STATE COUNCIL OF TECHNICAL EDUCATION AND VOCATIONAL TRAINING, ODISHA
TEACHING AND EVALUATION SCHEME FOR DIPLOMA IN ENGINEERING COURSES

DISCIPLINE: ELECTRONICS & TELECOMMUNICATION ENIGINEERING						**SEMESTER: 3RD**						
SL NO	**SUBJECT CODE**	**SUBJECT**	**PERIODS**			**EVALUATION SCHEME**						
			L	**T**	**P**	**INTERNAL EXAM**			**END SEM EXAM**	**TERM WORK**	**PRACTICAL EXAM**	**TOTAL MARKS**
						TA	**CT**	**Total**				
THEORY												
1	BST 301	ENGINEERING MATH-III	4			10	20	30	70			100
2	ETT 301	ANALOG ELECTRONICS-I	3	1		10	20	30	70			100
3	EET 321	CIRCUIT THEORY	3	1	-	10	20	30	70			100
4	ETT 302	DIGITAL ELECTRONICS (**COMMON TO (ETC/AEI/ CSE/IT)**	4	1	-	10	20	30	70			100
5	ETT 303	ELECTRONICS MEASUREMENT & INSTRUMENTATIONS	3	1	-	10	20	30	70			100
PRACTICAL/TERM WORK												
5	ETP 301	ANALOG ELECTRONICS-I LAB			4	-	-			25	25	50
6	EEP 321	CIRCUIT SIMULATION LAB USING (P-SPICE) SOFTWARE			4	-	-	-		25	25	50
7	ETP 302	DIGITAL ELECTRONICS LAB (**COMMON TO (ETC/AEI/ CSE/IT)**			4	-	-	-		25	25	50
8	ETP 303	ELECTRONICS MEASUREMENT LAB			3	-	-	-		25	25	50
9	CSP 321	C PROGRAMMING& WEB PAGE DESIGN LAB.			3					25	25	50
GRAND TOTAL			**17**	**04**	**18**	**50**	**100**	**150**	**350**	**125**	**125**	**750**

Total Contact hours per week: 39

Abbreviations: L- Lecture, T- Tutorial, P- Practical, TA- Teacher's Assessment, CT- Class Test

Minimum Pass Mark in each Theory subject is 35% and in each Practical subject is 50%

* Minimum pass mark in End Sem Exam is 35% & that in term work is 50%

ENGINEERING MATHEMATICS – III
(COMMON TO ELECT/CSE/ETC, AE & I/CP/IT/MECH/AUTO)

Name of the Course: Diploma in Electronics &Telecomm. Engineering			
Course code:	BST 301	Semester	3rd
Total Period:	60	Examination	3 hrs
Theory periods:	4P / week	Class Test:	20
Tutorial:		Teacher's Assessment:	10
Maximum marks:	100	End Semester Examination:	70

A. RATIONALE:

The subject Engineering Mathematics-III, is a common paper for Engineering branches. This subject includes Matrices, Laplace Transforms, Fourier Series, Differential Equations and Numerical Methods etc. for solution of Engineering problems.

B. OBJECTIVE:

On completion of study of Engineering Mathematics-III, the students will be able to:

1. Apply matrices in Engineering mechanics, electrical circuits and linear programming.
2. Transform Engineering problems to mathematical models with the help of differential equations and familiarize with the methods of solving by analytical methods, transform method, operator method and numerical methods.
3. Solve algebraic and transcendental equations by Iterative methods easily programmable in computers.
4. Analysis data and develop interpolating polynomials through method of differences.

C. Topic wise distribution of periods:

Sl. No.	Topics	Period
1	Matrices	04
2	Differential equation	12
3	Laplace transform	14
4	Fourier series	14
5	Numerical methods	04
6	Finite difference & Interpolation	12
	Total:	**60**

COURSE CONTENTS **Periods**

1. MATRICES **04**

1.1 Define rank of a matrix.

1.2 Perform elementary row transformation to determine the rank of a matrix.

1.3 State Rouche's Theorem for consistency of a system of linear equations in 'n' unknowns.

1.4 Solve equations in three unknowns testing consistency.

2. Linear Differential Equations **12**

2.1 Define Homogeneous and non-homogeneous differential equations with constant coefficients with examples.

2.2 Find general solution of linear equations in terms of C.F. and P.I.

2.3 Derive rules of finding C.F. and P.I. in terms of operator D.

2.4 Define Partial Differential equations(P.D.E.)

2.5 Form partial differential equations by eliminating arbitrary constants and arbitrary functions.

2.6 Solve partial differential equations of the form P.p+Q.q=R

2.7 Solve Engineering problems on 2.1-2.6.

3. LAPLACE TRANSFORMS **14**

3.1 Define Gamma function and $\Gamma(n+1)=n!$ and find $\Gamma(1/2)=\sqrt{\pi}$ (No

problem)

3.2 Define Laplace transform of a function f(t) and inverse laplace transform.

3.3 Derive L.T. of standard functions and explain existence conditions of L.T.

3.4 Explain linear, shifting and Change of scale property of L.T.

3.5 Formulate L.T. of derivatives, integrals, multiplication by t^n and division by t.

3.6 Derive formula of inverse L.T.

3.7 Solve Linear Differential Equations with constant coefficients associated with initial conditions using Transform Method(upto 2nd order only).

3.8 Solve problems on 3.2- 3.7

4 FOURIER SERIES **14**

4.1 Define periodic functions

4.2 State Dirichlet's conditions for the Fourier expansion of a function and its convergence.

4.3 Express periodic function $f(x)$ satisfying Dirichlet's conditions as a Fourier series.

4.4 State Euler's formulae.

4.5 Define Even and Odd functions and Obtain F.S. in $(0 \le x \le 2\pi$ and $-\pi \le x \le \pi)$

4.6 Obtain F.S. of continuous functions and functions having points of discontinuity in $(0 \le x \le 2\pi$ and $-\pi \le x \le \pi)$.

