31/01

CURRICULUM

FOR

ADVANCED DIPLOMA

IN

INDUSTRIAL ELECTRONICS
(FIRST TO EIGHTH SEMESTERS)



CURRICULUM DEVELOPMENT CENTRE M.P. BOARD OF TECHNICAL EDUCATION, OFFICE COMPLEX, BLOCK A-4, GAUTAM NAGAR, BHOPAL-462023.

FOR

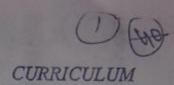
### ADVANCED DIPLOMA

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CURRICULUM DEVELOPMENT CENTRE
MIT BOARD OF TECHNICAL EDUCATION,
OFFICE COMPLEX, BLOCK A-4, GAUTAM NAGAR,
BHOPAL.-462023.



# ADVANCED DIPLOMA

IN

# INDUSTRIAL ELECTRONICS

(FIRST SEMESTER)

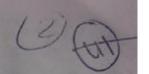


CURRICULU I DEVELOPMENT CENTRE

TEAL LAS TRAINING INSTITUTE,

MLA H'LLS, BHOPAL-462 002

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# ADVANCED DIPLOMA IN INDUSTRIAL ELECTRONICS

#### I Semester

S. Course Title	Theory	Practical	Total
1. Commun. Ition skills	5	0	5
2. Maths - I.	5	0	5
3. Engineering Physics	5	2	7
4. Engineering Chemistry	3	2	5
5. Engineering Drawing	0	8	8
6. Workshop practice (Mech.) - I	0	6	6
	18	18	36

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### MADHYA PRADESH BOARD OF TECHNICAL EDUCATION, BHOPAL

# Scheme of Studies and Examination Advanced Diploma in Industrial Electronics

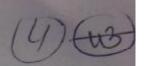
#### FIRST SEMESTER

St.	COURSE TITLE	HOLRS/NEEK		SESSI	SESSIONAL MARKS PR					THEORY PRACTICAL/VIVA			
		TH.	PR.	TERM	LAB. WORK	1	11	PAPER	DURATION Hrs.			DURATION Hrs.	
1.	Communication Skills	5		15		10	10	1	3	100	3	-	
2.	Mathematics - 1	5		15	-	10	10	1	3	100		9.46	
3.	Engineering Physics	5	2	15	8	10	10	1	3	100	í	3	50
4.	Engineering Chamistry	3	2	15	8	10	10	1	3	100	1	3	50
5.	Engineering Drawing	О	8	40		10	10	1	4	100	1	3	50
5.	Workshop Practice - I	0	6		50	-				1	1	4	50
		18	18	100	100	50	50			500			200

<sup>(</sup>a) Total Theory Marks = 500

<sup>(</sup>b) Total (Sessional, Progressive Assessment + Practical) Marks

<sup>(</sup>c) Ratio of Theory Marks to (Sessional + Progressive Assessment + Practical Marks) = 1:1



# First Semester

# COMMUNICATION SKILLS

The	ory per week: 5 Hrs.	Practical per week: N			
Top No		Theory Pra	ectical Hrs.		
1.	Passages for comprehension	22			
2.	Applied grammar	22			
3.	Rapid Reading (short stories)	12			
4.	Unseen passages for compre- hension	08	-		
5.	Precis writing	08			
6.	Paragraph writing	08	- 1		
	Total	80	-		

# (5)



#### ADVANCED DIPLOMA IN INDUSTRIAL ELECTRONICS

#### First Semester

#### COMMUNICATION SKILLS

. Theory per week : 5 Hrs.

Practical per week : Nil

#### COURSE CONTENT

1. Passages for comprehension

A course in Technical English: Book I, prepared at Curriculum Development Centre, Technical Teachers' Training Institute, (Western Region), Bhopal, (Section I, prescribed units: 1 to 10)

2. Applied Grammar

(Text book as above; section II) (Prescribed Units: 1 to 10)

Rapid Reading (short stories)

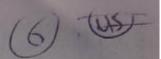
(Text book as above)

- (i) The selfish Giant Oscar Wilde
- (ii) A letter to God Gregorio Lapex Y. Fuentes
- (iii) An Astrologer's Day R.K.Narayan
- (iv) The Malefactor Anton Cheknov
- (v) The last leaf O.Henry
- 4. Unseen passage for comprehension

  Passages of general interest will be given.
- 5. Precis Writing

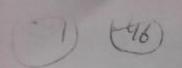
  Passages of general interest will be given.
- 6. Paragraph writing

  Topics of general interest will be given.



#### REFERENCES

- Living English Structures A practice Book for Foreign students by W.S.Allen
- 2. English Grammar & Composition by Wren & Martin (latest revised edition)
- 3. Structure of Technical English by A.J. Helbert; ELBS
- Advanced Learners Dictionary & Current English by A.S.Hornby; Oxford
- 5. Scientific & Technical Dictionary by Flood & West; ELBS



# First Semester ·

### MATHEMATICS - I

Theory pe	er week: 5 Hrs.	Practical per week: Nil
Topic No.	Title	Theory Hrs.
1.	Algebra	32
2.	Trigonometry	24
3.	Vector Algebra	14
4.	Statistics	10
	Total	80

#### First Semester

#### MATHEMATICS - I

Theory per week: 5 Hrs.

Practical per week: Nil

#### COURSE CONTENTS

#### 1. Algebra

Quadratic Equation - General solution, nature of roots, relation between the roots & coefficients of the equation, formation of an equation from given roots.

Indices

Logarithms

Sequences & series - Arithmetic and Geometric progressions.

Permutations & Combinations - Factorial notation, symbols nPr, nCr, Simple problems.

Binomial theorems - Statement of theorem to any index, General term middle term/terms, greatest term.

Determinants Partial Fractions

### 2. Trigonometry

System of measurement of angles, trigonometric ratios & identities, T.R. of standard angles & angle of any magnitude, use of T.tables, graphs of T.functions, inverse T.functions, solution of T.equations, T. ratios of compound angles, multiple & submultiple angle, C-D formula, A-B formula, properties of triangle & solution of triangle, height and distance.

#### 3. Vector Algebra

Vectors & scalors, i, j, k. vectors.

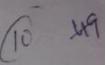
Addition of vectors, multiplication by a scalor, dot product, cross product, cross product with geometrical and physical applications.

#### 4. Statistics

Definition of Descriptive statistics, scales, frequency distribution, measures of central tendency, mean, mode, measures of dispersion, variance, standard deviation, concept of normal distribution.

#### REFERENCES

- 1. Mathematics for polytechnics Vol. I & II; T.T.I., Bhopal
- 2. Plane tigonometry Part I & II by S.L.Loney
- 3. Algebra by K.P.Basu
- 4. Mathematical Statistics by M.Ray & Sharma
- 5. Mathematics for polytechnics by S.P.Deshpande
- 6. Vector Algebra by Shanti Narain
- 7. Higher Engineering Mathematics by G.S.Grewal



#### First Semester

#### ENGINEERING PHYSICS

Topic No.	Title	Theory Hrs.	Practical Hrs.
1.	S.I.Units	4	6
2.	General properties of matter	15	6
3.	Heat Transfer	10	3
4.	Thermodynamics	10.	0
5.	Electricity	10	6
6.	Cells, batteries and their maintenance	6	3
7.	Electromagnetism	10	6
8.	Basic Electronics	10	2
9.	Optics	5	-
	Total	80	32

#### First Semester

#### ENGINEERING PHYSICS

Theory per week : 5 Hrs.

ractical per week : 2 Hrs.

#### COURSE CONTENTS

#### 1. S.I.Units

Significance of S.I. Units, Fundamental Units, Base Units, Derived units in terms of base units and notations.

#### 2. General Properties of Matter

- \* Molecular kinetic theory of matter, kinetic and potential energy of molecules, concept of internal energy and heat energy, gas laws and their derivations by kinetic theory.
- \* Cohesive and adhesive forces, surface tension, surface energy, rise in capillary tube.
- \* Fluid viscosity, streamline and turbulent flows, Stroke's law, kinematic viscosity, Coefficient of viscosity by Poiseulle's method.
- \* Elasticity, Hook's law, elastic limit, Young's Modulus, Bulk modulus.

#### Heat Transfer

Distinction between heat and temperature, modes of heat transfer, variable and steady state coefficient of thermal conductivity for good and bad conductors, convention, natural and forced heat transfer during heat covention, radiation, emissive and absorptive power, black body radiation, Stefan Boltzman law, Newton's law of cooling.

#### 4. Thermodynamics

First law of thermodynamics, second law of thermodynamics, thermodynamic process-reversible and irreversible process, carnot cycle.

#### 5. Electricity

Electric current, free electron, theory of metallic electrical circuits.



# 6. Cells, Batteries and their Maintenance

Comparative study of the chart specifying the primary and secondary cells electrodes, electrolyte, depolariser, principle of potentiometer, EMF, internal resistance of different types of cells. Maintenance of primary and secondary cells (when in use or when they are stored).

#### 7. Electro Magnetism

- \* Magnetic induction, magnetic induction of a current element, straight conductor, circular coil, magnetic flux.
- \* Motion of a charged particle in a magnetic field, current carrying conductor in a magnetic field, moving coil galvanometer, conversion of galvanometer into ammeter and voltmeter.
- \* Magnetic properties of materials, permeability, susceptibility.,
- \* Elementary idea of transformer.

#### 8. Basic Electronics

- \* Thermoionic emission, photoelectric emission, photocell, photovoltaic cells.
- \* Semiconductors, intrinsic and extrinsic semiconductor, P-type, N-type, P-N junction as a rectifier.

#### 9. Optics

Dual nature of light, wave theory, Huygen's principle, concept of wave front, wave as rap, principle of superimposition, interference of light, conditions of interference, speed of light in different media, optical density, refractive index, diffraction of light.

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#### LIST OF EXPERIMENTS

- 1. Precise measurement of length by
  - (a) Vernier calliper
  - (b) Micrometer Screw
  - (c) Screw gauge
- To determine surface tension of liquid by capillary rise method.
- 3. To determine coefficient of viscosity of liquid by Poiseulle's method.
- To determine coefficient of thermal conductivity of a good conductor (Searle's method)
- To determine Young's modulus.
- To verify Ohm's law.
- To measure resistance by ammeter and voltmeter and verification of series and parallel combination of resistance.
- 8. To convert a galvanometer into a voltmeter of a given range.
- 9. To convert a galvanometer into an ammeter of a given range.
- 10. To investigate the relation between current flowing through the resistance and heat generated.
- 11. To observe the variation of magnetic field by varying the current in coil.
- 12. To determine the internal resistance of cell by potentiometer.
- To investigate the uni-directional property of P-N

#### First Semester

#### ENGINEERING CHEMISTRY

Theory per week: 3 Hrs. Practical per week: 2 Hrs. Practical Theory Topic Hrs. Hrs. No. 6 14 Metals and Alloys Fuels and Combustion 2. Lubrication and Lubricants 3. Bonding 2 5. Catalysis Corrosion and protection 6 6. Protective coating 3 8. Dielectrics Pollution - Water, Air and Industrial Oxidation and Reduction 10. Industrial detergents 11. 48

#### REFERENCES :

- 1. Principles of Physics TTTI, Bhopal
- 2. Principles of Physics Brijlal and Subramanian
- 3. Modern college Physics H.E. White
- 4. College Physics Sears and Zee Manskey
- 5. A level physics Roger Mumcaster

#### First Semester

#### ENGINEERING CHEMISTRY

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Theory per week: 3 Hrs.

Practical per week: 2 Hrs.

#### COURSE CONTENTS

#### 1. Metals and Alloys

General properties of metals, some important ferrous and non-ferrous alloys and their properties, Chemical analysis of metals and alloys.

#### 2. Fuels & Combustion

Classifications of fuels, Calorific value, properties and applications of different fuels, Handling & storage of Fuel, Fire - protection.

#### 3. Lubrication & Lubricants

Friction and wear, Lubricants, Mechanism, Classification and properties of Lubricants, Selection of Lubricants. Systems of lubrication, gravity forced, static and hydrodynamic, addition of agents for motor oil.

#### 4. Bonding

Nature of Chemical Bond, Ionic and Covalent bonding, Physical bonding.

#### 5. Catalysis

Types, characteristics of catalytic reactions, Autocatalysts.

#### 6. Corrosion & Protection

Corrosion, types of corrosion, factors affecting corrosion, Protection against corrosion.

#### 7. Protective Coatings

Introduction, cleaning and preparation of metal surfaces, types of coatings - metallic coatings and metal cladding, chemical conversion coatings, paints, varnishes, enamels, liqueurs, ceramic protective coatings, sealents.

#### 8. Dielectrics

Introduction, Dielectric properties, classification of dielectrics, Gaseous Insulators, Liquid insulating materials, Solid insulating materials.

### 9. Pollution

Water Pollution - BOD, MPN, Purification of Water.

Air pollution - Major air pollutants, Air pollution and measures for its control.

Industrial pollution - Industrial wastes (effluents, garbage fumes etc.), measures for its control.

### 10. Oxidation & Reduction

Oxidation and Reduction, Electronic concept of oxidation and reduction, Oxidation number and Valency, Acid, Base, pH, determination of pH.

### 11. Industrial Detergents

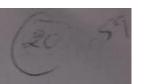
Brief idea about industrial detergents.

#### LIST OF EXPERIMENTS

- 1. To measure the pH of different solutions by -
  - (a) pH meter
  - (b) colorimetric method
- To determine the percentage of copper in a sample of Brass by volumetric method.
- 3. To determine the percentage of Iron in Ferrous Salt.
- Quantitative estimation of two metals in an alloy (Solder/Brass).
- 5. To find out the flash point, fire point of dry/non-drying oils.
- 6. To determine the viscosity of lubricants by viscometer.
- To determine the rate of corrosion on simple and galvanised nail by nail and acid method.
- 8. To analyse the Cations and Anions in a given salt by macro analysis.
- 9. To determine total dissolved solids (TDS)
- 10. To determine dissolved oxygen (DO)
- 11. To determine most probable number (MPN)
- 12. To identify the concentration of NH3, CO2, and SO2.

