic gates (AND gate, OR gate) and simulate the code.

2. Simplify the function f=(0,1,4,5,8,9,12). Write aVHDLcodeforthe simplified function andsimulateit.

3. Write aVHDLcodefor half adder and full adder and simulate the code.

4. Write aVHDLcodeforhalf subtractor and full subtractor and simulate the code.

5. Write aVHDLcodefor single bit digital comparator and simulate the code.

6. Write aVHDLcodefor8 to 1 multiplexer and implement it in FPGA kit.

7. Write aVHDLcodeforJK flipflop and simulate using software or implement it in FPGA kit.

8. Write aVHDLcodefor1 to 8 demultiplexer and implement it in FPGA kit.

9. Write aVHDLcodefor7segmentdecoder – Boolean expression and implement it in FPGA kit.

10. Write aVHDLcodefor7segmentdisplay - with counter and implement it in FPGA kit.

11. Write aVHDLcodefor 8 to 3 encoder and implement it in FPGA kit.

12. Write aVHDLcodefor2 to 4 decoder and implement it in FPGA kit.

13. Write aVHDLcodeforblinkingaLED and implement it in FPGA kit.

14. Write aVHDLcodeforblinkinganarrayofLEDs and implement it in FPGA kit.

15. Write aVHDLcodeforspellerwithanarrayofLEDs and implement it in FPGA kit.

LISTOFEQUIPMENTS

1. FPGA KIT with atleast 10 switches for input, 8 LEDs for output, a 7 segmentdisplay, debounced push switch (2 Nos) for manual clock input and external clocksource–10Nos with software.

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

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

Course Name : 1040:Electronics and Communication Engineering

Course Code : 4040562

Semester : V Semester

Subject Title : Consumer Electronics 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	
Consumer Electronics 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 objective of teaching this subject is to give students an in depth knowledge of various electronic audio and video devices and systems. Further this subject will introduce the students with working principles, block diagram, main features of consumer electronics gadgets/goods/devices. This in-turn will develop in them capabilities of assembling, fault diagnosis and rectification in a systematic way.

OBJECTIVES:

On completion ofthefollowing experiments, the students must be able to

➢ Troubleshoot different types of Microphones and loudspeakers.

➢ Maintain and troubleshoot of audio systems.

➢ Troubleshoot LED TV Receiver.

➢ Know about installation and troubleshoot of CCTV and Dish antenna.

> ➤ Know about various sensors and their functionalities of washing machine.
>
> ➤ Know about Installation and troubleshoot of A/C
>
> ➤ Maintain various consumer Electronic appliances.

4040562 CONSUMER ELECTRONICS PRACTICAL DETAILED SYLLABUS

Contents:Practical

Exercises

1. To study public address system and its components.
2. To plot the directional response of a Microphone.
3. To plot the directional response of a Loud Speaker.
4. Trouble shooting of CD/DVD Player.
5. To perform fault identification in LED TV.
6. Installation of Dish Antenna for best reception.
7. Installation of CCTV system.
8. Demonstration of Microwave Oven.
9. Demonstration of Automatic Washing Machine and locate various sensors used in that washing machines.
10. To study the various parameters in the Smartphone and Tablet.
11. Explore digital cameras settings.
12. To build and test temperature control system.
13. To build and test circuit for A/C motor control.
14. Verify functions of Camcorder.
15. Installation of LCD/LED Projector and verify the functionalities.

BOARD EXAMINATION
DETAILED ALLOCATION OF MARKS

CIRCUIT DIAGRAM	: 25
PROCEDURE	: 30
EXECUTION & HANDLING OF EQUIPMENT	: 20
OUTPUT / RESULT	: 15
VIVA – VOCE	: 10

TOTAL : 100

MODEL QUESTION PAPER
4040562 CONSUMER ELECTRONICS PRACTICAL

1. To study public address system and its components.
2. To plot the directional response of a Microphone.
3. To plot the directional response of a Loud Speaker.
4. Trouble shooting of CD/DVD Player.
5. To perform fault identification in LED TV.
6. Installation of Dish Antenna for best reception.
7. Installation of CCTV system.
8. Demonstration of Microwave Oven.
9. Demonstration of Automatic Washing Machine and locate various sensors used in that washing machines.
10. To study the various parameters in the Smartphone and Tablet.
11. Explore digital cameras settings.
12. To build and test temperature control system.
13. To build and test circuit for A/C motor control.
14. Verify functions of Camcorder.
15. Installation of LCD/LED Projector and verify the functionalities.