4.7 Solve problems on 4.1-4.6

5 NUMERICAL METHODS **04**

5.1 Appraise limitations of analytic method of solution of algebraic and transcendental equations.

5.2 Derive Iterative formula for finding the solutions of algebraic and transcendental equations by:

a) Bisection method

b) Newton Raphson method

5.3 Solve problems on 5.2

6 FINITE DIFFERENCE and INTERPOLATION **12**

6.1 Explain finite difference and form table of forward and backward difference.

6.2 Define shift operator(E) and establish relation between E and difference operator(Δ).

6.3 Derive Newton's forward and backward interpolation formula for equal interval.

6.4 State Lagrange's Interpolation formula for unequal intervals.

6.5 Explain numerical integration and state

6.5.1 Newton-Cote's formula(No derivation)

6.5.2 Trapezoidal Rule

6.5.3 Simpson's 1/3rd rule

6.6 Solve Problems on 6.1-6.5

Learning Resources:

Sl.No	Name of Authors	Title of the Book	Name of Publisher
Text Book:			
1	Dr.B.S. Grewal	Higher Engineering Mathematics	Khanna Publishers

Reference Book

1 Text book of Engineering Mathematics-III By C.R.Mallick Kalyani Publication

ANALOG ELECTRONICS-I

Name of the Course: Diploma in Electronics & Telecomm. Engineering			
Course code:	ETT 301	Semester	3rd
Total Period:	60(45L+15T)	Examination	3 hrs
Theory periods:	3P/week	Class Test:	20
Tutorial:	1P/week	Teacher's Assignment:	10
Maximum marks:	100	End Semester Examination:	70

A: RATIONALE:

Analog Electronics has played an developmental role in the field of Electronics. In each and every field, electronics systems are used. Analog electronics is one of the subjects which is the base of all advance electronics .It starts with PN junction which makes the student to follow the functioning of all semiconductor based electronics. This is a core group subject and it develops cognitive and psychomotor skills. This Subject deals the fundamental analysis & design of Electronics and systems. The concept of Semiconductor, different electronics circuits and their applications will required in the subject Analog Electronics.

B: OBJECTIVES :

On completion of the study the students will be able to:

- Know the concept of Diode& its applications
- Know about transistor & its parameters
- Know the different types of Audio & Power Amplifiers.
- Know about the Field Effect Transistors & its classification.
- Know about the concept of Feedback Amplifier.
- Concept of Barkhausen Criterion of Oscillation & the different types of oscillators & its applications.
- Know about the concept of Tuned Amplifier.
- Know the concept of Clipping & Clamping circuits& wave shaping circuits

C: TOPIC WISE DISTRIBUTION OF PERIODS

SL NO.	TOPIC	PERIODS
1	DIODE AND CIRCUITS	10
2	TRANSISTORS AND CIRCUIT ANALYSIS	10
3	AUDIO POWER AMPLIFIERS	07
4	FIELD EFFECT TRANSISTOR (FET).	08
5	FEED BACK AMPLIFIER	06
6	OSCILLATOR	06
7	TUNED AMPLIFIER	05
8	COMMON APPLICATION OF DIODE, TRANSISTOR & WAVE SHAPING CIRCUIT	08

D: COURSE CONTENT:

1. DIODE AND CIRCUITS.

1.1 Discuss construction working principle, Diode current equation, Specification and use of p-n junction diode.

1.2 Explain effect of temperature of dependence of junction diode.

1.3 Explain concept of breakdown of diode (Avalanche &Zener Breakdown) and describe Construction, working, Characteristics and use of Varactor Diode.

1.4 Define and classify the rectifiers and explain working of different types of Rectifiers

1.5 Derive efficiency (mathematical derivation), advantages & disadvantage of Half-Wave

Rectifier and Full-Wave Rectifier (CT &BRIDGE type)

1.6 Define ripple factor & PIV of a diode & derive expression for ripple factor, TUF for Half-wave and Full-wave Rectifier.

2 TRANSISTORS AND CIRCUIT ANALYSIS.

2.1 Discuss construction and working principle of p-n-p and n-p-n transistor.

2.2 Explain different types of transistor connection (CB, CE and CC) & Explain input and output characteristics of transistor in different connections.

2.3 Define ALPHA, BETA, and GAMMA of transistors in various modes. Establish the Mathematical relationship between them.

2.4 Draw the load line (AC &DC) and determine the Q-point.

2.5 Explain Transistor as switch. Definition & graphical representation of different Time periods.

2.6 Draw re transistor model of CE, CC circuit of a Transistor &

2.7 Simple problems in Transistor

2.8 Explain various Types of Coupling& Explain principle working and use of R-C Coupled Amplifier including advantages and Disadvantages & Frequency Responses of R-C coupled Amplifier & draw the curve.

2.9 Explain concept of Photo transistor &Photo Darlington.

3 AUDIO POWER AMPLIFIERS.

3.1 Classify Power Amplifier &Differentiate between Voltage and Power Amplifier.

3.2 Explain the working principle of different types of Power Amplifier (Class-A, Class-AB, Class-B and Class-C & Class D amplifier).

3.3 Derive collector efficiency of class-A and class-B power amplifiers.

3.4 Explain construction and working principle and advantages of Push Pull (Class-B) Amplifiers

3.5 Explain construction and working principle and advantages of Complementary Symmetry Amplifiers

3.7 Explain Power transistors Heat Sinking.

4 FIELD EFFECT TRANSISTOR (FET).

4.1 State concept of FET & its classifications.

4.2 Differentiate between JFET & BJT.

4.3 Explain construction, working principle & characteristics of JEFT & Explain JEFT as an amplifier.

4.4 Define parameters of JFET & Establish relation among JFET parameters.

4.5 Explain JFET biasing method (Self-Bias , Voltage Divider) and connections.

4.6 Define MOSFET & its classification & characteristics (Drain & Transfer)

4.7 Explain construction, working principle of Enhancement type & Depletion type MOSFET.

4.8 Explain the operation of CMOS, VMOS & LDMOS

5 FEED BACK AMPLIFIER.

5.1 Define & classify Feedback Amplifier.

5.2 Explain principle of negative feedback with the help of block diagram.

5.3 Define gain of an amplifier with feedback.

5.4 Discuss the advantages & Effects of negative feedback in amplifier.

5.5 Discuss input & output impedance of negative feedback amplifier.

5.6 Explain principle of working, characteristics and use of Emitter Follower & Darlington Amplifier

6 OSCILLATOR.

6.1 General theory of feedback: Types of feedback – negative &positive feedback.

6.2 Types of negative feedback – voltage shunt, voltage series, current shunt & current series.

6.3 Advantages of negative feedback on voltage gain , bandwidth , input Impedance output

impedance, stability , noise , distortion in amplifiers.