#### REFERENCES

- 1. Advance Inorganic Chemistry by Behl & Tuli
- 2. Advance Inorganic Chemistry by Mitra
- Applied Chemistry by Shrivastava & Singhal; PBS Publication, Bhopal
- 4. Objective Chemistry by Shrivastava & Shrivastava; Chandra Publication, Bhopal
- 5. Engineering Chemistry by P.C.Jain & Monica Jain; Dhanpat Rai & Sons Publication
- 6. Experiments in Applied Chemistry by M. Prasad; Chandra Publication, Bhopal
- 7. A text book of Engineering Chemistry by P.C.Jain



### <u>First Semester</u>

#### ENGINEERING DRAWING

Theor	ry per week - NIL Practic	al per we	ek - 8 Hrs.
Topic No.	Title	Theory Hrs.	Practical Hrs.
1.	Introduction to drawing & drawing instruments		2
2.	Engineering Scales, Lines and Curves		12
3.	Lettering and Dimensions	- 112	8
4.	Projections of points, lines and planes	-	13
5.	Orthographic projections	-	16
6.	Projection of solids and section of solids.	7.33	18
7.	Projection of machine components by free hand sketching	1-2-12-2	18
8.	Development of surfaces	- 1011	10
9.	Isometric Projections	-	12
10.	Standard convensions & symbols	515 11	4
11.	Element of Machine Drawing	-	10
	Total	-	128

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#### ADVANCED DIPLOMA IN INDUSTRIAL ELECTRONICS

#### First Semester

#### ENGINEERING DRAWING

Theory per week - NIL.

Practical per week - 8 Hrs.

#### COURSE CONTENTS

1. Introduction to Drawing and Drawing Instruments

Define engineering drawing, Display and explain the use of various drawing instruments.

2. Engineering Scales, Lines and Curves

Calculation of representative fraction and length of scale, construction of plain scale, diagonal and vernier scale, alphabets of lines - thick, medium, and thin lines. Conventional representation of centre line, full line, hidden line, cutting line, section line, dimension line, extension line etc., practice on sketch book. Engineering curves, method of construction of curves like ellipse, parabola, hyperbola, cycloid, involute, helix, and spiral of archemedian. Uses of these curves.

3. Lettering and Dimensioning

Single stroke letters, gothic letters. Principles of dimensioning systems - Aligned and unidirectional. Arrangement of dimensions - chain, parallel and combined. Size and location dimensioning - superfluous dimensions. (IS 696 - 1972), Arrow heads & Extension lines, Practice problems on dimensioning techniques, Rules for dimensioning the isometric drawings.

4. Projection of Points lines and Planes

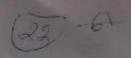
Introduction, elements of projections. Projection of points in different planes. Projection of line - True length. Projection of planes, practice problems.

5. Orthographic Projections

Meaning of orthographic projection, Planes of projections, Terms associated with orthographic projections front, side and top view. Differentiate between first angle and third angle projections on the basis of -

- (a) Position of the object corresponding to the reference
- (b) Position of projection plane in relation to that of observer's eye and that of object.

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(c) Relative position of front view and top view.

(d) Relative position of side view.

#### 6. Projection of solids and section of solids

Types of solids-terminology; position of solids with respect to reference planes. Practice problem to draw the projection of solids placed in various position with respect to the reference planes, (Cone, Cylinder, Cube, Prism & Pyramid), Define sectioning, need of sectioning, differentiate between full section, half section and Partial section. Simple problems.

#### Projection of simple machine components by free hand sketching

Techniques of free hand sketching, free hand sketching of simple machine components such as bearing cap, simple journal bearing, simple brackets, orthographic views of Hexagonal and square nut and bolts, simple practice problems.

#### 8. Development of surface

Concept and importance of development in engineering applications. Development of cube, prism, pyramid, cylinder and cone. Practical problems of development of chimney, ducts and hoppers etc.

#### 9. Isometric Projections

Need and use of isometric scale. procedure for preparing isometric drawing of rectangular, pentagonal and hexagonal blocks and sphere.

#### 10. Standard Conventions and Symbols

Sign conventions and symbols used in CME engineering as per IS code 696-1972. Symbols of building material such as Brick work, stones, concrete, wood, glass and foundation Bolts. Conventional representation of features like, external and internal threads; compression, tension and leaf springs, knurling, bearings and gears. Elementary electrical symbols like DC, AC, bulb fuse, earthing, plug, resistance, capacitance, inductance, bell, buzzer, loudspeaker.

#### 11. Elements of Machine Drawing

Rivets and Riveted joints, forms of screw threads, conventional representation of pipe joints and valves.

#### REFERENCES

- IS Code 696-1972
- Elementary engineering drawing by N.D.Bhatt; Charotar Book Stall, Amana
- Engineering Drawing by Gujaral and Shende: Khanna Publishers
- Machine Drawing by N.D. Bhatt; Charotar Book Stall, Anand
- Engineering Drawing by R.B.Gupta; Satya Prakashan, New Delhi
- Graphics for engineers by W.J.Luzzadar; Prentice Hall India Ltd., New Delhi
- Fundamentals of engineering drawing by W.J.Luzzadari Prentice Hall India Ltd., New Delhi



### First Semester

# WORKSHOP PRACTICE - I

Theor	y per week - Nil	Practical per w	eek - 6 Hrs.
Topic No.	Title	Theory Hrs.	Practical Hrs.
1.	Introduction to Workshop		2
2.	Carpentry shop	71300 partie - 5000	22
3.	Fitting Shop	ranger by Little	24
4.	Sheet metal shop	100 10 10 mg 20 100	24
5.	Smithy Shop and forging		24
	Total	-	96

NOTE: Theoretical inputs will be provided on shop floor during workshop practice.



#### First Semester

#### WORKSHOP PRACTICE - I

Theory per week - Nil

Practical per week - 6 Hrs.

#### COURSE CONTENTS

#### 1. Introduction to Workshop

Familiarisation of different sections of a general engineering workshop. Safety precautions and good housekeeping in the workshop. Layout of different sections of workshop, general safety rules of workshop.

#### Carpentry shop

General layout of carpentry shop, Types of job produced in carpentry, Basic information required by carpenter. Raw materials, carpentry hand tools like saws, planer, chisels, hammers, pallet, marking gauge, vice, try square, engineering rule etc., use of carpentry tools for making simple joint.

#### 3. Fitting shop

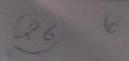
Introduction of tools and equipments used in fitting shop - files, vice, chisels, punch, scriber, hammers, try square, callipers, surface plate etc.
Fitting processes - filing, chipping, scraping, sawing etc.
Preparation of Male-Female joints.

#### 4. Sheet-Metal shop

Metals used in sheet metal work - Black Iron, Galvanised Iron, Stainless steel, Copper, Aluminium, Tinned plate.
Tools - stakes, hammers, scissors etc., sheet metal processes - folding, hemming.

# Black-smithy and forging

Layout of shop, types of jobs produced in black-smithy and forging shop, Basic information required for jobs to be made in these shops, Forging operations, furnance operations and type of heating systems used in forging



#### LIST OF EXERCISES

- Study and sketch of various tools used in different shops such as - carpentry, fitting, sheet metal and smithy shop.
- One job in carpentry shop with the use of different carpentry tools.
- One job on different types of carpentry joints.
- One job on fitting joints containing different operations such as hacksaw cutting, filling, slotting, fitting, drilling etc.
- Filing and fitting of mating parts, checking gap with gauge.
- \*6. One job on forging operations such as bending, upsetting, drawing down, and setting down etc.
- \*7. One job on sheet metal work containing surface development of jobs and marking joints.
- filing to make a perfect square, marking and centre -
- Chipping and bending a copper sheet to make a cylinder.
- 10. Filing a L-channel sawing straight and slant slots on it.
- Filing, marking number and letter punching on a M.S. sheet in different ways.
- Filing and forming a radius by flat hitting on a sheet metal.
- Making boxes and cases for various equipments and other sheetmetal works.
- \* These experiences could be industry based to achieve the required performance skill.

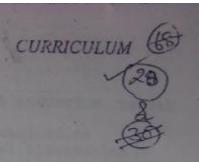
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# REFERENCES

- 1. Workshop tech. Vol. I & II by Hazra Choudhary
- 2. Workshop Technology Vol. I & II by Chapman
- 3. Workshop Technology Vol. I & II by Gupta and Kaushik
- 4. \* Manufacturing Processes by Young

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# ADVANCED DIPLOMA

# IN

# INDUSTRIAL ELECTRONICS

(SECOND SEMESTER)



CURRICULUM DEVELOPMENT CENTRE

TECHNICAL TEACHERS' TRAINING INSTITUTE, SHAMLA HILLS, BHOPAL - 462 002



#### MADHYA PRADESH BOARD OF TECHNICAL EDUCATION, BHOPAL

#### Scheme of Studies and Examination Advanced Diploma in Industrial Electronics

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#### SECOND SEMESTER

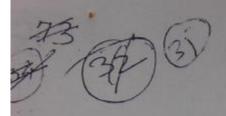
SL.	COURSE TITLE		/ÆK	SESSIO	NAL MARKS	PROCRE			EXAMINATION			CAL/VIVA	PRACTICAL MARKS	Tota Mark
		TH.	PR.	TERM	LAB. WORK	ī		PAPER	DURATION Rrs.		PRACT.	DURATION Hrs.		
1.	Mathematics - II	5		15		10	10	1	3	100		3		135
2.	Basic Mechanical Engineering	4	2	15	ø	10	10	1	3	100	1	3	50	210
3.	Electronic Engineering - I	6	2	15	25	10	10	1	3	100	1	3	50	210
4.	Basic Electrical Engineering	6	2	15	25	10	10	1	3	100	1	3	50	210
5.	Electrical à Electronics Materials	4		15		10	10	1	3	100				135
6.	Electrical & Electronics Workshop	1	4		100	(20)	**				*	3	*00	20
-	Total	25	10	75	175	50	50	(5)		500	64		250	11

- (a) Total Theory Marks = 500
- (b) Total (Sessional + Progressive Assessment + Practical) Mark = 600
- (c) Ratio of Theory Marks to (Sessional + Progressive Assessmen + Practical Marks) = 1:1.2



#### II SEMESTER

S.N	o. Course Title	Theory	Practical	Total
1.	Mathematics - II	5	-	5
2.	Basic Mechanical Engineering	4	2	6
3.	Electronics Engineering -I	6	2	8
4.	Basic Electrical Engineering	6	2	8
5.	Electrical and Electronics Materials	4		4
6.	Electrical and Electronics Workshop	1	4	5
	Total	26	10	36



# Second Semester

# MATHEMATICS - II

The	ory per week: 5 Hrs.	Practical per	r week: N11
Top No		Theory Hrs.	Practical Hrs.
1.	Coordinate Geometry	24	107807 1195
2.	Complex Variables	12	111-11-1
3.	Differential calculus	22	131913
4.	Integral Calculus	22	
	Total	80	-



Second Semester

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MATHEMATICS - II

Theory per week: 5 Hrs.

Practical per week: Nil

#### COURSE CONTENTS

#### 1. Coordinate Geometry

Cartesian & polar co-ordinates, point, locus.

Straight line - Equation of a straight line, Angle between two straight lines, Conditions for perpendicular & parallel lines, Length of perpendicular, Bisector of an angle between two straight lines.

Circle - Equation of a circle, Equations of tangent, normal & chord

Parabola - Equation of a parabola, its tangent & normal.

Ellipse - Equation of an ellipse, its tangent & normal.

#### 2. Complex Variables

Complex Numbers: Basic definition, operation and geometric representation of complex number, complex number as vector, complex conjugates, absolute values, polar forms, product powers.

Definition of Function of Complex Variable : Definition and Ouotients.

#### 3. Differential Calculus

Functions and limits, differentiation of all types of functions, partial differentiation, higher derivatives (upto second order).

#### 4. Integral Calculus

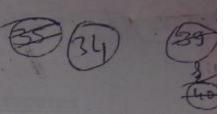
Integration as reverse process of differentiation, standard formula, integration by substitution, integration by parts, integration by partial fractions, definite integral.

#### Second Semester

#### MATHEMATICS - II

#### REFERENCES

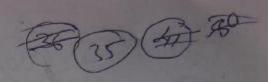
1.	Mathematics for Polytechnics Vol. I & Vol.II	-	TTTI, Bhopal
2.	Coordinate Geometry		by S.L. Loney McMillan Co. of India Ltd.
3.	Text book on Differential Calculus	-	by Gorakh Prasad Pothi Shala Pvt.
4.	Text book on Integral Calculus	-	by Gorakh Prasad Pothi Shala Pvt.
5.	Higher Engineering Mathematics	-	by G.S.Grewal
5.	Complex Variables and Applications		by Churchill Ago Mc Grawhill Co.



# Second Semester

# BASIC MECHANICAL ENGINEERING

Theory	per week: 4 Hrs.	Practical per week: 2 Hrs.				
Topic No.	Title/Topic	Theory Hrs.	Practical Hrs.			
1.	Basic Thermodynamics	08	_			
2.	Properties of Steam	06	-			
3.	Boilers	06	08			
4.	Steam Turbine	06	04			
5.	I.C. Engine	08	04			
6.	Fundamental of Fluid Flow	10	08			
7.	Pumps	08	04			
8.	Compressors and Fans	06	-			
9.	Heat Exchanger and Cooling Towers	06	04			
	Total	64	32			



#### Second Semester

#### BASIC MECHANICAL ENGINEERING

Theory per week: 4 Hrs.

