

**STATE BOARD OF TECHNICAL EDUCATION, BIHAR**  
**Scheme of Teaching and Examinations for**  
**III SEMESTER DIPLOMA IN ELECTRONICS ENGINEERING**  
**(Effective from Session 2016-17 Batch)**

**THEORY**

Sr. No.	SUBJECTS	SUBJECT CODE	TEACHING SCHEME	EXAMINATION – SCHEME							Credits
			Periods per Week	Hours of Exam.	Teacher's Assessment (TA) Marks (A)	Class Test(CT) Marks (B)	End Semester Exam. (ESE) Marks (C)	Total Marks (A+B+C)	Pass Marks ESE	Pass Marks in the Subject	
1.	Applied Mathematics-I	1600301	04	03	10	20	70	100	28	40	03
2.	Computer Programming Through 'C '	1600302	03	03	10	20	70	100	28	40	03
3.	Analog Electronics	1621303	03	03	10	20	70	100	28	40	03
4.	Electronics Drawing & Drafting	1621304	03	04	10	20	70	100	28	40	03
5.	Electronics Measurement-I	1621305	03	03	10	20	70	100	28	40	03
<b>Total:- 16</b>							<b>350</b>	<b>500</b>			

**PRACTICAL**

Sr. No.	SUBJECTS	SUBJECT CODE	TEACHING SCHEME	EXAMINATION – SCHEME					Credits
			Periods per Week	Hours of Exam.	Practical (ESE)		Total Marks (A+B)	Pass Marks in the Subject	
					Internal (A)	External (B)			
6.	Computer Programming Through 'C' Lab.	1600306	06	03	15	35	50	20	03
7.	Analog Electronics Lab.	1621307	04	03	15	35	50	20	02
8.	Electronic Measurement and Instrumentation Lab.	1621308	04	03	15	35	50	20	02
<b>Total:- 14</b>							<b>150</b>		

**TERM WORK**

Sr. No.	SUBJECTS	SUBJECT CODE	TEACHING SCHEME	EXAMINATION – SCHEME				Credits
			Periods per week	Marks of Internal Examiner (X)	Marks of External Examiner (Y)	Total Marks (X+Y)	Pass Marks in the Subject	
9.	Electronics Drawing & Drafting (TW)	1621309	03	30	70	100	40	02
<b>Total:- 03</b>							<b>100</b>	<b>24</b>
Total Periods per week Each of duration one Hours = 33							<b>Total Marks = 750</b>	

# **APPLIED MATHEMATICS -I**

**(Elect./Chem./Textile/Agri./C.Sc.&E/Electro/Ceramic/Print/Ec.&Comm./Inst.& Cont.)**

Subject Code <b>1600301</b>	Theory						Credits <b>03</b>
	No. of Periods Per Week			Full Marks	:	100	
	L	T	P/S	ESE	:	70	
	04	—	—	TA	:	10	
	—	—	—	CT	:	20	

Contents :Theory		Hrs/week	Marks
<b>Unit -1</b>	<b>Integration:</b> 1.1 Definition of integration as anti-derivative. Integration of standard function. 1.2 Rules of integration (Integrals of sum, difference, scalar multiplication). 1.3 Methods of Integration. 1.3.1 Integration by substitution 1.3.2 Integration of rational functions. 1.3.3 Integration by partial fractions. 1.3.4 Integration by trigonometric transformation. 1.3.5 Integration by parts. 1.4 Definite Integration. 1.4.1 Definition of definite integral. 1.4.2 Properties of definite integral with simple problems. 1.5 Applications of definite integrals. 1.5.1 Area under the curve. 1.5.2 Area between two curves. 1.5.3 Mean and RMS values	<b>12</b>	<b>20</b>
<b>Unit -2</b>	<b>Differential Equation</b> 2.1 Definition of differential equation, order and degree of differential equation. Formation of differential equation for function containing single constant. 2.2 Solution of differential equations of first order and first degree such as variable separable type, reducible to Variable separable, Homogeneous, Nonhomogeneous, Exact, Linear and Bernoulli equations. 2.3 Applications of Differential equations. 2.3.1 Laws of voltage and current related to LC, RC, and LRC Circuits.	<b>10</b>	<b>15</b>
<b>Unit - 3</b>	<b>Laplace Transform</b> 3.1 Definition of Laplace transform, Laplace transform of standard functions. 3.2 Properties of Laplace transform such as Linearity, first shifting, second shifting, multiplication by $t^n$ , division by $t$ . 3.3 Inverse Laplace transforms. Properties- linearly first shifting, second shifting. Method of partial fractions, 3.4 Convolution theorem. 3.5 Laplace transform of derivatives, 3.6 Solution of differential equation using Laplace transform (up to second order equation).	<b>08</b>	<b>14</b>
<b>Unit - 4</b>	<b>Fourier Series</b> 4.1 Definition of Fourier series (Euler's formula). 4.2 Series expansion of continuous functions in the intervals $(0, 2l)$ , $(-l, l)$ , $(0, 2\pi)$ , $(-\pi, \pi)$ 4.3 Series expansions of even and odd functions. 4.4 Half range series.	<b>08</b>	<b>07</b>