6.4 Introduction to oscillator, block diagram of sine wave oscillator, Types Requirement of oscillation- Barkhausen criterion

6.5 RC oscillators – RC phase shift , Wien bridge&LC oscillators – Colpitts , Hartley :Circuit operation, circuit diagram, equation for frequency of oscillation & frequency stability

6.6 Explain the construction and working principle & use of Crystal Oscillator.

7 TUNED AMPLIFIER.

7.1 Defined and classify Tuned amplifier.

7.2 Explain parallel Resonant circuit, Resonance Curve & sharpness of Resonance.

7.3 Explain working principle of single tuned Voltage Amplifier & its limitation

7.4 Explain working principle of Double tuned Voltage Amplifier& its frequency response

7.5 Explain working of Stagger-tuned voltage amplifier

8 COMMON APPLICATION OF DIODE, TRANSISTOR & WAVE SHAPING CIRCUIT

8.1 Explain different type of Non-linear circuits - Clipper , diode series & shunt ,positive & negative biased & unbiased and combinational clipper clippers circuit & its application.

8.2 Explain different type of Clamper circuit (positive & negative clampers) & its application.

8.3 Explain working of a voltage multiplier circuit.

8.4 Explain the working of voltage Doubler & Tripler Circuit

8.5 Explain the working of Astable, Monostable & Bistable Multivibrator with circuit diagram.

8.6 Explain the working & use of Integrator and Differentiator circuit using R- C circuit. (Linear) , input / output waveforms & frequency response

LEARNING RESOURCES:

Text Books

Sl.No	**Name of Authors**	**Title of the Book**	**Name of the publisher**
1	Dr. R.S. Sedha	A Textbook of Electronic Circuit	S.Chand Publication
2	Adel S. Sedra,Kenneth C. Smith	Micro Electronic Circuits	Oxford publication
3	Robert L. Boylestad, Louis Nashelsky	Electronic Devices and Circuit Theory	Pearson Education
Reference Books			
1	Millman,Halkias, SatyabrataJit	Millman's Electronic Devices and Circuits	McGraw-Hill
2	N.N.Bhargaya,D.C. Kulshreshtha&S C Gupta	Basic Electronics & linear Circuits	McGraw Hill
3	Sahdev	Electronics principle	DhanpatRai&Co

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CIRCUIT THEORY

Name of the Course: Diploma in Electronics &Telecomm. Engineering			
Course code:	EET 321	Semester	3rd
Total Period:	60(45L+15T)	Examination	3 hrs
Theory periods:	3P/week	Class Test:	20
Tutorial:	1P/week	Teacher's Assessment:	10
Maximum marks:	100	End Semester Examination:	70

A: RATIONALE:

The Circuit Theory will cover some the basics of electric circuit theory, circuit analysis, and will touch on circuit design. This book will serve as a companion reference for a 1st year of an Electrical Engineering undergraduate curriculum. Topics covered include AC and DC circuits, passive circuit components, phasors, and RLC circuits. The focus is on students of an electrical engineering undergraduate program. Hobbyists would benefit more from reading Electronics instead.

B: OBJECTIVES:

On completion of the study the students will be able to:

- On completion of the study the students will be able to:
- Define Network Elements & analysis.
- Know about the Network Theorems.
- Know about R-L, R-C, R-L-C circuits.
- Know about Series & Parallel Resonance.
- Know about Transient Response & Laplace Transform.
- Know about One Port & Two Port Networks.
- Know about Different types of Filters & attenuators

C: TOPIC WISE DISTRIBUTION OF PERIODS

SL NO.	TOPIC	PERIODS
1	NETWORK ELEMENTS	05
2	NETWORK THEOREMS	10
3	A.C FUNDAMENTALS	10
4	RESONANCE	08
5	TRANSIENT RESPONSE OF SIMPLE CKTS (DC)	08
6	LAPLACE TRANSFORM AND ITS APPLICATIONS	05
7	NETWORK FUNCTIONS AND PARAMETERS	07
8	FILTERS& ATTENUATORS	07
	TOTAL-	60

D: COURSE CONTENT

1 NETWORK ELEMENTS

1.1 Define Network elements

1.2 Explain scope of network analysis & synthesize

1.3 Define Electric charge, electric current, Electrical energy, Electrical potential, R-L-C parameters, Energy Source ,Active& Passive Elements.

1.4 Explain current and voltage source, their transformation & mutual inductance

2 NETWORK THEOREMS

2.1 Explain Star – Delta transformation,
2.2 Explain method of Analysis (Mesh ,Nodal)with simple problem.
2.3 State, Explain & Prove Superposition Theorem, Millman Theorem, Thevenin's Theorem, Norton's Theorem, Maximum Power transfer Theorem, Reciprocity Theorem and their applications
2.4 Solve numerical problems of above.

3 A.C FUNDAMENTALS

3.1 Define frequency, Cycle, Time period, Amplitude, Average value, RMS value & Form factor of AC Wave.
3.2 Define phasor representation of alternating quantities
3.3 Explain the behaviour of A.C. through pure resistor, inductor & capacitor.
3.4 Explain the behaviour of R-L, R-C, R-L-C series circuit & draw the phasor diagram and voltage triangle
3.5 Solve numerical problems of above Circuit.
3.6 Explain the behaviour of R-L, R-C, R-L-C parallel circuit (with numerical problems.)

4 RESONANCE

4.1 State & Explain Series resonance,
4.2 Derive the following expression for series resonance
a. Condition for Resonance
b. Frequency of Resonance
c. Impedance, Current, Voltage, Q Factor and Power Factor of Resonance.
d. Bandwidth interm of Q.
4.3 State Explain Parallel Resonance (RL,RC& RLC).& derive the expression
4.4 What are the comparisons of Series & Parallel resonance

5 TRANSIENT RESPONSE OF SIMPLE CKTS (DC)

5.1 Define Network equations & initial conditions for resistor, inductor & capacitor
5.2 Analysis and derive the equation for circuit parameters of R-L, R-C, R-L-C circuit to DC
5.3 Define Time Constant of the above Circuit

6 LAPLACE TRANSFORM AND ITS APPLICATIONS

6.1 Define Laplace Transformation
6.2 Analysis and derive the equations for circuit parameters of Step response of R-L, R-C &R-L-C
6.3 Analysis and derive the equations for circuit parameters of Impulse response of R-L, R-C, R-L-C