Practical per week: 2 Hrs.

#### COURSE CONTENTS

#### 1. Basic Thermodynamics

- Difference between gases and vapours
- Boyle's Law
- Charle's Law
- Universal gas constant R
- Gas equation
- Internal energy
- Specific heat
- Applications of law of thermodynamics
- Thermodynamic process
- P-V diagram of thermodynamic process
- Working of following cycle by P-V diagram Auto & Diesel cycle

#### Properties of Steam

- Steam formation & process of vapourisation
- Definition of various terms connected with steam
- Introduction to steam table and its uses

#### 3. Boilers

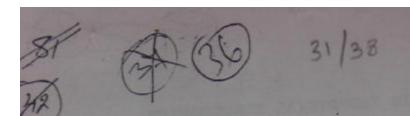
- Principle and working of boilers
- Classification of boilers
- Mounting and Accessories of steam boilers

#### 4. Steam Turbine

- Principle of working of steam turbine
- Classification of turbine
- Steam and hydraulic turbine

#### 5. I.C. Engine

- Construction and working of I.C. Engine
- Classifications of I.C. Engine
- Two stroke and four stroke engine
- Detail of four stroke engine



#### Fundamentals of Fluid Flow

- Fluid and their properties, fluid pressure, pressure Head viscosity
- Pressure measurement Piezometer, 'U' tube manomet inverted 'U' tube manometer, micro-manometer
- Types of flow-steady, streamline and turbulent flow
- Bernoullis theorem and its application to venturimet and pilot tube
  - Flow measurement study and measurement of orific and flow over notches 'V' and rectangular

#### Pumps 7.

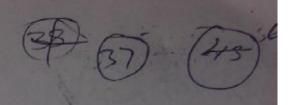
- Type of pumps
- Working of centrifugal and reciprocating pumps
- Comparison of centrifugal and reciprocating pumps
- Applications

#### Compressor and Fans 8.

- Working principle of rotary and reciprocati compressors
- FANS types, application & specifications

### Heat Exchanger and Cooling Towers

- Introduction, LMTD, parallel and counterflow he exchanger, condenser
- Cooling towers types, applications and specification of heat exchangers and cooling towers

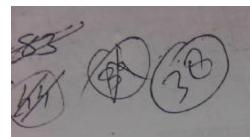


#### Second Semester

#### BASIC MECHANICAL ENGINEERING

#### LIST OF EXPERIMENTS

- 1. Study by models, charts and actual units of the following :-
  - (a) Common types of fire-tube and water tube boilers
  - (b) Boiler Mountings and Accessories
  - (c) Steam Turbine
  - (d) Surface Condenser
  - (e) Cooling Tower
- 2. To study different types & trial run of water turbine
- 3. To study Centrifugal pump
- 4. To study reciprocating pump
- 5. To study two stroke and four stroke petrol engine
- 6. To study two stroke and four stroke diesel engine
- 7. Measurement of pressure by U tube manometer
- 8. Measurement of pressure by micro manometer
- 9. Determine the coefficient of discharge for 'V' and Rectangular notches, orifices



### Second Semester

## BASIC MECHANICAL ENGINEERING

### REFERENCES

1.	General Mechanical Engineering	-	by Hazra Choudhary
2.	Thermal Engineering	-	by P.L. Ballaney, Khanna Pub.
3.	Thermodynamics and Heat Engine	-	by S. Domkundwar Dhanpat Rai & Son's
4.	Fluid Mechanics and Hydraulic Machines	1200	by K.D. Saxena J.K. Jain & Co.
5.	Hydraulic and Hydraulic Machines	-	by Jagdish Lal Sahu and Co.
6.	Heat Engine and Thermodynamics	-	by Pandya and Shah Charotar Book Stall
7.	Mechanical Engineering		by Mathur & Mehta Jain Pub.
8.	Fluid Mechanics		by Dr. P.N. Modi and Dr. N.S. Seth Standard Book House, Delhi



#### Second Semester

### ELECTRONICS ENGINEERING - I

Theory I	per week: 6 Hrs.	Practical	per week: 2 Hrs.
Topic No.	Title/Topic	A STATE OF THE STA	Practical Hrs.
1.	Semiconductor Theory	12	-
2.	Junction Diodes	12	02
3.	Rectifiers and Power Supplies	28	12
4.	Transistors	20	06
5.	Transistor Amplifiers	18	06
5.	Introduction to Electronic Measuring Instruments	06	06
18.13.00	Total	96	32

#### Second Semester

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#### ELECTRONICS ENGINEERING - I

Theory per week : 6 Hrs.

Practical per week: 2 Hrs.

#### COURSE CONTENTS

#### 1. Semiconductor Theory

- \* Semiconductor Materials
- Classification of conductors, semi-conductors and insulator.
- Crystalline structure of semiconductor.
   Doping of P-type and N-type materials.
- Effect of temperature on semi-conductor material.
- Minority and majority carriers.

#### 2. Junction Diode

- \* Characteristics of junction diode (Si/Ge).
- Biasing of junction diode.
- \* Diode Resistances (Forward and Reverse).
- \* Capacitive effect of a P-N junction:
- \* Characteristics of Zener diode.
- \* Characteristics of avalanche diode.

### Rectifiers and Power Supplies

- \* Half Wave Rectifier
- Voltage regulation, ripple factor, efficiency ratio of rectification.
- \* Full wave Rectifier
- Centre tapped FW rect fier.
- FW Bridge Rectifier.
- PN in different configuration and comparison of different rectifier circuits.
- \* Filter Circuits
- Capacitor filter.
- LC filter ( .. and L type).
- Comparison of different filter ckts.

\* Voltage Multiplier 31/43

- \* Zener Regulator
- \* Clipper and Clamper
- Positive and Negative Clipper.
   Positive and Negative Clamper.
- \* Regulated Power Supply using 7805 and 7905 Transistor

#### 4. Transistors

- \* Basic Structure
- Types of Transistor
- Parameter
- Two diode analogy
- h parameters
- \* Transistor Configuration
- Biasing of transistor
- CE, CB and CC configuration, Regron of transistor (cutoff, active and saturation)
- Current gain (.. and ..)Voltage gain, power gain
- \* Transistor Characteristics
- Input and output characteristics in CB, CE and CC
   Comparison of different configuration

#### 5. Transistor Amplifier

- \* Transistor Baising
- Base biasing
- Emitter biasing
- Emitter feedback biasing
- Collector feedback biasing
- Voltage divider biasing
- \* Common Emitter Amplifier
- Amplifier action
- AC and DC load line analysis

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# 7. Introduction to Electronics Measuring Instruments

\* A.C. and D.C. Power Supply

\* Digital and Analog Multimeter

\* CRO

\* Function generator

\* LCR Meter (Front panel layout and functions of switches and knobs and application of above instruments)

#### Second Semester

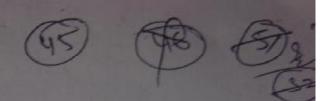
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#### ELECTRONICS ENGINEERING- I

#### LIST OF EXPERIMENTS

- Experiment with P-N junction diode & verify the nature of its characteristic curve
- Experiment with Zener-diode and verify the nature of its characteristic curve and draw inferences on its application
- 3. Construct a Half-Wave Rectifier circuit on bread-board and observe its rectified and unrectified waveform on CRO. Calculate the following for the same:-
  - (a) Ripple Factor
  - (b) Efficiency of Rectifier
  - (c) PIV
- 4. Construct a Centre-Tapped FW Rectifier on bread-board, observe rectified and unrectified waveform on CRO and calculate the following:-
  - (a) Ripple Factor
  - (b) Efficiency of Rectifier
  - (c) PIV
- 5. Construct a Bridge FW Rectifier on bread-board, observe rectified and unrectified waveform on CRO, and calculate the following:-
  - (a) Ripple Factor
  - (b) Efficiency of Rectifier
  - (c) PIV
- 6. Construct HW and FW Rectifier using C-Filter and LC-Filter, observe the rectified output waveform without filter and with filter. And compare both outputs
- 7. Construct "Voltage-Doubler" and "Voltage-Tripler" on breadboard using diode-capacitor combinations and observe the outputs on CRO, measure and calculate its value
- 8. (a) Construct Zener-Voltage Regulator on bread board and verify its voltage regulation observing output waveform on CRO and infer it
  - (b) Construct Voltage Regulator circuit using 7805/7812/ 7905/7912 on bread board and verify its voltage regulation observing output on CRO and infer

- 9. (a) Construct positive and negative clipper circuit using diode on bread board. Observe the output waveform on CRO and verify it
  - (b) Construct positive and negative clamper circuit using diode on bread board. observe the output waveform on CRO and verify it
- 10. Using a board having a fixed transistor with three terminals brought out connect them in CE, CB, CC configuration and compare their voltage gains and draw input and output characteristics
- 11. Construction of CE amplifier using voltage divider biasing and draw its AC and DC load line find Q point
- 12. Observe the waveform at input and output of a transistor :-
  - (a) Without any biasing
  - (b) With various biasing
- Using function generator observe the output waveforms on CRO and find out the amplitude and frequency
- 14. Test the component and measure the value using :-
  - (a) LCR Meter
  - (b) Multimeter
  - (c) CRO



### Second Semester

### ELECTRONICS ENGINEERING - I

### REFERENCE BOOKS

1.	Electronics Principles	-	by Albert Paul Malvino TMH Pub.
2.	Electronic Devices and Circuits	-	by Allen Mottershed Prentice Hall Pub.
3.	Integrated Electronics	1	by Millman & Halkias TMH Pub.
4.	Basic Electronic Principles	-	by V.K. Mehta Khanna Pub.
5.	Design of Electronics Circuit and Computer Aided Design	-	by M.M. Shah Wiley Eastern Pub.
6.	Electrical and Electronics Measurements	-	by A.K. Sawhney Dhanpat Rai & Sons Pub.
7.	Electronic Instrumentation and Measurement	- 1	by W.D. Cooper A.D. Helfrick PHI Pub.
8.	Laboratory Mannual for Introductory Electronics	11-	by L.K. Maheshwari M.M.S. Anand

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# Second Semester

# BASIC ELECTRICAL ENGINEERING

Theory per week: 6 Hrs.

Practical per week: 2 Hrs.

Topic	Title/Topic	Theory Hrs.	Practical Hrs.
1.	DC Circuit and Network Theorem	14	08
2.	Magnetic Circuit	12	02
3.	· Electromagnetic Induction	12	02
4.	·Electrostatics	12	04
5.	· AC Fundamental	18	12
6.	Polyphase Circuits	14	04
7.	Power System	14	
3.	Materials	-	02
	Total	96	32

#### Second Semester

# 31/10

#### BASIC ELECTRICAL ENGINEERING

Theory per week: 6 Hrs.

Practical per week: 2 Hrs.

#### COURSE CONTENTS

### 1. D.C. Circuits & Network Theorems

- Resistance
- Series & Parallel combination of Resistances
- Temperature coefficient of Resistances
- Kirchoff's laws and their application for D.C. circuits
- Star-Delta Transformation
- Superposition Theorem
- Thevenin's Theorem
- Nortons Theorem
- Maximum Power Transfer Theorem
- Reciprocity Theorem and their applications through simple problems

#### 2. Magnetic Circuits

- Concept of Magnetic field
- Magnetic flux
- Flux Density
- Intensity of magnetisation or magnetic force
- Magneto Motive force
- Permeability
- Analogy of electrical and magnetic circuits
- Series & parallel magnetic circuits and numerical based on them
- B-H curve and hystresis loop, Hystresis
- Force exerted between two parallel conductors carrying current
  - (a) In the same direction
  - (b) In opposite direction

### 3. Electromagnetic Induction

- Faraday's Law's of electromagnetic induction
- Fleming's Left Hand and Right Hand rule
- Lenz's Law
- Statically and Dynamically induced emf
- Self and mutually induced emf
- Coefficient of self and mutual inductance
- Energy stored in a magnetic field
- Eddy current

Electrostatics Electric charge Coulomb's Inverse square law Permitivity Electric Intensity Concept of Electric field Condensers Types of condensers and their practical applications Capacitance of parallel plate capacitor Capacitor's in series and parallel Energy stored in Electrostatic field Rise and decay of current in R-C & L-C series circuits A.C. Fundamentals Concepts of sinusoidal and unidirectional waveforms Definitions of -Cycle Frequency Time period Instantanous value Phase & Phase difference R.M.S. value \* Average value Maximum value Form factor & peak factor Mathematical expression of single phase voltages and currents i.e. E=Em sin.., I = Im Sin.. Generation of sinusoidal waveforms Current, voltage and power relations in pure resistive, inductive and capacitive circuits Graphical representation of phasors, mathematical representation of phasors in complex, polar trigonometric forms Representation of alternating quantities in 'J' notation and numericals based on it. (Addition, Substraction, Multiplication, Division) Simple A.C. series & parallel circuits consisting \* R-L R-C R-L-C Resonance in series circuit Active and reactive power in simple A.C. circuit Power factor Polyphase Circuits Concept of polyphase Advantage of polyphase system over single phase system Generation of three phase voltages with waveforms Meaning of phase sequence Star and Delta connection of three phase circuits Current, voltage and power relations for three phase star and delta connection (No Derivation)