<b>Unit - 5</b>	<b>Numerical Methods</b>		
	5.1 Solution of algebraic equations Bisection method. Regularfalsi method. Newton – Raphson method.	<b>05</b>	<b>07</b>
	5.2 <b>Solution of simultaneous equations containing 2 and 3 unknowns</b> Gauss elimination method. Iterative methods- Gauss seidal and Jacobi's methods.	<b>05</b>	<b>07</b>
	<b>Total</b>	<b>48</b>	<b>70</b>

<b>Text /Reference Books:</b>		
<b>Name of Authors</b>	<b>Titles of the Book</b>	<b>Name of the Publisher</b>
Mathematics for polytechnic	S. P. Deshpande	Pune Vidyarthi Griha Prakashan, Pune
Calculus: single variable	Robert T. Smith	Tata McGraw Hill
Laplace Transform	Lipschutz	Schaum outline series.
Fourier series and boundary value problems	Brown	Tata McGraw Hill
Higher Engineering Mathematics	B. S. Grewal	Khanna Publication, New Dehli
Introductory Methods of Numerical analysis	S. S. Sastry	Prentice Hall Of India, New Dehli
Numerical methods for scientific & engineering computations	M. K. Jain & others	Wiley Eastern Publication.

# COMPUTER PROGRAMMING THROUGH 'C'

Subject Code <b>1600302</b>	Theory			No of Period in one session :50			Credits  <b>03</b>
	No. of Periods Per Week			Full Marks	:	100	
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
				CT	:	20	

## Rationale:

Computers play a vital role in present day life, more so, in the professional life of technician engineers. In order to enable the students use the computers effectively in problem solving, this course offers the modern programming language C along with exposition to various engineering applications of computers.

## Objective:

The objectives of this course are to make the students able to:

- Develop efficient algorithms for solving a problem.
- Use the various constructs of a programming language viz. conditional, iteration and recursion.
- Implement the algorithms in “C” language.
- Use simple data structures like arrays, stacks and linked list solving problems.
- Handling File in “C”.

Contents : Theory			Hrs/week	Marks
Unit -1	<b><u>INTRODUCTION TO PROGRAMMING</u></b> The Basic Model of Computation, Algorithms, Flow-charts, Programming Languages, Compilation, Linking and Loading, Testing and Debugging, Documentation. Programming Style-Names, Documentation & Format, Refinement & Modularity.		[03]	
Unit -2	<b><u>ALGORITHM FOR PROBLEM SOLVING</u></b> Exchanging values of two variables, summation of a set of numbers. Reversing digits of an integer, GCD (Greatest Common Division) of two numbers. Test whether a number is prime. Organize numbers in ascending order. Find square root of a number, factorial computation, Fibonacci sequence. Compute sine Series. Check whether a given number is Palindrome or not. Find Square root of a quadratic equation. multiplication of two matrices,		[08]	
Unit -3	<b><u>INTRODUCTION TO ‘C’ LANGUAGE</u></b>		[08]	
	03.01	Character set, Variable and Identifiers, Built-in Data Types, Variable Definition, Declaration, C Key Words-Rules & Guidelines for Naming Variables.		
	03.02	Arithmetic operators and Expressions, Constants and Literals, Precedence & Order of Evaluation.		
	03.03	Simple assignment statement. Basic input/output statement.		
	03.04	Simple ‘C’ programs of the given algorithms		
Unit -4	<b><u>CONDITIONAL STATEMENTS AND LOOPS</u></b>		[07]	
	04.01	Decision making within a program		
	04.02	Conditions, Relational Operators, Logical Perator.		
	04.03	If statement, it-else statement.		
	04.04	Loop statements		
	04.05	Break, Continue, Switch		
Unit -5	<b><u>ARRAYS</u></b> What is an Array?, Declaring an Array, Initializing an Array. One dimensional arrays: Array manipulation: Searching, Insertion, Deletion of an element from an array; Finding the largest/smallest element in array; Two dimensional arrays, Addition/Multiplication of two matrices.		[07]	

