

BHARATHIAR UNIVERSITY, COIMBATORE.
M. Sc. APPLIED ELECTRONICS DEGREE COURSE WITH COMPULSORY
DIPLOMA (AFFILIATED COLLEGES - Effective from the academic Year 2009-2010)
SCHEME OF EXAMINATIONS – CBCS PATTERN

Sem.	Study Components	Course title	Ins. hrs/ week	Examinations				Credit
				Dur.	CIA	Marks	Total Marks	
I	Paper I - Microwave and Radar Navigation Systems		5	3	25	75	100	5
	Paper II - Microcontroller and Applications		5	3	25	75	100	5
	Paper III - Micro Electro Mechanical Systems and Power Electronics		5	3	25	75	100	5
	Paper IV - Design of Analog Integrated Circuits		4	3	25	75	100	5
	Practical I - General Electronics Lab		4	-	-	-	-	-
	Practical II - Embedded & VHDL Lab		4	-	-	-	-	-
	Elective Dip. Paper I		3	3	25	75	100	3
II	Paper V - Embedded Systems		5	3	25	75	100	5
	Paper VI - VHDL Programming		5	3	25	75	100	5
	Paper VII - DSP Processor And Architecture and Programming		5	3	25	75	100	5
	Paper VIII - High Performance Communication Networks		4	3	25	75	100	5
	Practical I - General Electronics Lab		4	4	40	60	100	4
	Practical II - Embedded & Vhdl Lab		4	4	40	60	100	4
	Elective Dip. Paper II:		3	3	25	75	100	3
III	Paper IX - Advanced Digital Signal Processing		5	3	25	75	100	5
	Paper X - PC Based System Design		5	3	25	75	100	5
	Paper XI - Wireless Communication Engineering		5	3	25	75	100	5
	Paper XII - Elective Paper		4	3	25	75	100	5
	Practical III - PC Hardware Lab		4	4	40	60	100	2
	Practical IV - DSP Lab		4	4	40	60	100	2
	Elective Dip. Paper III		3	3	25	75	100	3
IV	PROJECT WORK & VIVA VOCE		10	-	-	-	200*	6
	Elective Dip. Practical:		3	4	40	60	100	3
	Total						2200	90

* Project report - 160 marks; Viva-voce – 40 marks

Elective Paper

1. Verilog and Asic Design
2. Bio-Medical Instrumentation
3. Computer Architecture and Parallel Processing

List of Group Elective/Diploma papers (Colleges can choose any one of the Group/Diploma papers as electives)

	GROUP A DIPLOMA IN INFORMATION TECHNOLOGY	GROUP B DIPLOMA IN ELECTRONIC INSTRUMENTATION	GROUP C DIPLOMA IN ELECTRONIC DESIGNING AND AUTOMATION
Paper I/ Sem I	Web Technologies	Electronic Test Instruments	Analog and Digital Circuit Design and Analysis
Paper II/ Sem II	Relational Data Base Management Systems	Analytical Instrumentation	PCB Designing and Product Development Tools
Paper III/ Sem III	Programming with .NET	Virtual Instrumentation	Signal Processing Implementation and Simulation
Paper IV/ Sem IV	RDBMS and .NET Lab	Instrumentation Lab	EDA Tools : Design, Analysis and Simulation lab

Note :

1. The Syllabus for the above papers (except elective Diploma papers Group B & Group C) be the same as prescribed for the academic year 2007- 08.
2. The syllabus for the elective Diploma papers Group B & Group C are furnished below :

GROUP B DIPLOMA IN ELECTRONIC INSTRUMENTATION SEM – I

PAPER I : ELECTRONIC TEST INSTRUMENTS

UNIT I ANALOG METERS

D.C,A.C voltmeters, ammeters, multimeter,power meter,Q-meter,true RMS meter, vector impedance meter, vector voltmeter, component measuring instrument.

UNIT II SIGNAL SOURCES

Sine wave generator-Frequency synthesized sine wave generator-Sweep frequency generator, pulse and square wave generator-Function generator-Wave analyzer-Applications-Harmonic distortion analyzer-Spectrum analyzer-Applications- Audio Frequency generator-Noise generator.

UNIT III OSCILLOSCOPES

General purpose oscilloscope-Screens for CRT graticules-Vertical & horizontal deflection systems- Time base operation, triggers – sweep control, z axis input – Delay line-Multiple trace-Dual beam & dual trace-Probes-Oscilloscope techniques-special oscilloscopes-Storage oscilloscope-sampling oscilloscope-digital CRO.