7 NETWORK FUNCTIONS AND PARAMETERS

7.1 Define Network functions for one port & two port networks.
7.2 Define & Explain Open circuit (Z-Parameter)& Short Circuit(Y-Parameter) Parameters.
7.3 Calculate open & short Circuit Parameters for Simple Circuits
7.4 Define & Explain h- parameter (hybrid parameter)
7.5 Define T-Network & PI – Network

8 FILTERS& ATTENUATORS

8.1 Define filters, cut off frequency, pass band and stop band.
8.2 Classify filters; low pass, high pass, band pass, band stop filters & study their Characteristics.
8.3 Define Attenuation and Gain, Bel and Decibel & neper and their relations.
8.4 Define Attenuators
8.5 Define T- Type & PI – Type attenuators

LEARNING RESOURCES:

Text Books

Sl.No	Name of Authors	Title of the Book	Name of the publisher
1	A.Chakbarti	Circuit Theory	DhanpatRai& Co
2	Smarajit Ghosh	Network theory	PHI Learning Private Limited
3	SurajitBagchi	Circuit Theory & Network	S.Chand& Company Ltd

Reference Books

Sl.No	Name of Authors	Title of the Book	Name of the publisher
1	Nagsarkar	Circuit and Networks	Oxford
2	Ravish R Singh	Electrical Networks	Tata McGraw-Hill

DIGITAL ELECTRONICS

Name of the Course: Diploma in Electronics &Telecomm. Engineering			
Course code:	ETT 302	Semester	3rd
Total Period:	75(60L+15T)	Examination	3 hrs
Theory periods:	4P/week	Class Test:	20
Tutorial:	1P/week	Teacher's Assessment:	10
Maximum marks:	100	End Semester Examination:	70

A: RATIONALE:

The Digital Electronics can play a vital role in wide Varity applications in the field of industrial machinery, computers, microprocessor, microcontrollers & household appliances, among others. It is the inter connection among the digital components and modules. The various Digital ICs are replaced today the analog components. These are working with high degree of accuracy in the Electronics, Communication & other fields .

B: OBJECTIVES :

On completion of the study the students will be able to:

- Know about the Number systems & codes.
- Know about Different types of Logic gates.
- Know about Boolean Algebra.
- Know about different types of Combinational Logic & Sequential Logic Circuits.
- Know about different types of Logic Families.
- Know about Flip flops , Counters and Registers.
- Know about the ADC & DAC.
- Know about Display devices.

C: TOPIC WISE DISTRIBUTION OF PERIODS

SL NO.	TOPIC	PERIODS
1	NUMBER SYSTEMS AND CODES	08
2	LOGIC GATES	08
3	BOOLEAN ALGEBRA	07
4	COMBINATIONAL CIRCUITS	10
5	SEQUENTIAL CIRCUITS	10
6	LOGIC FAMILIES	06
7	COUNTERS	07
8	REGISTERS	08
9	A /D and D /A CONVERTERS& DISPLAY DEVICES & APPLICATIONS	11
	TOTAL-	75

D: COURSE CONTENT:

1 NUMBER SYSTEMS AND CODES

1.1 List different number system (Binary, Octal, Decimal, Hexadecimal) & the Conversion from one number system to another

1.2 Perform Arithmetic operations (Addition, Subtraction, and Multiplication& Division) of binary number systems

1.3 Represent the Concept of complementally numbers: 1's & 2's complementally

of Binary numbers& Subtraction using complements method

1.4 Define concept of Digital Code & its application & Distinguish between weighted & non-weight Code

1.5 Study Codes: definition, relevance, types(BCD,Gray,Excess-3,ASCII & EBCDIC) and applications

2 LOGIC GATES

2.1 Illustrate the Different between Analog signals & systems and Digital signals & Systems

2.2 Discuss the Types of logic & representation using electric signals

2.3 Learn the Basic Logic gates (NOT, OR, AND, NAND, NOR, EX-OR & EX-NOR)-Symbol, Function, expression, truth table & timing diagram

2.4 Concept of AOI (AND-OR-INVERT) &OAI (OR-AND-INVERT) Blocks

2.5 Define Universal Gates & realisation of other gates

2.6 Discuss the concept Threshold Gate.

3.0 BOOLEAN ALGEBRA

3.1 Understand Boolean: constants, variables & functions

3.2 Comprehend the Laws & details of Boolean algebra

3.3 State and prove Demorgan's Theorems & Duality theorem.

3.4 Represent Logic Expression: SOP & POS forms & conversion

3.5 Simplify the Logic Expression /Functions (Maximum of 4 variables): using Boolean algebra and Karnaugh's map methods & Minimization of logical expressions using K-map (2, 3, 4 variables).

3.6 What is don't care conditions &Minimization of logical expressions using K-map with don't care conditions

3.7 Realisation of simplified logic expression using gates

4.0 COMBINATIONAL CIRCUITS

4.1 Define a Combinational Circuit and explain with examples

4.2 Arithmetic Circuits (Binary)

a) Realise function, functional expression, logic circuit, gate level circuit, truth table& Applications of Half-adders, Half-Subtractor, Full-adder & Full- Subtractor

b) Explain Serial & Parallel Adder & application

c) Working of 4 bit parallel adders with logic circuit

d) Construct 2 bit Magnitude Comparator: logic expression, truth table, gate level circuit

4.3 Discuss Decoder (2:4)& Encoder(8:3 Octal to Binary): definition, relevance, gate level of circuit Logic circuit truth table

4.4 Explain the working of BCD to Seven Segment Decoder

4.5 Discuss Multiplexers: definition, relevance, gate level circuit of simple Multiplexers (4:1) logic circuit .

4.6 Discuss De-multiplexers: definition, relevance, gate level circuit of simple De-multiplexers (1:4) logic circuit with truth Table

5 SEQUENTIAL CIRCUITS

5.1 Define Sequential Circuit: Explain with examples & distinguish from Combinational Logic circuits

5.2 Know the Clock-definition, characteristics, types of triggering & waveform

5.3 Define Flip-Flop & Explain SR Flip Flop using NAND, NOR Latch (un-clocked)

5.4 Study Clocked RS,D,T,JK, MS-JK flip-flop with at level circuit, logic Circuit and truth table

5.5 Concept of Racing and how it can be avoided.

5.6 Applications of flip-flops and its conversation

6 LOGIC FAMILIES

6.1 list of various logic families & standard notations

6.2 Explain propagation Delay, fan-out, fan-in, Power Dissipation ,Noise Margin ,Power Supply requirement &Speed with Reference to logic families.