<b>Unit -6</b>	<b>FUNCTIONS</b> Top-down approach of problem solving. Modular programming and functions, Definition of Functions Recursion, Standard Library of C functions, Prototype of a function: Formal parameter list, Return Type, Function call, Passing arguments to a Function: call by reference; call by value.	[07]	
<b>Unit -7</b>	<b>STRUCTURES AND UNIONS</b> Basic of Structures, Structures variables, initialization, structure assignment, Structures and arrays: arrays of structures,	[04]	
<b>Unit -8</b>	<b>POINTERS</b> Concept of Pointers, Address operators, pointer type declaration, pointer assignment, pointer initialization pointer arithmetic.	[06]	
<b>Total</b>		<b>[50]</b>	

### **Text / Reference Books -**

1. Programming with C. Second Edition. Tata McGraw-Hill, 2000 - Byron Gottfried
2. How to solve by Computer, Seventh Edition, 2001, Prentice hall of India. - R.G. Dromey
3. Programming with ANSI-C, First Edition, 1996, Tata McGraw hill. - E. Balaguruswami
4. Programming with ANSI & Turbo C. First Edition, Pearson Education. - A. Kamthane
5. Programming with C. First Edition, 1997, Tara McGraw hill. - Venugopla and Prasad
6. The C Programming Language, Second Edition, 2001, Prentice Hall of India. - B. W. Kernighan & D.M. Ritchie
7. Programming in C, Vikash Publishing House Pvt. Ltd., Jungpura, New Delhi. - R. Subburaj
8. Programming with C Language, Tara McGraw Hill, New Delhi. - C. Balagurswami
9. Elements of C, Khanna Publishers, Delhi. - M. H. Lewin
10. Programming in C. - Stephen G. Kochan
11. Programming in C, khanna Publishers, Delhi. - B. P. Mahapatra
12. Let us C, BPB Publication, New Delhi. - Yashwant kanetkar
13. Programming in C, Galgotia Publications Pvt. Ltd. Dariyaganj, New Delhi. - Kris A. Jamsa
14. The Art of C Programming, Narosa Publishing House, New Delhi. - Jones, Robin & Stewart
15. Problem Solving and Programming. Prentice Hall International. - A.C. Kenneth
16. C made easy, McGraw Hill Book Company, 1987. - H. Schildt
17. Software Engineering, McGraw Hill, 1992. - R.S. Pressman
18. Pointers in C, BPB publication, New Delhi. - Yashwant Kanetkar

## **ANALOG ELECTRONICS**

<b>Subject Code 1621303</b>	<b>Theory</b>			<b>No of Period in one session :50</b>			<b>Credits  03</b>
	<b>No. of Periods Per Week</b>			<b>Full Marks</b>	<b>:</b>	<b>100</b>	
	<b>L</b>	<b>T</b>	<b>P/S</b>	<b>ESE</b>	<b>:</b>	<b>70</b>	
	<b>03</b>	<b>—</b>	<b>—</b>	<b>TA</b>	<b>:</b>	<b>10</b>	
				<b>CT</b>	<b>:</b>	<b>20</b>	