- Simple problem on the above relationships

- Meaning of balanced and unbalanced three phase a.c. system

#### Power System

- Generation of electrical power

Conventional methods

\* Non conventional methods

- Transmission and distribution of electric power

- Single line diagram of power system

- Standard voltages of generation, transmission & distribution

 Power system protection with the help of circuit-Breakers and Relays

- Concept of earthing

- Earthing of power system and equipments

- Electric shock and treatment - Safety rules and regulations

#### Second Semester

### BASIC ELECTRICAL ENGINEERING

#### LIST OF EXPERIMENTS

- Given an electric circuit having series & parallel branches measure the current & voltage drops in each branch. Confi the same using kirchoff's Laws
- Verification of thevenins theorem 2.
- Verification of Maximum Power Transfer Theorem
- Verify Faraday's Law & Lenz's Law by using appropriat 4. model
- Determine the value of unknown resistance by loss of charm 5. method
- Performance of R-L series circuit -
  - Calculate the impedance & p.f
  - (b) Measurement of current, power and voltage
  - (c) Draw vector diagram
- 7. Performance of R-C series circuit -
  - Calculate the impedance & p. f
  - Measurement of current, power and voltage (b)
  - Draw vector diagram (C)
- Performance of R-L-C series circuit :-8.
  - (a) Calculate the impedance & p. f
  - (b) Measurement of current, power and voltage
  - (c) Draw vector diagram
- Determination of voltages (line & phase) and current (line) 9. phase) in case of star connection. Establish the relationships
- Identification and selection of appropriate materials for
- Determination of voltage (line & phase) and currents (line 11. phase) in case of delta connection. Establish the relevant
- 12. To plot the charging curve of a capacitor



# Second Semester

# BASIC ELECTRICAL ENGINEERING

### REFERENCES

1.	Electrical Technology	-	by B.L. Theraja
2.	Electrical Technology	-	by H. Cotton English Language Pools
	Electrical Engineering		by S.L. Uppal Khanna Pub.
4.	Engineering Electrical	-	by J.B. Gupta . Dhanpat Rai Pub.
	Principles of Power system	-	by V.K. Mehta Khanna Pub.
6.	Electrical Power	- 7	by J.B. Gupta Dhanpat Rai Pub.
7.	Protection	-	by Sunil S. Rao
8.	Electrical Power System	-	by William D. Stevenson Mc Grawhill International Editions

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### ADVANCED DIPLOMA IN INDUSTRIAL ELECTRONICS

#### Second Semester

### ELECTRICAL AND ELECTRONICS MATERIALS

Theory per week: 4 Hrs.		practical per week: NIL			
Topic	Title/Topic	Theory Hrs.	Practical Hrs.		
1.	Conducting Materials	14	lested and the same		
2.	Insulating Materials	16			
3.	Semiconductor Materials	10	Maila a		
4.	Magnetic Materials	12			
5.	Materials Used in Electronics Components	12	15:10 - 11:10 M		
74	Total	64	THE PERSON NAMED IN		

### Second Semester

# ELECTRICAL AND ELECTRONICS MATERIALS

Theory per week: 4 Hrs.

Practical per week: NIL

### COURSE CONTENTS

#### Conducting Materials 1.

- Classification of Materials
- Concept of conductivity
- Requirement of good conducting material Factor affecting resistivity of material
- Name of common conducting material
- Comparison of different conducting materials
- Concept of current flowing in conductor
- Mobility
- Energy level of a molecules
- Application of conductors
- Emission of electron From Conductor Surface
- Thermonic Emission
- Photo Electric Field Emission
- Secondary Emission
- Concept of Super Conductivity
- Thermoelectric Effect and Application

#### 2. Insulating Materials

- Distinction between Insulator and Conductor
- Insulation Resistance
  - Definition
  - Factor affecting insulation resistance
- Dielectric Strength
  - Definition
  - Factor affecting dielectric strength
  - Dielectric constant

### Breakdown Voltage

- Definition
- Effect of dielectric breakdown
- Concept of air space in insulation



- Effect of Frequency and Temperature on Dielectric
  - Dielectric loss
  - Perfect dielectric
- Ferroelectric Properties
  - Curie point
  - Thermal, Mechanical, Physical, Chemical properties
- Classification of Insulating Material
  - Class A, B, C, H, F, Y
- Transformer Oil
  - Characteristics
  - Contamination
  - Purification

#### Semiconductor Materials 3.

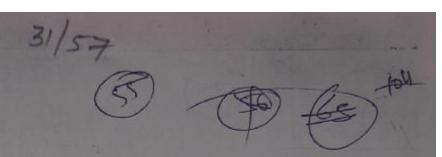
- Classifying Material as Semiconductors
  - Concept of conductivity
  - Name of different semiconductor material
  - Concept of forbidden energy gap and comparison with insulating and conducting materials
  - Energy band diagram
  - Fermi level
- Intrinsic & Extrinsic Semiconductors
  - Energy bond in extrinsic material
  - Diffusion
  - Mobility
- Einstein Relation
  - Drift & diffusion current
- Hall Effect
  - Definition
  - Application

#### Magnetic Material 4.

- Classification
  - Paramagnetic
  - Ferromagnetic
  - Antiferromagnetic or ferrimagnetic
  - Diamagnetic
  - Comparison

### Different Magnetic Material

- Siticon steel
- Soft steel
- Cast iron
- Application & properties
- Comparison



- \* Curie Temperature
  - Definition
  - Effect on magnetic material
- \* Impurities in Ferromagnetic Material & their effect
- \* Magnetostriction
  - Definition
  - Effect
  - Application
- \* Hystresis Effect
  - B-H curve
  - B-H curve for soft & hard material
  - Losses
  - Steinmet'z constant
- \* Powdered Core Materials
  - Application
- 5. Material Used in Electric & Electronic Components
  - \* Resistor
    - Carbon composition resistor
    - Insulated moulded resistor
    - Film type resistor
    - Wire wound resistor - Printed circuit resistor
  - \* Capacitor
    - Paper capacitor
    - Ceramic dielectric capacitor
    - Glass dielectric capacitor
    - Plastic dielectric capacitor
    - Electrolyte capacitor
  - \* Inductor
    - Core material
    - Laminated core
    - Powdered iron core
    - Ferrite core material
  - \* Soldering Material
    - Flux material
    - Soft soldering material
    - Hard soldering material
  - \* Fuse
    - Fuse material
    - Properties
  - \* Material Used in Fibre Optics (Optical Fibre)

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# ADVANCED DIPLOMA IN INDUSTRIAL ELECTRONICS

# Second Semester

# ELECTRICAL AND ELECTRONICS MATERIALS

### REFERENCES

1.	General & Electrical Engineering Materials	0-10	by	M.L.	Gupta
2.	Electrical Engineering Material	-	by	A.J.	Decker
3.	Electrical Engineering Material	-	by	c.s.	Indulkar
4.	Electrical Engineering Material	-	S.I	K. Bha	Raina & attacharya Pub. House

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### ADVANCED DIPLOMA IN INDUSTRIAL ELECTRONICS

### Second Semester

### ELECTRICAL AND ELECTRONICS WORKSHOP

Theory p	er week: 1 Hr.	Practical	per week: 4 Hrs.
Topic No.	Title/Topic	Theory Hrs.	Practical Hrs.
1.	Symbols	04	04
2.	Data Book and Information Documents	02	04
3.	Tools		02
4.	Component Identification and Testing	100000000000000000000000000000000000000	06
5.	Contactor and Switches	02	08
6.	Cables and Wires	02	06
7.	Soldering Techniques	01	04
8.	P.C.B. Drafting	04	10
9.	Assembly and Testing	-	10
10.	Coil-Winding	-	06
11.	Safety and Storage	01	04
2 - 1 - Kapp	Total	16	64

#### Second Semester

# ELECTRICAL AND ELECTRONICS WORKSHOP

Theory per week: 1 Hr.

Practical per week: 4 Hrs

#### COURSE CONTENTS

#### 1. Symbols

- \* Electrical Symbols
  - Component
  - Electrical Instruments and Machines
  - Wiring
- Electronics Symbols
  - Components
  - Circuit
- Data Book and Information Documents
  - Necessity of Data-Books and Mannuals
  - Data/Information reading
- 3. Tools
  - Tools used in Electrical & Electronic Workshop
  - Specification of tools
  - Selection of tools
- Component Identification and Testing
  - Resistor
  - Inductor
  - Capacitor
  - Semiconductor diodes
  - Transistors
  - Silicon controlled rectifier
  - Integrated circuits

#### Contactor and Switches 5.

- Connectors
  - Various types of connectors (function and uses)
- Switches

  - Various types of switches (function and uses)
  - Micro switches

Contactors and Relays

- Various types of contactors (function and uses)

Setting and repairing of contactors

Various types of relays

Setting and repair of relays

#### Cables and Wires

#### Cables

Various types of cables and wires

Selection of wires and cables

#### Wiring

Interpretation of wiring diagram

(House, Industrial and control panel)

Identification of wires/cables

Wiring of control panel

Cable laying (for control panel)

Cable joints

#### 7. Soldering Techniques

Soldering materials, flux materials

Various types of soldering irons and its selection

Desoldering pumps

Precautions while soldering

Soldering and de-soldering practice

#### P.C.B. Development 8.

Various types of P.C.B.

P.C.B. layout drafting (of any circuits)

Printing of layout on copper clad board

Etching

Washing

Inspection of prepared P.C.B. and correction

Drilling holes on P.C.B.

Cutting of P.C.B.

Testing of P.C.B.

Timing of P.C.B.

### 9. Assembly and Testing

List of Assembly

Battery eliminator for 3,6,9,12 volt

I.C. Voltage regulators for 5V, 12V, 1 AMP

Waveform generators using 555 IC

Audio Amplifier

Electronic sound generator

Light dimmer/fan speed regulator using diac & triac

Select static relay for 10A, 400V

Electronic Display using LEDs/Seven segment display



Variable power supply

Signal generators

#### coil Winding 10

Winding and rewinding of coils, using coil winding machine

#### Safety and Storage 11.

Safety precautions in workshop

High voltage precaution and safety measures Storage of equipments/tools/components



### Second Semester

### ELECTRICAL AND ELECTRONICS WORKSHOP REFERENCE BOOKS

1.	Linear IC Equivalent	ō8	by A.M. Hoebeek BPB Pub.
2.	Fundamentals of Cable Engineering	-	by V. Privezentsev I. Grodnev S. Kholodny I. Ryazanov Mir Pub./Moscaw
3.	The Master Handbook of IC Circuits		by Delton T. Horn TAB Book Inc. Blue Ridge Summit, PA
4.	Handbook of IC Circuit Projects	-	by Jim Ashe TAB Book Inc. Blue Ridge Summit, PA
5.	International Diodes Equivalents	-	by A.M. Hoebeek BPB Pub.
6.	Design of Electronics Circuits and Computer Aided Design	-	by M.M. Shah Willow Fastern Pub

# ADVANCED DIPLOMA

# INDUSTRIAL ELECTRONICS

(THIRD SEMESTER)



STATE CURRICULUM DEVELOPMENT CENTRE

AL OFFICE COMPLEX, GAUTAM NAGAR, BHOPAL - 462023
TEL: \$76963, 767155, 571995

THIRD SEMESTER

A MEASURING INSTRUMENTS

# RATIONALE

Religionents in all & brancess of enger confinencing, are the prerequisite for proporpolation as interpretation. A technician has tomake various measurement and connect andinstall various measuring instruments.
Modern developments often confront him
when digital display instruments. Thestudent is also called upon to make electronicmeasurements in addition to the electricalmeasurements in addition to the electricalmeasurements. The syllabous includes we thetherefore of measurements and constructionto various types of measuring instruments
commonly used in the field of electrical and
electronics engineering.

and Measuring Instruments.

SCHEME OF STUDIES

.Ho	TOPIC	Con	Contact Hours				
		Theory	Practical	Total	Remark,		
1	circle ficition of Measur	7 08	04	12	-		
2	Other details of instrument	; 10	06	. 16			
3	Waltmetell and Energym		12	22			
4	Merburevant of Resistance	10	04	. 14			
5	Meaburement of Inductors and Capacitane.	08	- 04	12			
5	Additional Measury	10.	04	14			
7-	charmete cheaturements	08	04	.12			
7	Di-elicitic Measurement	5 06	.04	10	1000		
3	c. R. O.	06	04	10	-		
	Florthonz Voltmater	04	04	108	1 9 9		
	A. C. & 2. C. Messueros	6 05	04	: 0.9	and the same		
2	A. F. & R. F. Power	0.5	.06	11	4		
3	El Stal Instruments	06	04	10			
1	TOTAL	96	64	160			

MADNYA PRADESH BOARD OF TECHNICAL EDUCATION BHOPAL

- Sub. :- Electrical & Electronics Measurements & Measuring Instruments (3
- Topic[4.11] Classification of measuring instruments, errors and accuracies classification of instruments based on various effects of electric current indicating, recording & Integrating types of meters Accuracy and sensitivity, Types of errors.
- Topic[4.12] Construction operation and other details of 'electrical instruments Deflecting, comtrolling and damping forces.

  Supporting systems, bearing M.C. MI dynamometer, Electromagnetic induction, electrostatic, instruments and vibration galvanometer standard and substandard meters, calibration, shunt and Multipliers CT & PT.
- Topic[4.13] Wattmeter & Energy meter :- Dynamometer and induction type wattmater, induction type energy meter. Use of instrument transformers for extention of range advantages errors and their correction.
- Topic[4.14] Measurement of resistance :- Classification of resistance effect of contact Resistance and contact thermoemfs on the measurement of low resistance, kelvin's double bridge effect of temprature and humidity on the measurment of high resistance and insulation resistance ohmmetes, Megger Earth Tester Tongtester wheatstone bridge, Multimeter.
- Topic[4.15] Mansurement of inductone and capacitance by bridge Matheda, Manwell, Anderson, Desualty & wein bridge.
- Topic(4.15) Additional Measuring Instruments := Electric resonance and weston frequency meters, dynamometer, and lipman p.f. mater, weston synchroscope, Merz price Maximum demand indicator, Rotating type phase sequency indicator.
- Topic[0.17] Magnetic Measurements :- Ballastic Galvanometers
  Measurement of flux BG, Grassot fluxmeter, Fahy simplex
  Permeameter, determination of hystersis loop for ring and
  bar specimen, Licyd fisher magnetic square, Measurement of
  Iron lass. Ballastic Galvanometer Measmement of flux by
  BG, Grassot fluxmeter, Fahy simplex permeameter,
  Determination of hystersis loop for ring & bar specimen.
  Lloyd fisher magnetic square, Measurement of Iron loss

- Topic[4.13] Dielectric Measurment: Dielectric measurment by

  (1). Wattmeter method

  (3) C.R.O.
- Topic[4.19] C.R.O. :- Cathod ray tube, clectrostatic defle magnetic Dellection, time base. X and Y ampli controls on C.R.O. Dual Beam aved dual trace oscilla
- Topic[4.110]Electronic voltmeter :- Diode TVM &FET to Bridge, D.C. Amplifier, Voltage divider, Rectifier of A.C. a D.C. Ditterential Voltages specification electronic voltmeter, milli and micro voltmeters.
- Topic[4.111] udio & Radio foequency measmements : A.F. and Masserments, range of frequency mearements sensiti
- Topic[4.112]A.F. & R.F. Power Measurements
- Topic[4.113]Digital Instruments: Digital Instruments Avant digital instruments types of DVM, DVM, specifi Digital Multimeters, frequency counter/Times.