6.3 Explain Features, circuit operation &various applications of TTL (NAND), CMOS (NAND & NOR) & ECL

6.4 Explain Tristate Gates

7 COUNTERS

7.1 List the different types of counters-Synchronous and Asynchronous& its applications
7.2 Explain the modulus of a counter
7.3 Compare Synchronous and Asynchronous counters.
7.4 Explain the working of 4 bit ripple counter (UP & DOWN) with truth table and timing diagram
7.5 Explain the Synchronous decade/mod 10 counter

8 REGISTERS

8.1 Explain the working of buffer register
8.2 Explain the working of various types of shift registers SISO, SIPO, PISO, PIPO
8.3 Explain the working of bidirectional and Universal shift register(4bit)
8.4 Explain the applications of Shift Registers
8.5 Explain Ring &Johnson Counter

9 A /D and D /A CONVERTERS& DISPLAY DEVICES & APPLICATIONS

9.1 Explain the performance parameters of DAC-Resolution, Accuracy and Conversion time
9.2 Explain Binary Weighted resistor DAC
9.3 Explain R-2R Ladder type DAC
9.4 Explain the performance parameters of ADC-Resolution, Quantization Error and Conversion time Periods
9.5 Explain the Ramp type and Dual Slope ADC's
9.6 Explain the Successive –Approximation type ADC
9.7 Explain LED driver using IC 7447 decoder
9.8 Discuss PLD, its types, Symbol, Implementation & Advantages

LEARNING RESOURCES:

Text Books

Sl.No	Name of Authors	Title of the Book	Name of the publisher
1	Ananda Kumar	Fundamental of Digital Electronics	PHI Publication
2	P.RAJA	Digital Electronics	SCITECH Publication
3	G.K.Kharate	Digital Electronics	OXFORD Publication

Reference Books

Sl.No	Name of Authors	Title of the Book	Name of the publisher
1	Anokh Singh &A.K.Chhabara	Digital Electronics & Microprocessor	S.Chand
2	R.P.Jain	Modern Digital Electronics	McGraw Hill
3	S.Salivahanan ,S.Arivazhagan	Digital Circuits Design	VIKAS Pub House Pvt

ELECTRONIC MEASUREMENT & INSTRUMENTATIONS

Name of the Course: Diploma in Electronics &Telecomm. Engineering			
Course code:	ETT 303	Semester	3rd
Total Period:	60(45L+15T)	Examination	3 hrs
Theory periods:	3P/week	Class Test:	20
Tutorial:	1P/week	Teacher's Assessment:	10
Maximum marks:	100	End Semester Examination:	70

A: RATIONALE:

Measurement & Instrumentation serves not only in science & technology but spread over to all bran of engineering. Measuring is basically used to monitor a process or operation as well as the controlling process. The basic concept& principle of working of measuring instrumentation are included in this subject. The Analog & Digital types of Instruments are discussed in this subject.

B: OBJECTIVES:

On completion of the study the students will be able to:

- Know about the Qualities of Measurement
- Know about Indicating Instruments
- Know about Digital Instruments
- Study of Oscilloscope.
- Know about different types of Bridges.
- Know about Transducers & Sensors.
- Know about Signal Generator & Wave Analyzer.
- Know about various measurements using Electronics Devices

C: TOPIC WISE DISTRIBUTION OF PERIODS

SL NO.	TOPIC	PERIODS
1	QUALITIES OF MEASUREMENT	04
2	INDICATING INSTRUMENTS	11
3	DIGITAL INSTRUMENTS	11
4	OSCILLOSCOPE	08
5	BRIDGES	09
6	TRANSDUCERS & SENSORS	12
7	SIGINAL GENERATOR & WAVE ANALYSER	05
	TOTAL-	60

D: COURSE CONTENT :

1 QUALITIES OF MEASUREMENT

1.1 Discuss the Static Characteristics,
1.2 Define accuracy, sensitivity, reproducibility, & static error of instruments
1.3 Discuss the, Dynamic characteristics.
1-3 Define speed of instruments.
1.4 Define errors of an instrument & explain various types.

2 INDICATING INSTRUMENTS

2.1 Introduction to Indicator & Display devices & its types

2.2 Discuss the basic principle of meter movement, permanent magnetic moving coil movement & its advantages & Disadvantages.
2.3 Discuss the operation of Moving Iron Instrument
2.4 Discuss the principle of operation of DC Ammeter and Multi range Ammeter
2.5 Discuss the principle of operation of AC Ammeter and Multi range Ammeter
2-6 discuss the principle of operation of DC Voltmeter and its applications
2.7 Discuss the principle of operation of AC Voltmeter and its application
2.8 Discuss the operation of Ohm Meter (Series & Shunt type)
2.9 Discuss the operation of Analog Multimeter
2-10 discuss the operation of Q meter

3 DIGITAL INSTRUMENTS

3.1 Explain the principle of operation of Ramp type Digital Voltmeter
3.2 Explain the display of 3 1/2, 4 1/2– Digital Multimeter
3.3 Define the Resolution and Sensitivity of Digital Meters
3.4 Explain the principle of operation of working of Digital Multimeter
3.5 Explain the principle of operation of working of Digital Frequency Meter
3.6 Explain the principle of operation of working of Digital Measurement of Time
3.7 Explain the Measurement of Frequency.
3.8 Explain the principle of operation of working of Digital Tachometer
3.9 Explain the principle of operation of working of Automation in Digital Instruments (Polarity Indication, Ranging, Zeroing & Fully Automatic)
3.10 Draw the block diagram of LCR meter.