<b>Contents : Theory</b>		<b>Hrs/week</b>	<b>Mark</b>
<b>Unit -1</b>	<b><u>IDEAL AMPLIFIERS:</u></b> Ideal voltage amplifier, ideal current amplifier, ideal trans resistance amplifiers and ideal trans conductance amplifier. Distortions, amplitude distortion, harmonic distortion, frequency distortions and phase distortions.	[06]	
<b>Unit -2</b>	<b><u>TRANSISTOR AMPLIFIERS:</u></b> Multistage transistor amplifier, its gain, frequency response, decibel gain, bandwidth. Small signal amplifiers, large signal amplifiers, difference between voltage amplifier and power amplifier, classification of power amplifier, class A power amplifier, Push-Pull amplifier, multistage frequency response.	[14]	
<b>Unit -3</b>	<b><u>FEED BACK AMPLIFIERS AND OSCILLATORS:</u></b> Feed back concept negative and positive feedback, voltage/current, series/shunt feedback. Berkhaussian criterion colpitts. Hartley's, phase shift, wein bridge and crystal oscillator.	[08]	
<b>Unit -4</b>	<b><u>HYBRID PARAMETERS:</u></b> Determination of h-parameters, h-parameter equivalent circuit, performance of a linear circuit in h-parameters. The h-parameters of a transistor, Nomenclature for transistor h-parameters. Approximate hybrid formulae for transistor amplifier. Limitations of h-parameters.	[14]	
<b>Unit -5</b>	<b><u>POWER AMPLIFIERS:</u></b> Class-A, class-AB, class-B and Class-C, conversions efficiency Tuned amplifiers	[08]	
<b>Total</b>		<b>50</b>	

### **Text / Reference Books -**

1.	Electronics	-	Miliman and Halkias, Mc GRAW HILL
2.	Principle of electronics	-	V.K.Mehta & S.Chand.

# **ELECTRONICS DRAWING AND DRAFTING**

Subject Code <b>1621304</b>	Theory			No of Period in one session : 120			Credits <b>03</b>
	No. of Periods Per Week			Full Marks	:	100	
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
				CT	:	20	

## **Rationale**

The drawing part is important in all fields of Engineering and Electronics and Communications Engineering is not an exception.

## **Objectives**

Learn and practice to distinguish and draw the various types of components, their symbols, block diagrams, circuit diagrams, Line diagrams, Logic diagrams, sketch and pictorial views, PCBs drawing and drafting neatly and properly.

The broad main topics to be covered are:

SL	Units	Periods
1.	Symbols	07
2.	Construction views of commonly used component and devices	12
3.	Block Diagrams	16
4.	Circuit Diagrams	20
5.	Logic Diagrams	15
6.	Outline Drawing	10
7.	Sketch and Pictorial views	05
8.	Exploded views	06
9.	Wiring Diagram	12
10.	PCB Drawing	12
11.	Nomography	05
	<b>Total</b>	<b>120</b>

Contents : Theory		Hrs/week	Marks
<b>Unit -1</b>	<b>Symbols</b> 01.01 Symbols and references of Common types of active and passive devices. (min. 2 sheets)	[07]	
<b>Unit -2</b>	<b>Construction view of commonly used components and devices - showing all mechanical and electrical parts with labeling.</b> 02.01 Relays. 02.02 Microphones (min. 3 sheets). 02.03 Speakers. 02.04 Microphone. 02.05 Trimmers. 02.06 Condenser.	[13]	
<b>Unit -3</b>	<b>Block Diagrams</b> 03.01 Block Diagrams. 03.02 System Diagrams (min. 3 sheets). 03.03 Sub system diagram. 03.04 General layout (A. M. Transmitter , A. M. Receiver, F. M. Transmitter, F. M. Receiver, T. V. Transmitter, Computer, Calculator etc.)	[16]	
<b>Unit -4</b>	<b>Circuit Diagrams</b> 04.01 Simple circuits showing interconnections. 04.02 Amplifiers. 04.03 Coupled Amplifiers. 04.04 Large Signal Amplifier. (3 sheets) 04.05 Multivibrators (3 sheets) 04.06 Multimeters 04.07 Radio Receiver. 04.08 TV Receiver.	[20]	