MADHYA PRADESH BOARD OF TECHNICAL EDUCATION BHOPAL

THE SEMESTER / ADVANCED DIPLOMA PROGRAMME IN I NDUSTRIALIE LECTRO

(REVISED)

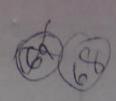
Sub. :- Electrical & Electronics Measurements & Measuring Instruments

List of Practicals :

- . Study and use of different types of Electrical measurement.
- . Mearesment of low resistance by Kelvin's double bridge.
- Detarmination of madium resistance by Wheat Stone Bridge Method.
- princing out insulation resistance of domestic wiring and machines by Megger.
- 5. neasurement of Inductance by Maxwell's Bridge Method.
- s. Measurement of Capacitance by Desanlty-Bridge Hethod.
- 7. Callbration of a single phase Energy Nater.
- Measurement of P.F. by Ammeter, Voltmeter and Wattmeter Method.
- the given circuit.
- 10. To find earth resistance of a given installation by earth
- 11. Messerement of R, L, and C by Universal bridge.
- 12. To find dislactric strength of a given transformer oil.
- 13. Study and operation of CRO and its controls.
- 14. Use of CMD. for measurement of different quountities voltage, oursent, phase and frequency etc.
- is. Stray and use of digital Instrument digital Multimeter frequency meter.
- 16. Stroy and use of various other electrical instruments e.g. stropbosocopa phase sequence weeer, wavemeter Maximum Demand

int. tarar tong tester.

- 4.8 -



MADHYA PRADESH BOARD OF TECHNICAL EDUCATION BHOPAL SEMESTER/ADVANCED DIPLOMA PROGRAMME IN INDUSTRIAL Sub. :- Electrical & Electronics Measurements & Measuring In

### LIST OF REFERENCE BOOKS

- Electrical Measurements & Measuring Instruments by E.W. Golding - Pitman & Sons India Pub.
- 2. A course in Electrical & Electronic measurement & Instru by A.K. Sawhney - Dhanpat Rai & Sons Pub.
- 3. Electrical Measurement by H.V. Satyanaryan Rao Khanna Po
- 4. Electrical & Electronics measurement & Instruments by S. Rama Dhadran Khanna Pub.
- 5. Electronic Instrumentation & measurement by William David Cooper - Prentice Hall of India Pub.
- 6. Disctronic Instrumentation by Prens Ry Prentice Hall o

HOWATCED DIPLOMAIN INDUSTRIAL ELECTRONICS

THIRD SEMESTER 31/71

SUS - 32 ELECTRICAL MACHINES

# RATIONALE

Get importance to a students of Industrial Electronics.

It mainly deals in the theoly and underlying principle

of electrical machines which a student is likely to
central in his future central career by way

contextake in his future cannot career by way

of operation, control and maintenances

of peration and maintenances

of the subject needed

of the subject needed

31/72

(70)

3.2 Electrical Machines

SCHEME OF STUDIES

2.4	T 0:21 C-	Cont	1		
5		Theory	Phactical	Total	hemark.
-1	Energy Comversioning	10	-	10	-
1/2	Thankfolmers	14	98	22	-
5	Polipiese Induction	. 20	12	32	-
4	Syncilonous ofacune	20	12	32	-
	Total	64	32	56	

WANCED DISLONA IN ELE THIRD SEMESTER CONTENTS L TENERGY CONVERSION PRINCIPLES 1. First of electromechanical conversion, Energy in the magnetic bystem, field energy and orechancel force, Diffeton of m mechanical forces Energy commotion viamagnetic field, Induced Vollage, Generatic and endor-cities, countre e m.f. and countre langue. Definition. Principle of operation, constituenment features 2 TRANSFORMER Types: single phase and Three phase applications. Regulation Lorsed, Efficiency, Different car its and of Three - - intend, attificial, all, wall, much a point gives of sofety devices used for therefores. TOTAL PRASE INDUCTION MOTOR Considerable actually, typed of nature square cape are their word, Photocom of not drag may that my this passe system. Some war and the of wage park come were therein with a sup and to diving I south superior in an view advantage. I lot in coment toward theyer, condition to maximum total with Mentioner = Machinery. Total-/ stip characteristics Environ they are count, aprec to you dogs. Styling mild - statel, topen control. Elektrick : DOL, Y/A: freitonthone franch - Thousand and Continued fertill . Repoliting wondown and making The person of the phase of the spend of the phase of the from factor is with the factor and coil strangers

Synchronous impedence and its importance. OpenOsa and Snort circuit test. Alternature characteristics Regulative of Albernator. Parallel sporation of allers of alternatus. Condition of paralleloperation. of Varying excitation of synchronous moter upon arms culient and power factor warn input is constant. Synchronous condenser. V'curves. Methods of starting synchronous motor. Hunting and its preven THIRD SEMESTER

SUB :

ELECTRICAL MACHINES

# List of Phachenle!

- (1) To connect these single phase transformers to form-
- (2) To hun two single phase transformers in parallel and to find their load sharing.
- (ii) To study the constructional debails of Polyphaseinduction motors.
- (4) To determine \$15 and calculating percentage 80pof a given induction motor.
- (5) To story direct on-line, story Delta, and Autothereformer starters and to run me motor with the
- (6) To bindy a slipping moter stretch and to hunine motor I with its their.
- Too Study a synchronous machine. a to verify me relation ship  $\hat{f} = \frac{NP}{120}$
- To hun we alternators in parallel and study Their tood sharing.

ADVANCED DIPLOMA AN INDUSTRIAL ELECTRONICS

- SUG: .... 3.3. Computer Application.

31/76

# RATIONALE

## RATIONALE --

Computers have become indispensable teel for business and industry. Their applications are ... . ...d numerous and vary from maintaining of on line calendar of personal engagements to design and production of complex physical systems. Technicians find them in use in almost all types of possible places of work. Knowledge of computers, therefore, has become indispensable. A third level course, In the studies of Tachnical Diploma Programme, is therefore well factified.

This course aims at providing students with basic knowledge of computers-focus is what they are end some understanding of problem solving using . puters. Major inputs on programming in BASIC have been included with a focus on hands an experience in programme development and execution. BASIC has been elecause of its sheer simplicity that supplicantly contributes to fast learning by students as his/her very first programming language. Moreover, hall being a general purpose language a wide variety or application ranging from data processing a physical parameters e.g. temperature apprendict are physical parameters.

To give an idea of popular application software published topics on WordStar, LOTUS and dBASE III+ have been included. The objective is to give the students a impulsage on how to use these packages and areas of their applications.

31/77

guro: 5.3. Computer Application

78003

# SCHEME OF STUDIES

-	TOPIC	Cont	act Hou	h.S	
- 1		1 0	Phactical	Total	Remark.
1	Introduction to computer	08	02	10	
2	Computer softwares	.08	04	12	
	Basic Concepts of	08	02	10.	
1	Programming in Programming in	16	. 16	32	
5	Intro-duction to- application packages	08	08	16	
		1			
				]	
	TOTAL	48	132	80	
			1	1	1

DIVANCED DIPLOMA IN INDUSTRIAL ELECTRONES

THIRD SEMESTER

SUB: 3.3 Computer Application.

## CON WES

1. Introduction to computer.

Computer hardware generations, computer; block diagram, basic terms ( bit, byte, and word etc) . Input & Subput devices, memories, classification of computers as micro, mini & mainframe.

2. Consumer Software.

Dasic och assistication of software viz. application & system software, their types and functions, Turpose and function of an operating system, and elementary lies of disc operating system. Development of programming languages and their basic difference, need of application packages & their guaral characteristics.

5. . Prato Concepts of Programming

Problem solving, algorithms, Flow charting, Programme development process, testing and documentation,

Programming in Pasic.

Tracouction, basic character set, difference between statements and commands, constants and turisties, expressions, assignment statement, I descript functions, sutput statments, control avaitarents, array, functiions, subroutine, files, fitting of programming bugs simple programming for suggesting problems and file processing.

was atten to application packages.

Long Lide of Word Processing, spread sheet. The latebase management packages, their functions, few ... mentary commends & field of application.

31/79

(7)

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NOVAHUED DIPLOMA IN INDUSTRIAL ELECTRONICS
THIRD SEMESTER

sus - 3.3. Computer Application.

## LIST OF EXPERIMENTS.

Visit to computer centre, Demonstrate various I/O units and show a computer session in progress.

Pamiliari Se with basic MS DOS commands.

Demonstration of different softwares, e.g. interpraters compilers, loaders, system libraries.

Description of BASIC program development & editing.

Practicals on BASIC programming.

Demonstration of word processor package.

Tablif a loing with Lotus 1-2-3.

Paulianising with dBase III+.

31/80

(28)

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A-DVANCED DIPLOMAIN INDUSTRIALELECTRONICE

THIRD SEMESTER

SUB: 3.3. Computer Application.

## LIST OF REFERENCE BOOKS.

Programming in Basic by Gotterfred, Scheme Series.
Programming in Hasic by E. Balaguruswamy, Tata McGraw
Hill Pub. Comp., New Delhi.

Basic Hand book by David A. Lien, Compusoft Publishing, California.

Companion book by Mehta, PBP Publications, New Delhi. Introduction to GBASE III+by Alan Simpsons.

1-2-3 The complete Reference by Mary Campbell, Osborne McGraw Hill.

Introduction to Wordstar by Arthur Naiman. Word Processing Essential concepts by Morilyn Popyk, McGraw Hill. ADVANCED DIPLOMA IN INDUSTRIAL ELECTRONICS

THIRD SEMESTER.

COURSE: ELECTRICAL BAND ELECTRONICS DRAWING.

# RATIONALE

Engineering drowing is the language of engineers. The knowledge of this subject is very important to the students of Industrialte symboles and notations of various electricaland electronic quantities, the various carcuit of and electronics equipments.
electrical machines and and electronics equipments, electrical machines and electronics equipments understanding drowings to of various circuits understanding drowings to of various circuits and equipments, conveying in structions and shop-fourstanding problems on sites and shop-fourstanding problems.

31/82 80

1900: 3.4 - Electrical & Electronics Drawing

# SCHEME OF STUDIES

SH	TOPIC	Cont	act Hou	18.	
		Theory	Practical	Total	Remark.
1	Symboles and Notations	-	16	16	
2	wiring circuits.	-	16	16	
	Instrument circuits	-	24	24	
4	Power Wiring Diagram	S -	24	24	
5	Symboles of electron	cs _	32	32	
	Electronic circuit		132	<sup>13</sup> 2.	
				}	
			14-4	144	

SHEET .

ELECTRICAL AND ELECTRONICS COURSE!

DRAWING ( 3.4)

Symbols and examplians. Reliento

Symptols and Motations as pos I. S.S. commonly used the substituted Engineering Symbols of principal units. Individual Engineering Symbols of principal units. Individual instruments, really instruments, control gests, or Distribution Booms, outlets, bells and recepted action. Switer geds, attestors are starters.

2 Wising circuiti, Fluorescent take Connection diagram ( Single and. Twine tuber), on. V. lamb one Sodium vaporus large connection diagram.

3: Instrument executs: Connector of Amounter . Volemeter, wetnotes and -Energy neigh single prose and True proce Two clementand Thee elements. Connection diagram of Extras P.T. for measurement of Borros and smergy.

a lower wining Diagrams Power windry diagrams of : snalled ball one split provide Brigged passe in dischool motiles. Series, front and Compound ( Long- short and short short) motolise supplied motor. D.c. motols stated ( 3 points and of points), DOL. Star-Delta, Auto-transformer staters, supring motor starter

5- symbold of relicitorie elements

a) Divided : Basic demendent works Vacuum diedes Level, Turnel, Veractel: Pris. Light emiling.

(b) Transaction bapolin junction 1/ prop & mpn),

FET, DEF TEET, MUSICET, UTTAN

(c) ingridation; when there see R ses Tes: DIP & pin & 16 9 pin.

1 speaker hereives. 6. Blechmiz Circuiti, forward and Reverse birting of a junction diode The Midge Lectified, full wrong confiet, connecting of a transfer in CB. CE Con 2. C. Coupled amplight are Voltage rights regulator.

List of Broks!

I I.s. 696 Latest version

2. Electrical Ergy. Daving by Brattachary.

3. Electrical Engy Maning by Happel

4. Electrical Deaving by Harany-

5. Electrical Engy, Drawing-log Dorgan

G. Electronic Principles - by Malvino.

(84)

ADVANCED DIPLOMA IN INDUSTRIAL ELECTRONICS

(This semester).

(This semester).