LIST OF EQUIPMENTS

S.NO	Name of Equipment with specification	Quantity
1.	Digital Multimeter	10
2.	Microphone (Different types)	10
3.	Loud Speaker	10
4.	LED TV	2
5.	Dish Antenna	1
6.	Microwave Oven, Washing machine, A/C	2
7.	Digital Camera, Smart Phone/Tablet, Camcorder	2
8.	LCD/LED Projector.	2
9.	CCTV Cameras	5

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

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

Course Name : 1040:Electronics and Communication Engineering

Subject code : 4040563

Semester : V

Subject title : SIGNAL AND IMAGE PROCESSING PRACTICAL

TEACHING AND SCHEME OF EXAMINATION

No. of weeks/ Semester: 16weeks

Subject	Instruction		Examination				Duration
	Hours /week	Hours /semester	Marks				
			Internal Assessment	Board Examination	Total		
Signal and Image Processing Practical	5	80	25	100*	100		3 Hours

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

RATIONALE:

This laboratory makes the student to understand the basic concepts of signal and image processing .signal processing focuses on analyzing, modifying and synthesizing signals such as sound, images and scientific measurements. The need to extract information from images and interpret their contents has been one of the driving factors in the development of image processing and computer vision during the past decades .Image processing application cover a wide range of human activities such as Medical application, Industrial, Military, Consumer Electronics, Law Enforcement and security, The internet particularly the world wide web.

OBJECTIVES:

On completion ofthefollowing experiments, the students must be able to

- ➢ know to generate discrete sequence signal.
- ➢ knowabout fourier transform
- ➢ know first order low pass filter and first order high pass filter
- ➢ know about spatial domain
- ➢ know about contrast stretching.
- ➢ know graylevel slicing and bitplane slicing
- ➢ know about masking
- ➢ know frequency domain of ideal lowpass filter and ideal high pass filter

4040563 SIGNAL AND IMAGE PROCESSING PRACTICAL
DETAILED SYLLABUS

Contents: Practical

Exercises

1. Write a MATLAB program to generate the discrete sequence unit step and unit impulse. Plot all sequences

2. Write a MATLAB program to generate the discrete sequence ramp and periodic sinusoidal signal.plot all sequences.

3. Find the Fourier transform of a square pulse using MATLAB .Plot its amplitude and phase spectrum.

4. Write a MATLAB program to generate a random sinusoidal signal and plot four possible realizations of random signals

5. Write a MATLAB program to find the magnitude and phase response of first order low pass filter. Plot the responses in logarithmic scale.

6. Write a MATLAB program to find the magnitude and phase response of first order high pass filter. Plot the responses in logarithmic scale.

7. Write a MATLAB program in spatial domain for image negatives and log transformation

8. Obtain the power law transformation in spatial domain using MATLAB.

9. Write a MATLAB program for contrast stretching.

10. Write a MATLAB program in spatial domain for linear filter

11. Write a MATLAB program for graylevel slicing andbitplane slicing.

12. Write a MATLAB program for histogram equalization

13. Write a MATLAB program for unsharp masking.

14. Obtain the frequency domain of ideal lowpass filter in MATLAB.

15. Obtain the frequency domain of ideal high pass filter in MATLAB.

BOARD EXAMINATION

DETAILED ALLOCATION OF MARKS

WRITING PROGRAM:		40
EXECUTION OF PROGRAM :		35
OUTPUT / RESULT :		15
VIVA – VOCE	:	10
TOTAL	:	100

MODEL QUESTION PAPER
4040563 SIGNAL AND IMAGE PROCESSING PRACTICAL

1. Write a MATLAB program to generate the discrete sequence unit step and unit impulse. Plot all sequences

2. Write a MATLAB program to generate the discrete sequence ramp and periodic sinusoidal signal.plot all sequences.

3. Find the Fourier transform of a square pulse using MATLAB .Plot its amplitude and phase spectrum.

4. Write a MATLAB program to generate a random sinusoidal signal and plot four possible realizations of random signals

5. Write a MATLAB program to find the magnitude and phase response of first order low pass filter. Plot the responses in logarithmic scale.