<b>Unit -5</b>	<b>Logic Diagrams</b> 05.01 Elements of Logic Diagram. 05.02 Symbols. 05.03 General Layout (2 Sheets) 05.04 Truth Tables. 05.05 Line Work and Labeling (Gates, Shift Registers, Counters, Calculators, A/D and D/A Convertor, Multiplexer, de-Multiplexer, Adder, Subtractor).	[16]	
<b>Unit -6</b>	<b>Outline Drawing</b> 06.01 Outlining and Pin Configuration of ICs. 06.02 Semiconductor Devices. 06.03 Electron Toys. 06.04 Speakers (1 Sheet). 06.05 Parts of Electric Machine and winding of Stator and Rotor.	[10]	
<b>Unit -7</b>	<b>Sketch and Pictorial Views</b> 07.01 Sketches and pictorial views of common devices and mechanical parts. (1 sheet)	[06]	
<b>Unit -8</b>	<b>Wiring Diagram</b> 09.01 Wiring Diagram. 09.02 Preparation of Layouts. 09.03 Wire Folds. 09.04 Representation of Joints in different ways. - (1 Sheet)	[13]	
<b>Unit -9</b>	<b>PCB Drawing</b> 10.01 Drawing documents for PCB. 10.02 Schematic Diagram. 10.03 Art Work. 10.04 Stencil Drawing.	[13]	
<b>Unit -11</b>	<b>Nomography</b> 11.01 Introduction. 11.02 Nomography of different electrical variations in realistic circuits. - (1 Sheet)	[06]	
<b>Total</b>		<b>120</b>	



# **ELECTRONIC MEASUREMENT - I**

<b>Subject Code</b> <b>1621305</b>	<b>Theory</b>			<b>No of Period in one session : 50</b>			<b>Credits</b>  <b>03</b>
	<b>No. of Periods Per Week</b>			<b>Full Marks</b>	<b>:</b>	<b>100</b>	
	<b>L</b>	<b>T</b>	<b>P/S</b>	<b>ESE</b>	<b>:</b>	<b>70</b>	
	<b>03</b>	<b>—</b>	<b>—</b>	<b>TA</b>	<b>:</b>	<b>10</b>	
				<b>CT</b>	<b>:</b>	<b>20</b>	

## **Rationale**

Measurements are essential in every sphere. The subjects of Electronics and Tele-Communication Engineering are inseparably linked. Studies of Electrical and Electronic measuring instruments are incorporated in two papers, Paper-I and Paper-II.

## **Objectives**

This paper mainly deals with the measurement of Current, Voltage, Power, Frequency and Phase beside the measurement of passive elements. The students are expected to be familiar with the principle, construction and uses of instruments utilized for these purposes.

<b>SL</b>	<b>Topics</b>	<b>Periods</b>
1.	Characteristics of Instruments and possible errors.	02
2.	Galvanometers	04
3.	Ammeters, Voltmeters and Ohm Meters	13
4.	Instruments Transformers	04
5.	Power Measurement	04
6.	Phase and Frequency Measurement	05
7.	Resistance Measurement	05
8.	Potentiometers	04
9.	DC and AC Bridges	04
10.	Cathode Ray Oscilloscope	05
	<b>Total</b>	<b>50</b>

<b>Contents : Theory</b>		<b>Hrs/week</b>	<b>Marks</b>
<b>Unit -1</b>	Characteristics of Instruments and possible errors: Introduction to value, accuracy, precision, sensitivity, resolution, noise, repeatability, instrument efficiency, scale range, linearity, dynamic systems, dynamic response, and loading. Types of errors.	02	
<b>Unit -2</b>	Galvanometers: D'Arranvol galvanometer, Torque equation, Dynamic behaviour, under damped, over damped and critically damped motion of galvanometer. sensitivity, choice of galvanometer, Flux meter.	04	
<b>Unit -3</b>	03 Ammeters, Voltmeters and Ohm meters: Types of instruments. 03.01 Permanent Magnet Moving coil Instruments: Torque equation, Multi-range Ammeter, Voltmeters, Sensitivity, Loading effects, Advantages and Disadvantages. 03.02 Ohm Meters: Series and Shunt type Multimeter, Megger, 03.03 Moving Iron Instruments: Operating Principle, Torque equation, Electro-dynamometer, ammeter and voltmeters. Errors. Use in AC and DC. Use of these at high frequency. 03.04 Introduction to Electrostatics. Induction type and Rectifier type Instruments.	13	
<b>Unit -4</b>	04 Instrument Transformer: Introduction to Instrument Transformer, Current Transformer and Potential Transformer in light of instrumentation.	04	
<b>Unit -5</b>	Power Measurement: Power Measurement using instrument transformer. Wattmeters of different types. 3-phase Wattmeters. Energy meters for DC and AC circuits.	04	
<b>Unit -6</b>	Phase and Frequency Measurement: Moving iron, Rotating field, Alternating field, Power Factor Meters. Types of Frequency Meters.	05	
<b>Unit -7</b>	Resistance Measurement: Classification of Resistance, Measurement of medium resistance using ammeter, voltmeter, substitution and bridges. Construction for low resistance, Methods for measurement of low resistance using ammeter and voltmeter, Kelvin double bridge Measurement of high resistances: Difficulties in measurement, guard circuits, Direct deflection, loss of charge and mega ohm bridges methods of measurement.	05	
<b>Unit -8</b>	Potentiometers: Classification, basic potentiometer, multi-range potentiometer, Application of potentiometers.	04	