CODE :-

# Rationale

The digital Tob are present everywhere as the hearts of small devices like electronic watches to biggest emphasizable like computers. These are present in the electronic control devices employed in all modern automatic plant to the control devices employed in all modern automatic plant to the production and production and processing equipolical control of the film production appliances entertainment to its land TV. VCR & film production appliances at logics pental what is inside in TC what are principles a logics used in these ? To is a device which uses these principles used in these ? To is a device which uses these principles and publicat covers all these principle elements a logics of the field of digital electronics.

The syllabus includes logic gates and logic fam-

To is assumed that all institutes how training to is assumed that all institutes how training these kits successfully. The students will devolope the seftware programmes want in these kits.

31/87 (85)

SUB: 315 Digital Electronics

# SCHEME OF STUDIES

SiHo	TOPIZ	Cont	act Hou	S	1 .
11		Theory	Practical	Total	Remark
11	Binary codes	06	-	0.6	
2	Boolean Aljebra	06		06	
3	Logic gates	08	08	. 16	
4	Logic Families	06	26	12	
5	sequential circuits	16	06	22	
6	Azithmetic Legac	10	0.4	14	
-7	Combinational Digital	06	04	10	
	Convestors	06	04	10	
					11/3/4
-	Total	64	32	9 6	

TNILL Semester.

SUBJECT-DIGITAL ELECTRONICS AND STREET (3.5)

31/88

CODES-

### CONTENTS

1. MORTER SYSTEMS AND BINARY CODES

- 7.1 Introduction to Decimal, Binary, OCtal, Hexadecimal
- 1.2 Comversion of number systems.
- 1.3 Complements of numbers | 7.4. | True's complement and maddin minus our complement.
- 1.4 Dimary operations ( 2.8 ) addition, subtraction, multiplication and division
- Excess-3 code, Gray code, NCD code, Reflected code, Brror correcting and Error detecting code, ASCII code.
- 2. ROCCINE ALCERNA
- 2.1 Borle Boolean Sunctions and Boolean theorems.
- 2.2 Simplification of Boolean functions.
- 2.7 While method for simplification of Boolean function
- 2 -----
- 3.4 Lisht Legie gates (AND, OR, NOT, NOR, NAND, EX-OR, EX NOR)
- 3.1 Illinon themolasic gates" & universal gates.
- Ball Prophetion of truth table and symbols of gates.
- 5 % Casin of Risio gate with universal Gate.
- As 10072 TAXINES
- 4.1 Concept of Resister diode logic, Diode Translater Logic (DTL), Translater Translater Logic (TTL), Resister Coupled Logic (DL), Mos & Cher their circuit and brief disoription.
- 4.2 Compairison of above logic family .

#### 00200

# 5. - BEQUINCTAL CIRCUIT

- 5.1 Introduction to Flip Flop.
- 5.2 R-S.JK.D and T type flip flop their analysis.
- 5.3 Advantages and Disadvantages of each Flip-Flops.
- 5.4 Emplaination of clocked flip flops.
- 5.5 Positive and Negative clock function.
- 5.6 Importance of Mage triggring.
- 5.7 Sounters-Circuit and Brief Discription of-
- 5.71 Symohronous/Asymchronous.
- 5.72 Seriet/Paration/
- 5.77 Shift register.
- 5.74 Alpple Counter.
- 5.75 Up-Jose Counter.
- 5.75 Decade Counter.
- 5.77 BCD Counter.
- 5.75 Ring Counter.

## 6. ANTONIANTE LOUTE UNTE (ALU)

- 531 Adder Circuit .
- 6.2 half sader.
- 6.1 Full adder.
- 5.4 3 But binary adder.
- 6.5 Decimal odder,
- 6.1 202 adder-
- 5.7 5 bit binary substractor circuit.

# 7. COMPRESENTIONAL MIGITAL CIRCUYULL.

- 7:1 EncoCor/Decodor-Circuit and Brief Discription.
- 7 . Multiplexer/Denultiplexer circuit and Brief Discription.
- C SOMMERTORS OF
- 8.1 A to D Convertor.
- 8.3 Ramp Convertor.

..3..

8.3 Dual Slope.

8.4 Successive approximation type.

8.5 D/A Convertor.

//meslam//

# THIRD SEMESTER.

31/91

SUBJECT: DIGITAL SECONDO & ACTUAL SECOND

CODE:-

# ITOT OF EXPERITMENTS:

- t. Set up AND/OR/MOY/MOR/MAND gates using digital Trainer/Experimenter and verify truth tables. Study the general specifications & pin configuration of TTL/C-MOS ICS
  - 2. Verification of Re-Margans Theorems using gate circultry.
  - 5. Setsup Exclusive ON/EX-LOR gates using NAME/NOR gates on trainer/experimenter and verify the truth tubles.
  - 4. Construct Full Adder using TC 7603 and substructor using TC-7455.
  - D. Genetruet a Half adder & Pull Adder using Logic gates.
  - 6. Frapare a circuit with 7-segment display & check the operations using logic input switches, NCD code truth table using 74.66.
  - 7. Realize the minimized networks of a given function and verify the truth tables .
  - B. Test the function of TTL (74 series) / G-105 (40 series ICs).
  - 9. Frepare clocked and unclocked an Fig-flop circuit using MAND/HOR gates.
  - 10. Make a Moster-Slave of F/F and verify the butput with its truth table.
  - 11. Rake a T-F/F and DF/F using J-R F/F and wenty its

. . 2 . .

12. Prepare a 3-bit Ripple; ,up/down,decade counter using J-K F/F/D-F/F with -ve and +Ve clock input and analyse its output.

13. Prepare RCD to Decimal decoder using IC 74141 and verify its output using 7-segments, display circuits.

14. Suggest Decimal to RCD decoder using logic gates.

15. Study operation of 4 line to 1 line multiplexer.

31/93 (9)

# ADVANCED DIPLOMA IN INDUSTRIAL ELECTRONICS THIRD SEMESTER.

SUBJECT : DIGITAL ELECTRONICS CHE APPLICATION

CODE:-

# LIST OF REFUSERCE BOOKS:

- Digital principles and applications
   By Malvino and Leach
- 2. Digital Computer fundamentals
  By Thomas G. Bartea:
- 3. \* Digital logic and computer design by Merris muno
- 4. Integrated Electronics

  By Jacob Millman and Cheistos Halkins

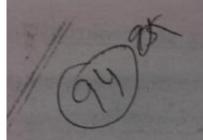
		× 0	4. 多灣情	
○ 발발 보고 12급 학립 ·	10. Total	3.3 COMPUTER APPLICATION  3.4 ELECTRICAL & ELECTRONICS  3.5 DIGITAL ELECTRONICS	S.Nd. NAME OF SUBJECT  S.1 BELECTRICAL MECHINES  S.1 BELECTRICAL MECHINES  S.1 BELECTRICAL MECHINES	(To be introduced from 1995
(3) (4) (5) (5) (6) (8)	( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( )	-(-) 9 (14) 9 (14) 4 (64) 2 (32) 6 (36)	(64) 2-(32) 6 (96)	96 - 97
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15-60% 15-60% -50%	2.50	3 50 220 3 50 220	50 50	To December
(m)/8/m	1000	Parce Hand	Sunction of the control of the contr	1

# ATTANCED DIPLOMA IN INDUSTRIAL ELECTRONICS

# Equipo. Course Title IST SEMESTER Communication Skills 170 Mathematics-T Engineering Physics Engineering Chemistry Sugineering Drawing Workshop Practice G. ITED SEMESTER Mathematics-II 18 Basic Machanical Engineering 2. Electronics Engineering-I 3. Mischrical and Electronics Materials Basic Blectrical Engg. Ricetrical and Electronics Workshop. T.V. SELINGTER Phretrical and Electronics Measurment and Managaring Instruments. Minimical Machines Computer Application Mischrical and Electronics Drawing Digital Misstronics ER RETER Flectmical Engg-II Minear Nos and applications News Electronics-I Process Control M. Sustrial Electronics-I V SEMESTER Modes misl Training-I ( 16 weeks) THE SEMESTER ...emoprocessors-I Power Riecuronics-II Tadus mial Ricetronics-II ...swmenastion

Dusiness Communication

(linox) Project.



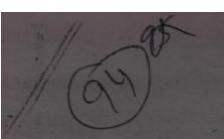
-2-

S.No.	Course Title
	VII TH SEMESTER
1.	Industrial Electronics-III
2.	Microprocessors-II
3.	Computers in Industry (CAM, Robotics, CNC)
4.	Maintenance Engg.
-5.	Industrial Management
6.	Major Project (Planning)
	VIII SEMESTER
1.	Industrial Training II + Major Project (16 Weeks)

# AD ANCED DIPLOMA IN INDUSTRIAL ELECTRONICS

Salle Course Title BILL STORES IST SEMESTER Communication Skills 234 20 Mathematics-T Engineering Physics 30 Engineering Chemistry Engineering Drawing 34 Workshop Practice 60 ITHD SEMESTER Mathematics-II 25 Basic Mechanical Engineering 20 30 Blactronics Engineering-I Electrical and Electronics Materials 5. Basic Blectrical Engg. Blactrical and Electronics Workshop. THE SEMESTER Directrical and Electronics Measurment and Measuring Eastruments. Micotmical Machines Computer Application Mischrical and Electronics Drawing Migital Electronics First trical Engg-II Minesu Mos and applications Howar Blackronics-L Process Control I dustrial Electronics-I H SEMESTER Andus mial Training-I ( 16 weeks) TON SEMESTER Alexeprocessors-I Rower Blectronics-II Tadustrial Riccircules-II Instrumentation Dusiness Communication

(dinor) Project.



-2-

S.No.	Course Title
	VII TH SEMESTER
1.	Industrial Electronics-III
2.	Microprocessors-II
3.	Computers in Industry (CAM, Robotics, CNC)
4.	Maintenance Engg.
-5.	Industrial Management
6.	Major Project (Planning)
	VIII SEMESTER
1.	Industrial Training II + Major Project (16 Weeks

1

# ADVANCED DIPLOMA IN 31/99 INDUSTRIAL ELECTRONICS

(FOURTH SEMESTER)



STATE CURRICULUM DEVELOPMENT CENTRE

M.P. BOARD OF TECHNICAL EDUCATION

AM, OFFICE COMPLEX, GAUTAM NAGAR, BHOPAL - 462023

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MADHYA PRADESH BOARD OF TECHNICAL EDUCATION, SHOPAL.

DIPLOMA PROGRAMME IN INDUSTRIAL SLECTRONICS

( To be introduced in 199

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	WEEK(YEAR)	MARKS	ONAL	ASSESMENT	PROGRASSIVE ASSESMENT			BOARD EXA	EXAMINATION	TION		
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POWER PLACE TOP TO	001/16/10/11									ano.		
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t10n	6 (96) 8 (48) 9 (144)	15	15	10	10	1-4	S Hits	100	-	2 1110	000	
15 Linear IC and Application	5 (50)4(54)9(144)	15	15	10	10	-	<b>100</b>	2			1	
子-W Electrical Engg.	6 (96)3(48)9(144)	7.7	'n	10			1000	TOO	-	S Hrs.	50 /	
		1	7.7	TO	TO	1	3 Hrs.	100	1	3 Hrs.	50	
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				1								
Total 22	2(352) (14 36 (576)	60	60	40	40	1	1	003		1	200	

NOTE:- (1) No. of Theory paper: 4 7

(7)

+Practical +Inplant Traingin

Marks)i.e.

Ratio of theory marks : 400/400

(a) Passing marks for :

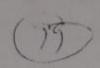
(a) Theory-33% (b) Practicals-40% (c) sessionals-60% (d) Inplant Trg-50%

- Total theory marks: 400 /
- (3)
- No. of Practicals : 4 / Total Pract.Marks : 300
- (5) Inplant Training Mks:
- (5) Total Mks.of Sessional+ Prog.Assessment.+Pract 200

  - (8) Total Marks: 800

457

31/10)



# ADVANCE DIPLOMA IN INDUSTRIAL ELECTRONICS

#### FOURTH SEMESTER

# SUBJECT - POWER ELECTRONICS

# SCHEME OF STUDIES

	Topic	Th. Hrs.	Pr. Hrs.	Total Hrs.
	Introduction to modern solid state devices	16	08	26
2.	(a) Uncontrolled Rectifier	40	30	70
	(b) Controlled Rectifiers			
11	Power Supply Stabilizers	12	12	24
,1	UPS and	10	14	24
		80	64	144

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# Advance - DIPLOMA IN INDUSTRIAL ELECTRONICS

## FOURTH SEMESTER

# SUBJECT - POWER ELECTRONICS

# 1. Introduction to Silicon Controlled Rectifiers

Constructional features of SCR (Thyristor, Diac, Triac), their characteristics & working, Definition of Terms related to thyristor, series-parallel operation & compensation. Protection of thyristor. Industrial application of thyristor.

2. (a) Uncontrolled Rectifier Review of single phase rectifier

> Half wave & full wave rectifier. Bridge circuit configuration. Circuit diagrams and wavefrom. Definition of terms related to half wave & full wave rectifier, Filters.

> Introduction to Three phase and multiphase Rectifier Half wave & full wave bridge rectifier. Circuit diagrams & waveforms. Comparative study of single phase & Three phase rectifier, multiphase rectifiers.

(b) Controlled Rectifiers

Principle of controlled rectification, single phase & Three phase controlled rectifier, Definition of terms, semicontrolled rectifier, Circuit diagrams and waveform of single phase and three phase controlled rectifier, advantages of controlled rectifiers. Industrial application of controlled rectifiers.

### ), Power Supply

- (a) Block diagram of linearly regulated power supply working of each block in detail. Current limiter.
- (b) Principle of working of SMPS, Block diagram of SMPS, functions of each block, advangates of SMPS, comparision of SMPS with linearly regulated power supply. Industrial application of SMPS.
- 4. Stabilisers Relay controlled and servo controlled stabilisers, CVT,

characteristics and comparision.