6. Write a MATLAB program to find the magnitude and phase response of first order high pass filter. Plot the responses in logarithmic scale.

7. Write a MATLAB program in spatial domain for image negatives and log transformation

8. Obtain the power law transformation in spatial domain using MATLAB.

9. Write a MATLAB program for contrast stretching.

10. Write a MATLAB program in spatial domain for linear filter

11. Write a MATLAB program for gray level slicing and bit plane slicing

12. Write a MATLAB program for histogram equalization

13. Write a MATLAB program for unsharp masking.

14. Obtain the frequency domain of ideal lowpass filter using MATLAB.

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15.   Obtain the frequency domain of ideal high pass filter using MATLAB.

LIST OF EQUIPMENTS

S.NO	Name oftheEquipments	Range	RequiredNos.
1.	Desk Top Computer		15
2.	Simulation Tool	MATLAB	1

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STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

(Implemented from the Academic Year 2020-2021 onwards)

Course Name   :1020:Mechanical Engineering

Subject Code   : 4020570

Semester   : V

Subject Title   : ENTREPRENEURSHIP AND START-UPS

TEACHING AND SCHEME OF EXAMINATION

No. of Weeks per Semester: 16 Weeks

Subject	Instruction		Examination				
	Hours/ Week	Hours/ Semester	Marks				Duration
			Internal Assessment	Board Examinations	Total		
Entrepreneurship and Startups	4 hours	64 hours	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	Topic	Hours
1	Entrepreneurship – Introduction and Process	10
2	Business Idea and Banking	10
3	Start ups, E-cell and Success Stories	10
4	Pricing and Cost Analysis	10
5	Business Plan Preparation	10
Revision, Field visit and Preparation of case study report		14
Total		64

RATIONALE:

Development of a diploma curriculum is a dynamic process responsive to the society and reflecting the needs and aspiration of its learners. Fast changing society deserves changes in educational curriculum particularly to establish relevance to emerging socio-economic environments; to ensure equity of opportunity and participation and finally promoting concern for excellence. In this context the course on entrepreneurship and start ups aims at instilling and stimulating human urge for excellence by realizing individual potential for generating and putting to use the inputs, relevant to social prosperity and thereby ensure good means of living for every individual, provides jobs and develop Indian economy.

OBJECTIVES:

At the end of the study of 5th semester the students will be able to

- To excite the students about entrepreneurship
- Acquiring Entrepreneurial spirit and resourcefulness
- Understanding the concept and process of entrepreneurship
- Acquiring entrepreneurial quality, competency and motivation
- Learning the process and skills of creation and management of entrepreneurial venture
- Familiarization with various uses of human resource for earning dignified means of living
- Know its contribution in and role in the growth and development of individual and the nation
- Understand the formation of E-cell
- Survey and analyze the market to understand customer needs
- Understand the importance of generation of ideas and product selection
- Learn the preparation of project feasibility report
- Understand the importance of sales and turnover
- Familiarization of various financial and non financial schemes
- Aware the concept of incubation and starts ups

DETAILED SYLLABUS

Unit	Name of the Topics	Hours
1	**ENTREPRENEURSHIP – INTRODUCTION AND PROCESS** ● Concept, Functions and Importance ● Myths about Entrepreneurship ● Pros and Cons of Entrepreneurship ● Process of Entrepreneurship ● Benefits of Entrepreneur ● Competencies and Characteristics ● Ethical Entrepreneurship ● Entrepreneurial Values and Attitudes ● Motivation ● Creativity ● Innovation ● Entrepreneurs - as problem solvers ● Mindset of an employee and an entrepreneur ● Business Failure – causes and remedies ● Role of Networking in entrepreneurship	10
2	**BUSINESS IDEA AND BANKING** ● Types of Business: Manufacturing, Trading and Services ● Stakeholders: Sellers, Vendors and Consumers ● E- Commerce Business Models ● Types of Resources - Human, Capital and Entrepreneurial tools	10