<b>Unit -9</b>	DC and AC Bridges: Basic principle of bridges. Wheatstone Kelvin Bridge, Maxwell bridges, Hay's bridges, Anderson's bridge. Measurement of inductance and capacitance using bridges. Wien's bridge, Universal bridge, Bridge circuits for measurement of mutual inductance.	04	
<b>Unit -10</b>	Cathode Ray Oscilloscope: CRT, Deflection Systems, Synchronization, Time base circuits, Measurement of voltage, current, phase angle, frequency Lissajous pattern etc.	05	
<b>Total</b>		<b>50</b>	

#### Recommended Books

SL	Title/Publisher	Author
1.	Electronic Instrument and Measurement Techniques	Cooper
2.	Course in Electrical and Electronic Measurement and Instrumentation	A. K. Sawhny
3.	Electric and Electronics Measurement	Golding

# COMPUTER PROGRAMMING THROUGH 'C' LAB

Subject Code <b>1600306</b>	Practical			No. of Period in one session : 84			Credits
	No. of Periods Per Week			Full Marks	:	50	03
	L	T	P/S	ESE	:	50	
	—	—	06	Internal	:	15	
				External	:	35	

## Rationale:

Computer Play a vital role in present day life, more so, in the professional life of technician engineer. In order to enable the students use the computer effectively in problem solving, this course offers the modern programming language C along with exposing to various engineering application of computers.

## Objective

The objectives of this course are to make the students able to:

- Use the various constructs of a programming Language viz. Conditional Iteration and recursion
- Implement the algorithm in C language
- Use Simple data structures like arrays, stacks and Linked list solving problems.
- Handling file in C

## Eight experiments to be performed in the laboratory:

Contents : Practical		Hrs/week	Marks
<b>Unit -1</b>	Programming exercise on executing a C program.	12	
<b>Unit-2</b>	Programming exercise on case Control Statement.	12	
<b>Unit-3</b>	Programming exercise on Decision Control Statement.	12	
<b>Unit-4</b>	Programming exercise on looping.	12	
<b>Unit-5</b>	Programming exercise on recursion technique.	12	
<b>Unit-6</b>	Programming exercise on Structure.	12	
<b>Unit-7</b>	Programs on array implementation.	12	

## Text / Reference Books -

1.	How to solve it by Computer, Prentice Hall of India, 1992.	-	R.G. Dromey.
2.	The C Programming Language, Prentice Hall of India, 1989.	-	B.W. Kernighan & D.M. Ritchie.
3.	The C Programming Language, Prentice Hall of India, 1989.	-	Cooper, Mullish
4.	Application Programming in C. Macmillain International editions. 1990.	-	Richa'd Johnson- Baugh & Martin Kalin
5.	The Art of C Programming, Narosa Publishing House, New Delhi.	-	Jones, Robin & Stewart
6.	Problem Solving and Programming. Prentice Hall International.	-	A.C. Kenneth.
7.	C made easy, McGraw Hill Book Company, 1987.	-	H. Schildt
8.	Software Engineering, McGraw Hill, 1992.	-	R.S. Pressman
9.	Programming in C, Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi	-	R. Subburaj
10.	Programming with C language, Tata McGraw Hill, New Delhi.	-	C. Balaguruswami
11.	Elements of C, Khanna Publishers. Delhi	-	M. H. Lewin
12.	Programming in C	-	Stephan G. Kochan.
13.	Programming in C, Khanna Publishers. New Delhi	-	B.P. Mahapatra
14.	Let us C, BPB Publication. New Delhi	-	Yashwant Kanetkar
15.	Programming in C, Galgotia Publications Pvt. Ltd. Dariyaganj, New Delhi.	-	Kris A. Jamsa