Principles of invertors, block diagram of UPS, function of each block. Principle of working of UPS advantages & Dem & Chy industrial application.

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# DIPLOMA IN INDUSTRIAL ELECTRONICS IV SEMESTER

Subject - Power Electronics

SCHEME OF STUDIES

## List of Practicals

- 1. To plot Wolt-Ampere characteristics of a S.C.R.
- 2. To plot Velt-Ampere characteristics of a Diac
- 3. To plot Volt-Ampere characteristics Triac
- 4. Observe & Analyse waveform of controlled single phase Half wave rectifier
- Observe & Analyse waveform of controlled single phase Full wave rectifier

THREE

- 6. Observe & Analyse waveform of controlled The phase Half wave bridge rectifier.
- 7. Observe & Analyse waveform of controlled Three phase Full wave bridge rectifier.
- 8. Study of SMPS (Switch mode power supply)
- 9. Study of linearly regulated power supply
- 10. Study of UPS (Uniterrupted power supply)
- 11. Study of Servo Stabilizers
- 12. Study of Relay Stabilizers
- 13. Study of CVT

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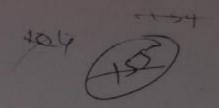
POWER ELECTRONICS

OF.

TV-Sem. Advance Diploma in Industrial Electronics."

٥.	Author	litle P	ublisher
	M.H.Rashid	Power Electronics	P.H.I.
	Cyril.W.Lander	Power Electronics	H.G.H
	Z.bar	Industrial Electronics A Text Lab Manual	т.и.н
	Schilling Belove	Electronics circuits	HC GF
	DEGEM Educational Electronic Systems	Course-H Electronic Source (-	DEGEH Por

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# ADVANCE DIPLOMA IN INDUSTRIAL ELECTRONICS

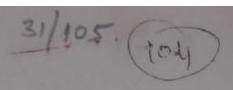
# FOURTH SEMESTER

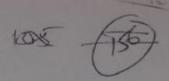
# SUBJECT + INSTRUMENTATION

# SCHEME OF STUDIES

S.No.	Topic	Th. Hrs.	Pr. Hrs.	Total Hrs.
1.	Introduction	10	04	14
2.	Sensors & Transducers	38	16	54
3.	Instrument Amplifiers & Signal Conditioners	26	14	40
4.	Display Devices & Recorders	22	14	36
		96 /	48 /	144

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# DIPLOMA IN INDUSTRIAL ELECTRONICS-IV SEMESTER Subject - Instrumentation

Instrumentation

## 1. Introduction -

Functional block-diagram of Instrumentation system. Function of each block, requirement of each block.

## 2. Sensors & Transducers -

Definition of transducers, Principle of transduction, Types of transducers, Application of transducer in the measurement of Displacement, level, strain, pressure. Temprature, voltage and current comparative study of these methods.

Measurement of force, Introduction to load cell.
Introduction to electronic - weighing system (block diagram & advantages)

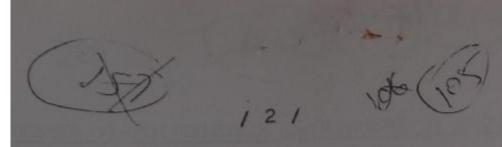
Measurement of Torque, Methodoused for torque measurement Frequency measurement, Principle of frequency. Methods used for measurement of low medium & high frequency.

Measurement of velocity, methods used for measurement of linear & Angular velocity, methods for the measurement of vibrations.

# 5. Instrument Amplifiers & Signal Conditioners -

Components for input modification, block diagram for D.C. & A.C. Signal conditioning systems pre-amplifiers. Input attenuators and filters instrument amplifiers. Modulation and demodulation, Data conversion and multiplexing.

Contd...2



# Display Devices & Recorders -

Need of display and recording in Instrumentation Analog - instruments (types, principle of operation and their characteristics)

Digital Display Devices - Various display systems used in digital instruments. Comparision of various display systems Block diagram of digital measuring-

Instruments , Criteria for the selection of digital

Instrument , Comparision of digital & Analog displaying systems.

Recorders - Types of recorders (analog, graphic, strip chart, x-y recorder, magnetic tape recorders) Their principle of operation and industrial applications.

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ADVANCEDIPLOMA IN INDUSTRIAL ELECTRONICS

## IV SEMESTER

# 31/107

# SUBJECT : - INSTRUMENTATION

# LIST OF PRACTICALS :-

- (1) Study the constructional features of a load call.
- (2) Study of different active & passive trausdue ars available.
- (3) Measurement of following quantities, using suitable transducars.
  - (a) Force (b) Speed (C) Vibrations (d) Temperatu-(e) Torque (f) Frequency (g) flow res.
- (4) Study of Instrumentation amplifier.
- (5) Using appropriate amplifier convert a signal from
  - (a) Voltage to current (b) Frequency
- (6) Study of Signal conversion
  - (a) A to D
  - (b) D to A
- (7) Study of various actuators & filters.
- (8) Study of multi plexers.
- (9) Study of various display devices
- (10) Study of recorders like

  (a) stripchart recorder (b) x-y recorder

  (c) Magnetic recorders
- (11) Study the performance of filters
  - (a) Bandpass (b) Band stop (c) Butter worth (d) All pass.
- (12) Study of modulation process for
  - (1) Amplitude (2) frequency (3) Phase (4) P.W.M.

### Refrence Books

- 1. Electronics Instrumentation & Measurement Techniques.
  By W.O.Cooper/A.D.Helfrick
  Phl Publication
- Elect. & Elx.Measurement & Instrumentation.
   By A.K.Sawhney
- 3. Instrumentation Devices & Systems.
  By C.S.Rangan/G.N.Sharma/V.S.V.Mani
  Tata Mcgraw Hills Publication
- 4. Instrumentation for Engineering Measurement.

  By R.H.Cerni & L.E.Foster

  Publication John Willey & Sons
  - 5 Electionic Measurement By Jerman & Pullit. 6. Instrumentation By Kirk & Remotion

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### ADVANCE DIPLOMA IN INDUSTRIAL ELECTRONICS IV SEMESTER

### SUBJECT: - LINEAR I.Cs.AND APPLICATION SCHEME OF STUDIES

S .No.	TOPIC	TH HRS	PRACT. HRS	TOTAL HRS
1-	Differential amplifier	10	08	18
2.	Operational Amplifiers	10	08	18
3.	OPAMP Application	20	16	36
4.	Voltage Regulat or	08	06	14
5-	Voltage Compar ator	10	08	18
6-	Timers	12	10	22
7-	Phase Locked Loop	10	08	18
	TOTAL	80	64	144

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### ADVANCE DIPLOMA IN INDUSTRIAL ELECTRONICS IV SEMESTER

SYLLABUS LINEAR ICS AND APPLICATION

### 1. DIFFERENTIAL AMPLIFIER -

Introduction, Differential Amplifiers, Inverting Input, Non-Inverting Input, Differential Input, Single Ended Output, Common Mode Input, Common Mode Rejection and Gain, Cascaded Diff Amps.

### 2. OPERATIONAL AMPLIFIERS -

Schematic Representation, Operational Amplifier, Opamp Generations, First Generation of Opamps, Second Generation of Opamps, Later Generation of Opamps, Stages of an Opamps, Input Stage of an Opamp, Intermediate Stage of Opamp, Output Stage of an Opamp, Practical Monolithic Opamp, Opamp Specifications, Open Loop Differential Characteristics, Output Signal Response, Input Error Signals, Common Mode Characteristics.

### 3. OPAMP APPLICATIONS -

Introduction, Inverting Amplifier, Non-Inverting
Amplifier, Mathematical Operations Using Opamps, Opamps
as Adder, Opamp as Subtractor, Opamp for Multiplication,
Opamp for Division, Opamp as Integrator, Opamp as
Differentiator, Electronic Analog Computation, Opamps
Filters, Low Pass Filter, High Pass Filter, Opamp as
Waveform Generators, Opamp as Astable Multivibrator,
Opamp as Triangular Wave Generator, Opamp as Sch-mitt
Trigger,

### 4. VOLTAGE REGULATOR -

Need for a Regulated Power Supply, Regulated Power
Supply, Monolithic Voltage Regulator, 723 Monolithic
Voltage Regulator, Basic High Voltage Regulator,
Additional Applications of 723.

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### 5. VOLTAGE COMPARATOR -

Function of a Comparator, Comparator Vs Opamp,

Voltage Comparator 710, Inside the 710, 710 Applications,

Hints while using a Comparator.

### 6. TIMERS -

Introduction, 555 Timer, Timer Operating Modes,

Monostable Mode, Astable Mode, Time Delay Mode,

555 as Frequency Divider, 555 as Pulse Width Modulator,

555 as Pulse Position Modulator, 555 as 50% Duty Cycle

Oscillator, General Design Consideration. (2)+ 10

### 7. PHASE LOCKED LOOP -

Introduction, Block Diagram of PLL, Lock and Capture,
Capture Process, PLL Transfer Characteristics, PLL Types,
565 PLL, Measurement of PLL Parameters, PLL Application,
Frequency Synthesis, FM Demodulation, AM Demodulation,
Frequency Shift Keying. Lest of Practicals & Pal Books is proposed

to be same as in 'y' Scheme TI Streeter Electronix in the

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### ADVANCE DIPLOMA IN INDUSTRIAL ELECTRONICS FOURTH SEMESTER

### SUBJECT - ELECTRICAL ENGINEERING

S No	. Name of Topic		3	
	, traine of topic	Th. Hrs.	Pr. Hrs.	Total Hrs.
1.	Electrical Safety	08	04	12
2.	D.C.Motor & Generator	24	10	34
3.	Single Phase Transformer	16	08	24
4.	Single Phase Motor	16	08	24
5.	Poly Phase Induction Motor	20	12	32
6.	Measuring with Ocsilloscope	12	06	18
		96 -	48	144

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### INDUSTRIAL-ELECTRONICS

FOURTH SEMESTER, Subject - Electrical Engineering

### Topic no. 1. - Electrical Safety

Effect of electricity on human body, demonstration of fault current, circuit protection in various devices, Overview of various safety rules involved in electrical working, steps to be taken on accident like switching off the source, removal of victim, artifical respirsation, earth and method/of earthing.

### Topic no. 2. - D.C. Motor & Generator

Constructional feature, Generation action, motor action, classification with respect to field connection, Derivation of E.M.F. equation of D.C.Generator significance of back E.M.F. in a motor, speed/torque, load torque characteristics, three point starter, various methods of speed control and application, reversal of direction of rotation of motor.

### Topic no. 3. - Single Phase Transformer

Static device no rotational power loss, construction core type, shell type, principle of E.M.F. production in transformer, number of turns in secondary/primary coil, transformation ratio, step up/step down transformer, E.M.F. equation ideal transformer, vector diagram on no load, behaviour of transformer under loaded conditions, effect of resistive inductive, capacitive load, vector diagram, open circuit and short circuit of transformer, leakage reactance and its effect, auto transformer and its construction, comparision of ratio of weights of auto/conventional transformer, use of auto transformer, different types of transformer and their use, concept of power transformer, impedance transformer, RF & AF transformer.

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### Topic no. 4. - Single Phase Motor

Nature of field produced in single phase motor, constructional feature, schematic representation of two pole motor, principle of single phase motor, double field revolving theory, torque, slip characterstics, starting, split phase motor capacitors start motors, capacitor run motor, capacitor start and run motor, opetation of shaded pole motor, application of servo motor and stepper motor.

### Topic no. 5. - Poly Phase Induction Motor

Principle of operation of 3 phase induction motor, slip, torque (no derivation), starting of induction motor, different methods types of starters, D.O.L/stardelta/resistance starter (contactor with protection circuit) speed control of motors reversal of direction of motor. Name plate specifications, ratings and their applications.

### Topic no. 6. - Measuring with Oscilloscope

Various controls of oscilloscope like intensity focus, vertical position, horizontal position, vertical gain, horizontal gain, vertical attenuation, horizontal sweep, synchronization select. Vertical input, horizontal input, procedure for adjesting oscilloscope controls, visual display of wave form on screen, utility in electronics servicing, measurement of voltage, frequency and phase duty cycle, other application.

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### ADVANCED DIPLOMA IN INDUSTRIAL ELECTRONICS

### FOURTH SEMESTER

### SUBJECT - ELECTRICAL ENGINEERING

### List of Practicals

- Demonstration of circuit protection like fuse, M.C.B. etc.
- 2. Demonstration of artificial respiration process.
- 3. Identification of parts of D.C.machine.
- 4. Speed/Torque charactéristics of D.C.motor.
- Load/Torque characteristics of D.C.motor.
- Demostration of speed control of D.C. motors using various methods.
- 7. (a) Open circuit & short circuit test of single phase transformer.
  - (b) Calculation of various parameters of phasor diagram.
- B. Demostration of single phase motors startingcapacitor, start, capacitor run & capacitor start & run motor.
- Study of DOL, star/delta & resistance starters used for 3 phase induction motors.
- Interpretation of name plate details of various motors, generators etc.
- Measurement of voltage, frequency & phase with the help of CRO.
- 12. Use of various controls of CRO.