	• Goals of Business and Goal Setting	
	• Patent, copyright and Intellectual Property Rights	
	• Negotiations - Importance and methods	
	• Customer Relations and Vendor Management	
	• Size and Capital based classification of business enterprises	
	• Role of Financial Institutions	
	• Role of Government policy	
	• Entrepreneurial support systems	
	• Incentive schemes for State Government	
	• Incentive schemes for Central Government	
3	**STARTUPS, E-CELL AND SUCCESS STORIES**	
	• Concept of Incubation centre's	10
	• Activities of DIC, financial institutions and other relevance institutions	
	• Success stories of Indian and global business legends	
	• Field Visit to MSME's	
	• Various sources of Information	
	• Learn to earn	
	• Startup and its stages	
	• Role of Technology – E-commerce and Social Media	
	• Role of E-Cell	
	• E-Cell to Entrepreneurship	
4	**PRICING AND COST ANALYSIS**	
	• Calculation of Unit of Sale, Unit Price and Unit Cost	

	• Types of Costs - Variable and Fixed, Operational Costs	10
	• Break Even Analysis	
	• Understand the meaning and concept of the term Cash Inflow and Cash Outflow	
	• Prepare a Cash Flow Projection	
	• Pricing and Factors affecting pricing	
	• Understand the importance and preparation of Income Statement	
	• Launch Strategies after pricing and proof of concept	
	• Branding - Business name, logo, tag line	
	• Promotion strategy	
5	**BUSINESS PLAN PREPARATION**	10
	• Generation of Ideas,	
	• Business Ideas vs. Business Opportunities	
	• Selecting the Right Opportunity	
	• Product selection	
	• New product development and analysis	
	• Feasibility Study Report – Technical analysis, financial analysis and commercial analysis	
	• Market Research - Concept, Importance and Process	
	• Marketing and Sales strategy	
	• Digital marketing	
	• Social Entrepreneurship	
	• Risk Taking-Concept	
	• Types of business risks	

REFERNCE BOOKS:

1. Dr. G.K. Varshney, Fundamentals of Entrepreneurship, Sahitya Bhawan Publications, Agra - 282002

2. Dr. G.K. Varshney, Business Regulatory Framework , Sahitya Bhawan Publications, Agra - 282002

3. Robert D. Hisrich, Michael P. Peters, Dean A. Shepherd, Entrepreneurship , McGraw Hill (India) Private Limited, Noida - 201301

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Board Examination – Evaluation Pattern

Internal Mark Allocation

Assignment (Theory portion)*   - 10

Seminar Presentation   - 10

          Attendance   - 5

TOTAL   **- 25**

Note: * Two assignments should be submitted. The same must be evaluated and converted to 10 marks.

Guidelines for assignment:

          First assignment – Unit I

          Second assignment – Unit II

Guidelines for Seminar Presentation--Unit III

Each assignment should have five three marks questions and two five marks questions.

BOARD EXAMINATION

Note

1. The students should be taught all units and proper exposure and field visit also arranged. All the portions should be completed before examinations.

2. The students should maintain theory assignment and seminar presentation. The assignment and seminar presentation should be submitted during the Board Practical Examinations.

3. The question paper consists of theory and practical portions. All students should write the answers for theory questions (40 Marks) and practical portions (60 Marks) should be completed for board examinations.

4. All exercises should be given in the question paper and students are allowed to select by lot. If required the dimensions of the exercises may be varied for every batch. No fixed time allotted for each portion and students have liberty to do the examination for 3Hrs.

5. For Written Examination: theory question and answer: 45 Marks

   Ten questions will be asked for 3 marks each. Five questions from each unit 1 & 2. (10 X 3 = 30).

   Three questions will be asked for 5 marks each. One question from each unit 1, 2 & 3. (3 X 5 = 15)

6. For Practical Examination: The business plan/Feasibility report or Report on Unit 4 & 5 should be submitted during the board practical examinations. The same have to be evaluated for the report submission (40 marks).

DETAILED ALLOCATION OF MARKS

SI. No	Description	Marks
Part A	Written Examination - Theory Question and answer (10 questions x 3 marks:30 marks & (3 questions x 5 marks: 15 marks)	45
Part B	Practical Examination – Submission on Business Plan/Feasibility Report or Report on Unit 4 & 5	40
Part C	Viva voce	15
	Total	100