## **ANALOG ELECTRONICS LAB.**

<b>Subject Code</b> <b>1621307</b>	<b>Practical</b>			<b>No of Period in one session :</b>			<b>Credits</b>  <b>02</b>
	<b>No. of Periods Per Week</b>			<b>Full Marks</b>	<b>:</b>	<b>50</b>	
	<b>L</b>	<b>T</b>	<b>P/S</b>	<b>ESE</b>	<b>:</b>	<b>50</b>	
	<b>—</b>	<b>—</b>	<b>04</b>	<b>Internal</b>	<b>:</b>	<b>15</b>	
				<b>External</b>	<b>:</b>	<b>35</b>	

<b>Contents : Practical</b>			
<b>Unit -1</b>	Wiring of RC coupled single stage FET amplifier and determination of the gain-frequency response, input and output impedances.	<b>Hrs/week</b>	<b>Marks</b>
<b>Unit -2</b>	Wiring of RC coupled single stage BJT amplifier and determination of the gain-frequency response, input and output impedances.		
<b>Unit -3</b>	Wiring of BJT Darlington Emitter follower with and without bootstrapping and determination of the gain, input and output impedances (single circuit) (one experiment)		
<b>Unit -4</b>	Wiring and testing for the performance of BJT-RC phase shift oscillator for $f_o \geq 10$ KHz.		
<b>Unit -5</b>	Testing for the performance of BJT-Hatley and colpitts oscillators for RF range $f_o \geq 100$ KHz.		
<b>Unit -6</b>	Testing for the performance of BJT-crystal oscillators for $f_o \geq 100$ KHz.		
<b>Unit -7</b>	Testing of diode clipping (single/Double ended) circuits for peak clipping, peak detection.		
<b>Unit -8</b>	Testing of clamping circuits: positive clamping/negative clamping.		
<b>Unit -9</b>	Testing of a transformer less class-B push pull power amplifier and determination of its conversion efficiency.		
<b>Unit-10</b>	Testing of half wave, full wave and bridge rectifier circuits with and without capacitor filter. Determination of ripple factor, regulation and efficiency.		
<b>Unit-11</b>	Verification of Thevinin's Theorem and maximum power transfer theorem for DC circuit.		
<b>Unit-12</b>	Characteristics of Series and Parallel Resonant Circuits.		

## **ELECTRONIC MEASUREMENT AND INSTRUMENTATION LAB**

Subject Code <b>1621308</b>	<b>Practical</b>			<b>No of Period in one session :</b>			<b>Credits</b>  <b>02</b>
	<b>No. of Periods Per Week</b>			<b>Full Marks</b>	<b>:</b>	<b>50</b>	
	<b>L</b>	<b>T</b>	<b>P/S</b>	<b>ESE</b>	<b>:</b>	<b>50</b>	
	<b>—</b>	<b>—</b>	<b>04</b>	<b>Internal</b>	<b>:</b>	<b>15</b>	
				<b>External</b>	<b>:</b>	<b>35</b>	

### **Rationale**

The study of this subject will help a student to gain the knowledge of working principles and operation of different electronic instruments (analog and digital). The practical work done in this subject will help to acquire skills in operation and testing of instruments as per their specifications.

<b>Contents : Practical</b>			
<b>Unit -1</b>	Conversion of Galvanometer into Ammeter and Voltmeter.	<b>Hrs/week</b>	<b>Marks</b>
<b>Unit -2</b>	Calibration of Ammeter, Voltmeter and Wattmeter.		
<b>Unit -3</b>	Determination of Inductance, Capacitance using AC bridges.		
<b>Unit -4</b>	Use of AC potentiometer, chokes, resistance model.		
<b>Unit -5</b>	To observe the loading effect of a multi-meter while measuring voltage across a low resistance and high resistance.		
<b>Unit -6</b>	Measurement of voltage, frequency, time period and phase angle using Cathode Ray Oscilloscope (CRO).		
<b>Unit -7</b>	Measurement of time period, frequency,		
<b>Unit -8</b>	Measurement of rise, fall and delay times using a Cathode Ray Oscilloscope.		
<b>Unit -9</b>	Measurement of R, L and C using a LCR bridge/Universal bridge.		