UNIT IV DIGITAL INSTRUMENTS

Digital method for measuring frequency, period, phase difference, pulse width, time interval, total count-Digital voltmeter-Types-Automatic polarity indication, automatic ranging, and auto zeroing-DMM-Microprocessor based DMM-DPM-swept – spectrum analyzer-network analyzer-discharge analyzer- logic probes-logic analyzer.

UNIT V DISPLAY AND RECORDING DEVICES

Bar graph display-Segmental and dot matrix display-X-Y recorders, magnetic tape recorders-Digital recording-Data loggers-Interference and screening-Electrostatic and electromagnetic interference & earth loops.

TEXT BOOKS

- 1.Albert D. Herlfrick & William D. Cooper, “Modern electronic Instrumentation & Measurement Techniques” Prentice Hall of India,2002.
- 2.A.J.Bouwens,’Digital Instrumentation” Tata Mc Graw Hill, 1997.
- 3.RobertA.Witte,’Electronic Test Instruments,Theory and applications’ Prentice Hall, 1993.

REFERENCE BOOKS

- 1.B.M.Oliver and J.M.Cage, ”Electronic Measurements & Instrumentation” Mc Graw Hill International Edition, 1975.
- 2.Joseph, J.Carr, ”Elements of Electronic Instrumentation & Measurements” III edition, Pearson Education,2003.
- 3.C.S.Rangan, G.R.sarma, V.S.V.Mani, ”Instrumentation Devices & systems” Tata Mc Graw Hill, 2002
- 4.D.A.Bell, “Electronic Instrumentation and Measurements” Prentice Hall of India,2002.
- 5.Rajendra Prasad, ”Electronic Measurements and Instrumentation”, Khanna Publishers, Delhi,2003.
- 6.B.R.Gupta, ”Electronics and Instrumentation”S.Chand Co. (P)Ltd., Delhi,

GROUP B DIPLOMA IN ELECTRONIC INSTRUMENTATION SEM – II

PAPER II : ANALYTICAL INSTRUMENTATION

Unit 1: Colorimetry And Spectrophotometry

Special methods of analysis- Beer-Lambert law-colorimeters - UV-ViS spectrophotometers-Single and double beam instruments-Sources and detectors-IR Spectrophotometers-Types-Attenuated total reflectance flame photometers- Atomic absorption spectrophotometers-sources and detectors-FTIR spectrophotometers-Flame emission photometers.

Unit 2: Chromatography

Different techniques- Gas chromatography- Detectors- Liquid chromatographs- Applications-High pressure liquid chromatographs-Applications.

Unit 3: Industrial Gas Analyzers and Pollution Monitoring Instruments

Types of gas analyzers-Oxygen,NO₂ and H₂S types, IR analyzers, thermal conductivity analyzers, analysis based on ionization of gases. Air pollution due to carbon monoxide, hydrocarbons, nitrogen oxides, sulphur dioxide estimation-dust and smoke measurements.

UNIT 4: pH Meters and Dissolve Component Analyzers

Principle of pH measurement, glass electrodes, hydrogen electrodes, reference electrodes, selective ion electrodes, ammonia electrodes, biosensors, dissolved oxygen analyzer-sodium analyzer-silicon analyzer.

UNIT 5: Radio Chemical and Magnetic Resonance Techniques

Nuclear radiations – Detectors - GM Counter - Proportional counter - Solid state detector - Gamma cameras - X-ray spectroscopy - Detectors- Diffractometers -Absorption meters -Detectors NMR-Basic principles-NMR spectrometer-Applications. Mass spectrometers - Different types - Applications.

Text Books:

- 1.R.S.Khandpur,"Handbook of Analytical Instruments"Tata Mc Graw Hill publishing Co. Ltd.2003.
- 2.H.H.Willard, L.L.Meritt, J.A.Dean, F.A.Settle,"Instrumental methods of analysis" CBS publishing & distribution, 1995.

References:

- 1.Robert D.Braun,"Introduction to Instrumental Analysis"Mc Graw Hill, Singapore,1987
- 2.G.W.Ewing,"Instrumental Methods of Analysis" Mc Graw Hill 1992.
- 3.DA Skoog and D.M.West,"Principles of Instrumental Analysis" Harper and Row publishers, 1974.

GROUP B DIPLOMA IN ELECTRONIC INSTRUMENTATION SEM – III

PAPER III : VIRTUAL INSTRUMENTATION

UNIT I : INTRODUCTION

General functional description of a digital instrument - Block diagram of a Virtual Instrument - Physical quantities and Analog interfaces - Hardware and Software - User interfaces - Advantages of Virtual instruments over conventional instruments - Architecture of a Virtual instrument and its relation to the operating system

UNIT II : SOFTWARE OVERVIEW

LabVIEW - Graphical user interfaces - Controls and Indicators - 'G' programming - Labels and Text - Shape, Size and Color - Owned and free labels - Data type, Format, Precision and representation - Data types - Data flow programming - Editing - Debugging and Running a Virtual instrument - Graphical programming palettes and tools - Front panel objects - Functions and Libraries.