4 OSCILLOSCOPE

4.1 Discuss the basic principle of Oscilloscope
4.2 Discuss the Block Diagram of Oscilloscope & simple CRO
4.3 Discuss the block diagram of Dual Trace Oscilloscope
4.4 Discuss the dual trace CRO specification
4.5 Explain the use of Lissajous method for Phase & frequency Measurement
4.6 Applications of Oscilloscope (Voltage period & frequency measurement)
4.7 Explain the operation of Digital Storage Oscilloscope

5 BRIDGES

5.1 Explain the working of Wheatstone's Bridge (Measurement of Resistance)
5.2 Explain the measurement of self-inductance by Maxwell's Bridge
5.3 Explain the measurement of self-inductance by Hay's Bridge
5.4 Explain the measurement of capacitance by Schering's Bridge
5.5 Explain the measurement of capacitance by a Wein's Bridge.
5.6 Discuss the working principle of Q meter
5.7 Explain the measurement of frequency working principle of Wien Bridge
5.8 Discuss the working principle of LCR Bridge

6 TRANSDUCERS & SENSORS

6.1 Discuss the parameter, method of Selecting & advantage of Electrical Transducer
6.2 Discuss Resistive Transducer
6.3 Explain the working principle of Strain Gauges; define Strain Gauge (No mathematical Derivation)
6.4 Explain the working principle of LVDT
6.5 Explain the working principle of capacitive transducers (pressure)
6.6 Explain the working principle of Load Cell (Pressure Cell)
6.7 Explain the working of Temperature Transducer (RTD, Optical Pyrometer, Thermocouple, Thermister)
6.8 Explain the working of Current transducer and KW Transducer.
6.9 Explain the working of Proximity & Light sensors.

7 SIGINAL GENERATOR & WAVE ANALYSER

7.1 Explain the working principle of AF Sine & Square wave generator .

7.2 Explain the working principle of a Function Generator
7.3 Explain the function of basic Wave Analyzer& types

LEARNING RESOURCES:

Text Books

Sl.No	Name of Authors	Title of the Book	Name of the publisher
1	H S Kalsi	Electronic Instrumentation	McGraw Hill
2	A K Sawheny	Electrical & Electronics Measurement & Instrumentation	Dhanpat rai
3	J.B.Gupta	Electronics & Electrical Measurement Instrumentation	Katson books

Reference Books

Sl.No	Name of Authors	Title of the Book	Name of the publisher
1	R.K.Rajput	Electrical and Electronic Measurements and Instrumentation	S Chand
2	S.K.Singh	Industrial Instrumentation Control	TMH
3	K KrishnaReddy	Electrical Measurements	SCITECH publications

ANALOG ELECTRONICS LAB – I

Name of the Course: Diploma in Electronics & Telecomm. Engineering

Course code:	ETP 301	Semester	3rd
Total Period:	60	Examination	4 hrs
Lab. periods:	4 P / week	Term Work	25
Maximum marks:	50	End Semester Examination:	25

A: RATIONALE:

Analog Electronics lab is an introductory experimental laboratory that explores the design, construction, and debugging of analog electronic circuits. This laboratory projects investigate the performance characteristics of diodes, transistors, JFETs etc including the construction of a small audio amplifier and preamplifier. The course provides opportunity to simulate real-world problems and solutions that involve tradeoffs and the use of engineering judgment. Design of amplifiers and other electronic systems have to satisfy specifications. Bipolar and field-effect transistors, diodes integrated circuits and passive components are part of the hardware needed. Gain, bandwidth, feedback, stability are some of the design concepts needed

B: OBJECTIVES :

On completion of the study the students will be able to:

- Perform various experiments Analog Electronic
- Understand the behavior of different semiconductor devices
- Understand the concept of Rectifiers, Amplifiers, Oscillators, feedback amplifiers
- Know the specifications of Electronics components

Skills to be developed:

Intellectual Skills:

1. Interpret results
2. Calculate values of various components for given circuits
3. Select instruments

Motor Skills:

1. Connect the instruments properly.
2. Take accurate readings

C: List of Practical:

1. Determine the input and output characteristics of CE & CB transistor configurations.
2. Design of simple amplifiers (common emitter and common source)
3. Construct Bridge Rectifier using different filter circuit and to determine Ripple factor & Analyse wave form with filter & without filter.
4. Construct Bridge Rectifier using different filters and to determine Ripple factor.
5. Construct & test the regulator using Zener diode.
6. Construct different types biasing circuit and analysed the wave form.
   (i) Fixed bias. (ii) Emitter bias (iii) Voltage divider bias
7. Study the two stage CE amplifier , find Gain & draw the frequency response curve
8. Construct & Find the gain (i) Class A Amplifier. (ii) Class B Amplifier (iii) Class C Tuned Amplifier
9. Construct & test Push Pull amplifier & observe the wave form
10. Determine Drain & Transfer characteristics of JFET & MOSFET
11. Construct & calculate the frequency & Draw the wave form of
    (i) Hartly Oscillator
    (ii) Collpit's Oscillator

(iii) Wein Bridge Oscillator
(iv) R-C phase shift Oscillator

12 Construct & Test Differentorand Integrator using R-C Circuit.
13 Test Transistor act as an Switch & study its characteristics
14 Observe the waveform of Clipper,Clamper circuits
15 Mini Project : To collect data like base configuration, Transistor& diode characteristics, applications and critical factors etc. on all semiconductor devices studied in theory and compile a project report throughout and submit at the end of the semester. To assemble and test simple circuit using above components with test points (e.g. Series Regulator / Oscillators, Emitter follower, push pull Amplifier etc)& use application of **TINA /Electronics Workbench/ p-spice / WiringX** SOFTWARE/ any software compatible circuits you can create simple wiring layouts with the most common discreet electronic components.

Reference Books

Sl.No	**Name of Authors**	**Title of the Book**	**Name of the publisher**
1	S P Rao & B.Sasikala	Handbook of Experiments in Electronics & Communication Engg	VIKAS
2	KAR	Advanced practical Electronics	Books & Allied Pvt

CIRCUIT SIMULATION LAB
(USING P-SPICE SOFTWARE)

Name of the Course: Diploma in Electronics & Telecomm. Engineering

Course code:	EEP 321	Semester	3rd
Total Period:	60	Examination	4 hrs
Lab. periods:	4 P / week	Term Work	25
Maximum marks:	50	End Semester Examination:	25

A: RATIONALE:

The Circuit Theory Lab can provide knowledge of measurements of various parameters, verification of different circuits and measuring instruments. Using p-spine software / TINA software student can able to analyse the circuits in the computer and simulate the DC/AC analysis easily for efficient outputs. This lab involved principles of operation of electrical and electronic test equipment and applications to measurement of circuit parameters with transient and steady state response of RLC networks & applications of laws and theories of circuits., Design, prototyping, and testing of electronic devices and circuits

B: OBJECTIVES:

On completion of the study the students will be able to:

- Measurement of Resistance, Voltage, Current, Voltage, Current in A.C & D. C.
- Measurement of Circuit Parameters by LCR meter
- Verification of Theorems
- Determine resonant frequency of series R-L-C circuit.
- Study of High Pass & low pass filter , Band pass Filter and Band Elimination Filter and determination of its cut-off frequency.
- Know circuit diagram and explain response of series & parallel resonant circuit
- Analysis the charging and discharging of an R-C & R-L circuit with oscilloscope.
- Know rise time, overshoot, damping factor
- Know Circuit simulation using P-SPICE software. &Construct different circuits using P-SPICE software and compare the measurements and wave forms.