# **ELECTRONICS DRAWING & DRAFTING -TW**

<b>Subject Code</b> <b>1621309</b>	<b>Term Work</b>			<b>No of Period in one session :</b>			<b>Credits</b>  <b>02</b>
	<b>No. of Periods Per Week</b>			<b>Full Marks</b>	<b>:</b>	<b>100</b>	
	<b>L</b>	<b>T</b>	<b>P/S</b>	<b>Internal</b>	<b>:</b>	<b>30</b>	
	<b>—</b>	<b>—</b>	<b>03</b>	<b>External</b>	<b>:</b>	<b>70</b>	

## **Rationale**

The drawing part is important in all fields of Engineering and Electronics and Communications Engineering is not an exception.

## **Objectives**

Learn and practice to distinguish and draw the various types of components, their symbols, block diagrams, circuit diagrams, Line diagrams, Logic diagrams, sketch and pictorial views, PCBs drawing and drafting neatly and properly.

The broad main topics to be covered are:

<b>SL</b>	<b>Topics</b>	<b>Periods</b>
1.	Symbols	07
2.	Construction views of commonly used component and devices	12
3.	Block Diagrams	16
4.	Circuit Diagrams	20
5.	Logic Diagrams	15
6.	Outline Drawing	10
7.	Sketch and Pictorial views	05
8.	Exploded views	06
9.	Wiring Diagram	12
10.	PCB Drawing	12
11.	Nomography	05
	<b>Total</b>	<b>120</b>

<b>CONTENTS : Term Work</b>		<b>Hrs/week</b>	<b>Marks</b>
<b>Unit -1</b>	<b>Symbols.</b> 01.01 Symbols and references of Common types of active and passive devices. (min. 2 sheets)	[10]	
<b>Unit -2</b>	<b>Construction view of commonly used components and devices - showing all mechanical and electrical parts with labeling.</b> 02.01 Relays. 02.02 Microphones (min. 3 sheets). 02.03 Speakers. 02.04 Microphone. 02.05 Trimmers. 02.06 Condenser.	[14]	
<b>Unit -3</b>	<b>Block Diagrams</b> 03.01 Block Diagrams. 03.02 System Diagrams (min. 3 sheets). 03.03 Sub system diagram. 03.04 General layout (A. M. Transmitter, A. M. Receiver, F. M. Transmitter, F. M. Receiver, T. V. Transmitter, Computer, Calculator etc.)	[20]	
<b>Unit -4</b>	<b>Circuit Diagrams</b> 04.01 Simple circuits showing interconnections. 04.02 Amplifiers. 04.03 Coupled Amplifiers. 04.04 Large Signal Amplifier. (3 sheets) 04.05 Multivibrators (3 sheets) 04.06 Multimeters 04.07 Radio Receiver. 04.08 TV Receiver.	[20]	
<b>Unit -5</b>	05 Logic Diagrams 05.01 Elements of Logic Diagram. 05.02 Symbols. 05.03 Truth Tables. 05.04 Gates, Shift Registers, Counters, Calculators, A/D and D/A Convertor, Multiplexer, de-Multiplexer, Adder, Subtractor.	[15]	
<b>Unit -6</b>	06 Outline Drawing 06.01 Outlining and Pin Configuration of ICs. 06.02 Semiconductor Devices. 06.03 Speakers (1 Sheet).	[10]	

<b>Unit -7</b>	07 07.01	Sketch and Pictorial Views Sketches and pictorial views of common devices and mechanical parts. (1 sheet)	[07]	
<b>Unit -8</b>	08 08.01 08.02 08.03 08.04	Wiring Diagram Wiring Diagram. Preparation of Layouts. Wire Folds. Representation of Joints in different ways. - (1 Sheet)	[12]	
<b>Unit -9</b>	9 9.01 9.02 9.03 9.04 9.05	PCB Drawing Drawing documents for PCB. Schematic Diagram. Art Work. Stencil Drawing. Marking Assembly Drawing (Pictorial and Part List).	[12]	
<b>Total</b>			<b>120</b>	

**Total Sheets: 20**