UNIT III : PROGRAMMING STRUCTURE

FOR loops, WHILE loops, CASE structure, formula nodes, Sequence structures - Arrays and Clusters - Array operations - Bundle - Bundle/Unbundle by name, graphs and charts - String and file I/O - High level and Low level file I/O's - Attribute modes Local and Global variables. **OPERATING SYSTEM AND HARDWARE OVERVIEW:** PC architecture, current trends, Operating system requirements, Drivers – Interface Buses – PCI Bus – Interface cards – specification – Analog and Digital interfaces – Power, Speed and timing considerations.

UNIT IV : HARDWARE ASPECTS

Installing hardware, Installing drivers - Configuring the hardware - Addressing the hardware in LabVIEW - Digital and Analog I/O function - Data Acquisition - Buffered I/O - Real time Data Acquisition.

UNIT V : LABVIEW APPLICATIONS

IMAQ - Motion Control: General Applications - Feedback devices, Motor Drives - Instrument Connectivity - GPIB, Serial Communication - General, GPIB Hardware & Software specifications - PX1 / PC1: Controller and Chassis Configuration and Installation.

TEXT BOOKS:

1. Garry M Johnson, "Labview Graphical Programming", Tata McGraw Hill, New Delhi, 2nd Edition, 1996.
2. Robert H. Bishop, "Learning with Lab-View" Prentice Hall, 2003.
3. Labview : Basics I & II Manual, National Instruments, 2005.

REFERENCES :

1. Lisa K Wells, "Labview for Everyone", Prentice Hall of India, New Delhi, 1996.
2. Barry Paron, "Sensor, Transducers and Labview", Prentice Hall, New Delhi, 2000.

GROUP B DIPLOMA IN ELECTRONIC INSTRUMENTATION

SEM – IV

PRACTICAL : INSTRUMENTATION LAB

Any Five of the following

1. Simple fault finding of pH meters and Identification different type pH electrodes.
2. Displacement measurement using LVDT
3. Design of V-F and F-V converter
4. Instrumentation amplifier
5. Study of Strain gauges.
6. Thermocouple Compensation.
7. Thermistor Linearization transmitter design.
8. Pressure Calibration.
9. Signal conditioning circuit for any resistive / pressure transducer.
10. Signal conditioning circuit for optical encoder.

Any Five of the following using Lab View

1. Creating a simple VI to place a Digital Control
2. Navigation and Editing
3. VI to make a Degree C to Degree F Converter
4. Converting VI in to Sub VI
5. Write a programme to count Modulus 32 and display the values in decimal, octal decimal and Binary.
6. Built a VI using *while loop* that displays random numbers in to three wave form charts.
(Strip, scope & Sweep)
7. Data Acquisition using Lab VIEW
8. Development of Temperature Measurement using Lab VIEW
9. Development of Virtual Instrument for Function Generator using Lab VIEW
10. Development of Virtual Instrument for Audio Signal Spectrum Analyser using Lab VIEW

GROUP C

DIPLOMA IN ELECTRONIC DESIGNING AND AUTOMATION SEM – I

PAPER I ANALOG AND DIGITAL CIRCUIT DESIGN AND ANALYSIS

Unit I : TINA TI

TINA and Design Suite- TINA TI- Features-Tina Design suit v7- Schematic editing using mouse:- using Right and Left mouse-Measurement units- Basic Screen format.

Unit II : TINA TI

Placing the circuit components- Creating and editing Circuit schematic-Analyzing the circuit- Testing the circuit with virtual instruments-analysis of SMPS Circuit-Creating sub circuits from SPICE circuit-

UNIT III : TINA TI COMPONENTS AND PROPERTIES

Basics-Switches- meters-Sources-Semiconductors- Manufacturers Model-Opto Electronics-Gates-A/D and D/A –Flip flops-Logic IC's- RF- analog control and special devices.