Skills to be developed:

Intellectual Skills:

1. Interpret results
2. Calculate values of various components for given circuits
3. Select instruments

Motor Skills:

1. Connect the instruments properly.
2. Take accurate readings.

3 Skill development use of Software

C: List of Practical:

1 Measurement of Resistance, Voltage, Current, Voltage, Current in A.C & D. C. Circuit by using digital multimeter & Measurement of A.C. Current by Clip-on ammeter

2. Verification of (a) Super positions Theorem
   (b) Thevenin's Theorem
   (c) Norton's Theorem
   (d) Milliman's Theorem
   (e) Maximum power theorem

3. Determine resonant frequency of series R-L/R-C/ R-L-C circuit and study the quality factor and bandwidth. Give applications of series resonance circuit and Draw the curve showing variation of R,XL,XC,I with F.

4. Develop the circuit diagram and explain responseof parallel resonant circuit
5. Analysis the transient response ,charging and discharging of an R-C & R-L circuit with oscilloscope. Compute the time constant from the tabulated data and determine the rise time graphically.

6. Determine the time constant of R-L-C circuit and analysis the transient response (rise time, overshoot, and damping factor from the oscilloscope)
7. Study of Low Pass filter and determination of cut-off frequency.
8. Study of High Pass filter and determination of cut-off frequency.
9.. Study of Band pass Filter and Band Elimination Filter and determination of its cut-off frequency.
10. Circuit simulation using P-SPICE software. Construct above circuits using P-SPICE software and compare the measurements and wave forms.
11 Determination of Parameters of Two Port Network (T & Y)
12 Design attenuator circuit (pie or T)
13 Mini Project: To collect data of catalogues and specification sheet of all the equipment &components used for performing experiment and submit the project on P-SPICE software into Analysis and Plot the graph of each measurement at the end of semester e.g. Butter Worth Filter

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DIGITAL ELECTRONICS LAB

Name of the Course: Diploma in Electronics & Telecomm. Engineering

Course code:	ETP 302	Semester	3rd
Total Period:	60	Examination	4 hrs
Lab. periods:	4 P / week	Term Work	25
Maximum marks:	50	End Semester Examination:	25

A: RATIONALE:

The Digital Electronics Laboratory can play a vital role in wide Varity applications in the field of microprocessor, microcontrollers & household appliances, among others. It is the inter connection among the digital components and modules. Various digital ICs are discussed. This lab include combinational logic & sequential logic circuits and its implementations.

B: OBJECTIVES :

On completion of the study the students will be able to:

- Familiarization of Digital Trainer Kit, logic Pulser Logic Probe & Digital ICs
- Verify truth tables of Digital gates
- Implement various gates by using universal properties
- Implement Half adder ,Full adder, Half subtractor and Full subtractor using logic gates.
- Know about Flip Flop, Counters, Registers
- Study Multiplexer and Demultiplexer.
- Study 8-bit D /A and A/ D conversion.

Study display devices, LED, LCD, 7-segment displays.

Skills to be developed:

Intellectual Skills:

1. Interpret results
2. draw pin diagram of various ICs for given circuits
3. Select instruments

Motor Skills:

1. Connect the instruments properly.
2. Take accurate readings/ observation

C: LIST OF PRACTICALS:

1 Familiarization of Digital Trainer Kit, logic Pulser Logic Probe & Digital ICs IE 7400, 7402, 7404,7408, 7432 & 7486.(draw their pin diagram and features)

2 Verify truth tables of AND, OR, NOT, NOR, NAND, XOR, XNOR gates & simplifications of Boolean gates

3 Implement various gates by using universal properties of NAND & NOR gates verify and truth table tabulate data.

4 Construct & verify operation of Half Adder and Full Adder using logic gates.

5 Construct & verify operation of Half Subtractor and Full Subtractor using logic gates.

6 Design &Implement a 4-bit Binary to Gray code converter.

7 Design & Implement a Single bit/ two bit digital comparator circuit

8 Design Multiplexe r(4:1) and Demultiplexer (1:4).

9 Study the operation of flip-flops (i)S-R flip flop (ii) J-K flip flop (iii) D flip flop (iv) T flip flop

10 Realize a 4-bit asynchronous UP/Down counter with a control for up/down counting.

11 Study shift registers.

12 verify the operation 8-bit D /A and A/ D conversion & test its performance

13 Study display devices LED, LCD, 7-segment displays.

14 Mini Project : To collect data like pin configurations, display devices, Operational characteristics, applications and critical factors etc. on all digital ICs studied in theory and compile a project report through out and submit at the end of the semester. To assemble and tests circuits using above digital ICs

with test points e.g. Digital Clock / Frequency Counter / Running Glow Light upto 999/Solar cell &Opto coupler applications.

(All the above experiments are to be conducted by through study of ICs)

15. **Digital Works 3.04/** higher is a graphical design tool that enables you to construct digital logic circuits and to analyse their behaviour through real time simulation. Its intuitive, easy to use interface makes it the ideal choice for learning or teaching digital electronics.

ELECTRONICS MEASUREMENTS LAB

Name of the Course: Diploma in Electronics & Telecomm. Engineering

Course code:	ETP 303	Semester	3rd
Total Period:	45	Examination	4 hrs
Lab. periods:	3 P / week	Term Work	25
Maximum marks:	50	End Semester Examination:	25

A: RATIONALE:

This lab aims to help students to better understand measuring devices and their operating principles, Measurement of Circuit Parameters, Power, Power Factor, Phase Angle, Frequency and Time, DC and AC Bridges, Characteristics of Discrete and Integrated Devices, Digital Instrumentation, Transducers.