UNIT IV : 5SPICE ANALYSIS

Getting Started: Introduction – Notations- Using 5Spice as a beginner-Allowed Resistance range-Simulator software and circuit design:- Modeling your circuit for simulation-Working effectively-Working with Schematic. Drawing/Editing/Panning/Zooming/Subscripts

UNIT V : 5SPICE ANALYSIS

Working with Analyses-Working with graphs- Working with the Library-Guidelines- Error Messages-Project default. Sample circuit design and simulation

Referance Books/Materials

1. Tina TI Quick Start Manual V7 distributed by Texas Instruments
2. User Guide from 5Spice Analysis

GROUP C
DIPLOMA IN ELECTRONIC DESIGNING AND AUTOMATION
SEM – II

PAPER II PCB DESIGNING AND PRODUCT DEVELOPMENT TOOLS

Unit-I

Feature highlights-Making electronic design easier-Tips for design capture-Component model and library management-Multi channel design concepts net connectivity and navigation.

Unit-II

Working with simulation waveforms-Design up data and Ecos –Managing DXP panel-PCB design rules and resolving violation-Impedance controlled routing-Generating outputs.

Unit-III

Design capture simulator and layout-Creating components-Integrated circuits-Customizing component reports-Multi channel designs- Board shapes and sheets.

Unit-IV

Editing multiple objects- Signal integrity getting started with FPGA- VHDL and schematic capture- Attributes for FPGA-DXP and xilinx interface

Unit V

LabVIEW : SOFTWARE OVERVIEW - Graphical user interfaces - Controls and Indicators - 'G' programming - Labels and Text - Shape, Size and Color - Owned and free labels - Data type, Format, Precision and representation - Data types - Data flow programming - Editing - Debugging and Running a Virtual instrument - Graphical programming palettes and tools - Front panel objects - Functions and Libraries.

Reference:

1. Online help system-Learning guides articles and tutorial from design explorer DXP from Attributes.
2. Garry M Johnson, "Labview Graphical Programming", Tata McGraw Hill, New Delhi, 2nd Edition, 1996.

GROUP C

DIPLOMA IN ELECTRONIC DESIGNING AND AUTOMATION SEM – III

PAPER III SIGNAL PROCESSING IMPLEMENTATION AND SIMULATION

UNIT I : GETTING A SIGNAL INTO A LABVIEW

Conventional Digital Receiver- SubSampling Digital Receiver- Choosing a sampling rate-Subsampling- SNR- Subsampling signal Placement- Other sampling methods:- Digital Oscilloscope – RF Spectrum Analyzer-Analog sampling card- Soundcard.

UNIT II: LABVIEW SPECTRAL ANALYSIS

Low Frequency domain function:- Simple FFY and Improved FFT. Analysing the DFT Results- Spectral Leakage – Sampling window shape- high level spectral functions.
Generating signals with labview: Basic functions- sinusoids-generating Channel Models-Generating symbols.

UNIT III: LAB VIEW DIGITAL FILTER DESIGN

Filter types- FIR Filter- IIR Filter- Comparing IIR and FIR filters- Pulse shaping filter- Multi rate signal processing:- up sampling, down sampling and recombining of filters.

UNIT IV : GRAPHICS AND PROGRAMMING USING MATLAB

Matrices and Arrays- Graphics:-overview-Editing- use of Plotting tools- Graphs for presentations-Basic plotting functions- mesh and surface plots-plotting image data – printing graph.

Programming : Flow control- Data structures- Scripts and functions- object oriented programming. General and Specific commands on signal processing.

Unit V : TOOLS

Data Analysis-Preprocessing, Summarizing and visualizing and modeling of data – Signal Processing tools box- Filter design and Analysis tools (fdatools, fvtool. win tools etc).

Reference books

1. Labview Digital Signal Processing and digital communication by Corry L.Clark-Tata Mc Graw Hill Edition
2. MATLAB Getting Started guide.

GROUP C
DIPLOMA IN ELECTRONIC DESIGNING AND AUTOMATION
SEM – IV

PRACTICAL : EDA TOOLS : DESIGN, ANALYSIS AND SIMULATION LAB
(ANY 10 EXPERIMENTS)

SCHEMATIC DESIGN AND ANALYSIS USING TINA TI

1. Analysis of Individual circuit components
2. Audio Circuits
3. Comparators
4. Control loop
5. Current Measurements
6. Single Supply
7. Circuit Design and simulation using 5spice simulator

DESIGN BASED ON ALTIUM DESIGN EXPLORER

1. Component creation
2. Single layer PCB Design
3. Multi Layer PCB Design
4. Circuit simulation – 555 Astable Multivibrator
5. Circuit Simulation- Basic Power supply
6. Circuit Simulation – Differential Amplifier
7. Study of Net list and Gerber Files

MATLAB EXPERIMENTS

1. Signal Generation
2. Convolution and Correlation
3. Digital filter design and analysis using FDTOOL of MATLAB
4. FIR and IIR Filter design
5. Generation and Study of Digital Filter Coefficients
6. Circuit Design and simulation using LAB view