B: OBJECTIVES :

On completion of the study the students will be able to:

- Measurement of Current and Voltages by Low range ammeter and voltmeter respectively with shunt and multiplier.
- Construct Bridges to measure R,L, & C.
- Observe the wave forms of different frequency by using Function generator and draw its diagram. & measure the amplitude and frequency using dual trace CRO.
- Measure the unknown frequency and phase angle using CRO by lissajous figure
- Measure the different parameters using Transducer.

Skills to be developed:

Intellectual Skills:

1. Interpret results
2. Calculate values of various components for given circuits
3. Select instruments

Motor Skills:

1. Connect the instruments properly.
2. Take accurate readings.
3. Draw phasor diagrams and graphs

C: LIST OF PRACTICAL:

1. Study and construction of moving coil and moving iron instruments&caliberate.
2. Study of static and dynamic characteristic of PMMC & moving iron instruments
3. Study of Resolution, Sensitivity of Digital Instrument
4. Measurement of Current and Voltages by Low range ammeter and voltmeter respectively with shunt and multiplier.
5. Observe the wave forms of different frequency by using Function generator and draw its diagram. &calculates average & R.M.S. Values, frequency, Time Periods using CRO.
6. Measure the amplitude and frequency using dual trace CRO.
7. Measure the unknown frequency and phase angle using CRO by Lissajous figure.
8. Measurement of resistance using Wheatstone's Bridge
9. Measure the inductance by Maxwell's Bridge &Hay's Bridge
10. Measure the capacitance by Schering's Bridge
11. Measure the Resistance, Capacitance of circuit (Series & parallel) by using LCR meter and find the Q factor of the coil.
12. Measure displacement using LVDT Transducer.
13. Measure the temperature using RTD &Thermister.
14. Construct & Test the performance of Proximity Sensor.
15. Mini Project : To collect data like base configuration, Operational characteristics, applications and critical factors etc. on all measuring devices & studied in theory and compile a project report through out and submit at the end of the semester

C- PROGRAMMING & WEB PAGE DESIGN LAB

Name of the Course: Diploma in Electronics & Telecomm. Engineering

Course code:	CSP 321	Semester	3rd
Total Period:	45	Examination	4 hrs
Lab. periods:	3 P / week	Term Work	25
Maximum marks:	50	End Semester Examination:	25

A: RATIONALE:

Web design encompasses many different skills and disciplines in the production and maintenance of websites. The different areas of web design include web graphic design; interface design; authoring, including standardised code and proprietary software; user experience design; and search engine optimization. Often many individuals will work in teams covering different aspects of the design process, although some designers will cover them all.The term web design is normally used to describe the design process relating to the front-end (client side) design of a website including writing mark up. Web design partially overlaps web engineering in the broader scope of web development. Web designers are expected to have an awareness of usability and if their role involves creating mark up then they are also expected to be up to date with web accessibility guideline.

B: OBJECTIVES :

On completion of the study the students will be able to:

1. To explore your business worldwide and makes strong impact image using active online presences with web site. And well-designed and aesthetically appealing website can give you a strong advantage over other online competitors.
2. To make an interesting to see graphic designers on one end, and web programmers on the other, arguing their respective positions active web page designing is today's need.
3. To get strong instantaneous recognition of relevance which leads to clarity, and understanding at a glance a well-crafted brand strategy which provides context and perspective, and a detailed website plan that spells out specific objectives, target audiences, paths to conversion other critical elements of your site

Skills to be developed:

Intellectual skills:

- Use of programming language constructs in program implementation.
- Apply different logics to solve given problem.
- Write program using different implementations for the same problem
- Identify different types of errors as syntax semantic, fatal, linker & logical
- Debugging of programs
- Understanding different steps to develop program
- Design a general webpage
- Design a general website
- Design multimedia page which includes Text, Audio, video, images, Animation.
- Upload the website on college server.
- Upload website on public internet

Motor skills:

- Proper handling of Computer System.
- Design simple Web pages - using HTML
- Organize information using Tables, collect information from users using forms &
- present information using Frames.
- Use style sheets to gain full control of formatting within Web page.
- Include JavaScript within Web pages.
- Embed multimedia to Web pages.

  Integrate all above to develop Web sites

C: LIST OF PRACTICALS:

List of Assignments/Tutorial for C program:

Write a C program

. Any one from 1 to 3

1)To display our College name twenty times on screen.
2)To display all even numbers from 1-100.
3)To perform addition of 1-100 numbers.

Any one from 4 and 5

4)To find smallest / largest number from array elements.
5)To sort array elements in ascending / descending order.

Any one from 6 to 8

6)To enter elements for 3X3 matrix and display them.
7)To calculate addition / subtraction of 2 dimensional matrix.
8)To calculate multiplication of 2 dimensional matrix.
9)To demonstrate output of standard library functions Strlen (), strcpy (), strcat (), strcmp ().

Any one from 10 and 11

10)To calculate area of circle using function.
11)To calculate factorial of any given number using recursion.
12)To demonstrate call by reference, call by value
13)To maintain and manipulate student data using structure.
14)To perform 4 arithmetic functions on pointers.

List of Assignments/Tutorial for web page design:

1. Browse different search engines and search different topics&Crete an e-mail account & use attachment facility
2. Design a general webpage Design a general website .
3. Design multimedia page which includes Text, Audio, video, images, Animation
4. Design a general website&multimedia page which includes
5. Upload the website on college server &load website on public internet.
6. Designs Web page and apply some block level tags and some text level tags &Include Horizontal Rules and special characters in a Web page.
7. Design Web page and include different lists & various links in a Web page & Include images with different alignments and wrapped text in Web page. Also include image as a link in the Web page.
8. Design a web page and set background colour and document wide text colour.
9. Design a web page with background image, different text colour for different paragraphs, and set colors for links, active links and visited links.
10. Create HTML table, format contents in table cells and span the rows and columns.
11. Create basic frameset and format the frames within the frameset using different attributes. Also use frame targeting.
12. Create a basic form using different input controls and pull down menu.

LEARNING RESOURCES :

Reference Books

Sl.No	Name of Authors	Title of the Book	Name of the publisher
1	Balgurusamy	Programming inC	TataMc-Graw Hill
2		Web page Design	TMG/Oxford/BPB publications

Develop programming concepts of students reference Websites:

- http://cplus.about.com/od/beginnerctutoriali/a/blctut.htm
- http://computer.howstuffworks.com/c.htm
- Objective questions:

http://www.indiastudycenter.com/studyguides/sc/objtest/default.asp

Demo lectures with power point presentations using LCD projector should be arranged to.