### MADRYA PRADESH BOARD OF TECHNICAL EDUCATION, BHOPAL

### Scheme of Evaluation Advanced Diploma in Industrial Electronics

YIII · SEMESTER

Inclustrial

Empiant Training (Duration 16 Weeks)

-	- dimen	Component of Assessment	Marka A. Loted
١.	In Ind	Austry	
	I. 7	Attendance and General discipli	ine 25
		Daily diary maintenance	25
		Smartantive & participative att.	Ituda 50
	IV.	Assessment of training by Indu- Supervisor	etrial 100
1.	In In	atitution	
	V	Training report	100
	VI.	Saminar	50
		Viva-Voce	50
	ATY.	1210-1000	
******	ATT.	Total	400
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### ANNEXUR-A

### Advanced Diploma in Industrial Electronics

### FIFTH SEMESTER

Implant Training (Duration

-=-=-=		
	Component of Assessment Marks	3 3 3
۸.	In Industry	======
	I Attendance and General discipline	25
	II Daily diary Maintenance	25
	III Initiative & Participative attitude	50
	IV. Assessment of Training by Industrial	100
	Supervisor	
B.	In Institution	
	V. Training report	1.00
	VI Seminar	50
	VII Viva-Voce	50
	Total	100
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# ADVANCED DIPLOMA IN INDUSTRIAL ELECTRONICS

(SIXTH SEMESTER)



### STATE CURRICULUM DEVELOPMENT CENTRE

### M.P. BOARD OF TECHNICAL EDUCATION

A/4, OFFICE COMPLEX, GAUTAM NAGAR, BHOPAL - 462023

TEL: (0755) 583656, 583673, 583627

# REPORT ON CURRICULUM DEVELOPMENT WORKSHOP FOR SUBJECTS OF VI SEMESTER FOR ADVANCED DIPLOMA IN INDUSTRIAL ELECTRONICS:

- 1. VENUE : S. V. GOVT. POLYTECHNIC, BHOPAL .
- 2. DURATION: 3 DAYS (14-1-98 TO 16-1-98)
- TIMINGS: 9 HRS. TO 17 HRS.
   Following members attended the workshop:
- Mr. D. M. Deshpande, Senior Research Officer, MACT, Bhopal.
- Mr. Arvind Mittal, Lecturer Electrical Engg. MACT, Bhopal
- Mr. P. K Shrivastava, Expert Teacher, P.D.U.
- Mr. A. S. Rathore, H.O.D. S. V. Govt. Polytechnic, Bhopal.
- Mr. S. D. Burman, I/C H.O.D. Govt. Women Polytechnic, Raipur.
- Mr. D. S. Tomar, Lecturer Govt. Women Polytechnic, Bhopal.
- Mr. Prateek Bajpai, Lecturer Govt. Women Polytechnic, Bhopal.
- Ms. Krishna Singh, Lecturer, S. V. Govt. Polytechnic, Bhopal.
- Ms. Vaishali Sohoni, Lecturer, S. V. Govt. Polytechnic, Bhopal.
- Mr. I. S. Arora, I/C HOD , S. V. Govt. Polytechnic, Bhopal.
- Mr. G. C. Khaira, Reasearch Officer, M.P.B.T.E. Bhopal.
- Mr. T. R. Arora, Deputy Secretary, M.P.B.T.E. Bhopal.

Apart from development of curriculum for various subjects following decisions were taken by the gorup, in respect of:

- (1) Amendements in the, proposed subject-structure prepared by T.T.T.I. Bhopal, for the course and (2) Curriculum development process.
- I. Curriculum for the subject of BUSINESS COMMUNICATIONS, being practiced for Advanced Diploma in Manufacturing Engg., be followed for the course of Industrial Electronics as well.
- II. Being the prerequisite of subjects of VI semester (of this course of Industrial Electronics), the subject Instrumentation [earlier proposed for VI semester of the course] had been shifted to IV semester, based on the recommendations of the development team of IV semester subjects of this course. The curriculum for the

subject INSTRUMENTATION was therefore developed earlier and has been implemented by M.P.B.T.E.

- III. Based on the above and to maintain sequence, the subject of PROCESS CONTROL has been shifted to VI semester in place of the subject INSTRUMENTATION.
- IV. It was discussed at length and consequently decided that in the subject "MINOR PROJECT", emphasis should be given to 'hands on experience'. And accordingly the contents for the subject were suggested in the curriculum.
- V. The group opined that in place of two proposed subjects, namely (1) Power Electronics II & (2) Industrial Electronics -II only one merged subject of the name. Industrial Electronics-I be taught, keeping in view the earlier merger of Power Electronics -I and Industrial Electronics -I into Power Electronics at level of IV semester, & restructured subject of Industrial Electronics -II at the level of VII semester.

In light of above important facts curriculum for following four subjects were developed.

- 1. MICROPROCESSOR I 2. Industrial Electronics I
- 3. Process Control 4. Minor Project.

The contents of each subject were developed by separate subgroups, after discussing various aspects related to curriculum development, with the members and on reaching to common final opinion. The group has tried to incorporate all possible aspects presented by AICTE in this regard.

The group has unanimously proposed following revised subject structure along with the scheme of studies & Examination for the VII semester of this course:

- Microprocessor II
- 2. Industrial Electronics II
- 3. Computer Application
- 4. Electronics Rapair, Maintenance & Testing Workshop
- Industrial Management.
- 6. Major Project (Entrepreneurship)

Co-ordinator

### परिशिष्ट-2

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आज दिनांक 21.1.98 को इंडस्ट्रीयल इलेक्ट्रॉनिक्स की बोर्ड आफ स्टडीज़ की बैठक शास. स.व. पोलिटेक निक, भोपाल में उ बजे आयो जित की गई । बैठक में निम्न सदस्य उप स्थित रहे :-

- श्री यू.के. जैन, संयोजक, प्राचार्य शास.पोली. भोपाल. 1.
- श्री के सी. महाजन, 2. सदस्य
- श्री आई. एस. अरोरा -तथेव-3.
- श्री एत.डी. बर्मन 40 -तथैव-
- श्री पी.के. श्रीवास्तव 5. विषय विशेषज्ञ पी.डी.यू. विशेष आमं त्रित
- श्री टी. आर. अरोरा उपसचिव, तकनीकी शिक्षा मण्डल, भोपाल. 6.

सदस्यों ने छटवें एवं सातवें सेमस्टर की पढ़ाई एवं परीक्षा योजना एवं प्रत्येक विषय के पाठ्यक्रम का विस्तृत अध्ययन किया । समिति पाठ्-यक्रम को अनुमोदित करती है लाथ ही समिति इस पाठ्यक्रम को तत्काल लागू करने की अनुशंसा करती है।

१्य. के. जैन१ संयोजक

सदस्य

१ँके. सी. महाजन१ १आई. ए. अरोरा१ १एस. डी. वर्मन१ सदस्य सदस्य

# MADHYA PRADESH BOARD OF TECHNICAL EDUACATION, BHOPAL

# ADVANCED DIPLOMA PROGRAMME IN INDUSTRIAL ELECTRONICS ( To be introduced from 1998-99 )

VI SEMESTER

SCHEME OF STUDIES AND EXAMINATION TOTAL TIME FOR SEMESTER = 16 WEEKS @ 36 PERIOD PER WEEK

NATION

TOTAL HOURS = 576

1. No. of Theory Paper 2. Total Theory Marks 3. No. of Practical S 4. Total Practical Marks 5. Inplant Training Marks 6. Total Marks of Sessional + Prog. Assessment + Pract & Inplant Training	1. MICROPROCESSOR - 1 2. INDUSTRIAL ELECTRONICS - 1 3. PROCESS CONTROL 4. BUSINESS COMMUNICATION 5. MINOR PROJECT TOTAL	NO NAME OF SUBJECT
04 7. 400 7. 200 8 7	CONTENT HRS PER WEEK (SEMESTER)  THEORY LAB TOTAL  5 (80) 3 (48) 8 (128) 6 (96) 3 (48) 9 (144) 6 (96) 3 (48) 9 (144) - 4 (64) - 4 (64) - 4 (64) - 6 (96) 3 (96) 36 (576)	SCHEME OF STUDY
Ratio of Theory Marks and (Sessional+Prog Assess+ Practical+Inplant Training Ma		Ydv
2 \	SESSIONAL MARKS  TERM LAB WORK  20 2	
400/ss	PROGRESSIV E  ASSIGNMENT  1	
9.	THEORY DURA MKS PAPER - HRS 100 L  1 3 Hrs 100 L  1 3 Hrs 100 L  1 3 Hrs 100 L	SCHEME
PASSING MARKS FOR (a) Theory (b) Practicals (c) Sessionals (d) Inplant Trg 50% (d)	DURA M -HRS 3 Hrs 10 3 Hrs 10	S S S S S S S S S S S S S S S S S S S
(P) (G)	BOARD EXAMINATION  MKS PRAC DURA TICA -HRS.  100 1 3 Hrs. 100 1 3 Hrs. 100 1 3 Hrs. 100 1 3 Hrs.	
Hechse From 1998-99 SELLAR K. Jahn KS FOR SECULARIA  - 33% - 40% - 50%	MKS 50 50 50	
200	REMARKS	

# M. P. BOARD OF TECHNICAL EDUCATION ADVANCED DIPLOMA IN INDUSTRIAL ELECTRONICS VI - SEMESTER

NAME OF SUBJECT: MICROPROCESSOR - I

### Rationale

Microprocessors have already had far-reaching effects in almost every industry. New processors, New Hardware & their relevant Software intended for use with Microprocessor and new Microprocessor based commercial products are coming up in the market.

Although 32 Bits Microprocessors have become popular for increasing processing capacity requirements but study of 8 Bit Microprocessor is essential because it is easily available and its architecture is easily understandable for beginners.

The Microprocessor fabrication uses the latest logic concept which are essential components of present advanced electronics circuits and signal processing system to meet the technological advancements in the field of electronics, Computer Technology and present Industrial requirements.

So the content of the subject is prepared with above view and divided into five chapters. Some practical programs and instructions for Lab-Work being included with reference to 8 bit Microprocessor mainly.

### NAME OF SUBJECT: MICROPROCESSOR - I

### SCHEME OF STUDIES AND SPECIFICATION TABLE

S.	Topic	Hrs. of Study			K	С	A	Total
No.	The second	Th.	Pr.	Total	-			Total
1.	Introduction	10	Nil	10	5	Nil	Nil	5
2.	Introduction to 8085 Microprocessor	20	Nil	20	10	10	Nil	20
3.	8085 Programming	20	48	68	15	10	5	30
4.	Interfacing & Memory Devices	15	Nil	15	15	10	Nil	25
5.	Basic features of other Microprocessor	15	Nil	15	10	10	Nil	20
	Total	80	48	128	55	40	5	100

Abbreviations

K KNOWLEDGE

C COMPREHENSION

A APPLICATION

# M. P. BOARD OF TECHNICAL EDUCATION ADVANCED DIPLOMA IN INDUSTRIAL ELECTRONICS VI - SEMESTER

### NAME OF SUBJECT: MICROPROCESSOR - I

### Content Outlines (Syllabus)

	Topic Details	Hours of Study
1.	Unit - 1	T+P=Tota
	Introduction	10+0=10
	Microprocessor, Block-Diagram of Microprocessor, Comparison of Microprocessor 8-bit, 16-bit, 32-bit.	
2.	Unit - 2	20+0=20
	Introduction to 8085 Microprocessor	
	Features of 8085 Microprocessor, Block-Diagram & Pin-Diagram of 8085, Address-bus, Data-bus, Controlbus, Various registers, Flags, Timing and control signal, ALU, Memory Mapped I/O, interrupt, Timing-diagrams.	
3.	Unit - 3	20+48=68
	8085 Programming	
	Machine level language, Assembly language & High Level Language, Instructions, Instruction formats, Addressing mode arithmetic instruction, Branching instruction. Logical instruction, Machine control Instructions, Subroutines, Development of simple Assembly Language Programs.	

VI - SEMESTER

31/126

NAME OF SUBJECT: MICROPROCESSOR - I

### Content Outlines (Syllabus)

Topic No.	Topic Details	Hours of Study T+P=Total
4.	Unit - 4	15+0=15
	Interfacing Memory and I/O devices	
	Brief introduction to Data Transfer Schemes, Synchronous data transfer, Asynchronous data transfer, Hand-Shaking, Interrupt driven data transfer, priority interrupt, Vector-interrupt, Software Polling, Hardware Polling, Direct Memory Access (DMA) data transfer, serial data transfer.	
5.	Unit - 5	15+0=15
	Basic features of other microprocessors	
	8 Bit Microprocessor Z-80, 6800 16 Bit Microprocessor 8086, 68000 32 Bit Microprocessor 80286, 80386.	
	Single chip micro computer (8051)	
	Brief study of Semi Conductor logic technology with reference to microprocessor.	

VI-SEMESTER

### LIST OF PRACTICALS

### 31/127

### NAME OF SUBJECT: MICROPROCESSOR - I

Topic No	Topic Details	Hours of Study T+P=Total
1.	Study of 8085 Microprocessor Kit.	
2.	Writing of small segment of Program for understanding & verification of the task of the following instruction.  MOV, MVI, LXI, LDA, STA, ORA, RLC, ADI, CALL,  CMA, DAD, INX, JC, CDA, LHLD, PUSH, POP etc.	
	For example: To verify the operation of the instruction MOV B, C, the student may write the following segment of program.  MVI C, 32 H  MOV B, C	
	Student will execute then above segment of program & verify that B contains the data (=32) which was loaded in register C.	
3.	Taking some program & anticipating the contents of various register, output port (if any), memory location.  Example:  Take the following programme.  MVI A, 8 F H  MVI B, 6 8 H  SUB B  ANI 0F H	
-	STA 2070 H HLT	

VI - SEMESTER

31/128

### LIST OF PRACTICALS

### NAME OF SUBJECT : MICROPROCESSOR - I

Topic No	Topic Details	Hours of Study T+P=Total
4.	Student should first anticipate the contents of register A, B & flag register and memory location (2070 H). Then he should actually run the program & verify then contents of register (A&B) and memory location 2070 H.  Write 8085 assembly language program for the solution of some of the problems involving the:	111-10(4)
	<ol> <li>Addition</li> <li>Subtraction</li> <li>Logical AND, OR, NOT</li> <li>Branching.</li> </ol>	

### REFERENCES

- Microprocessor Architecture, programming and application, Ramesh Gaonkar, Wiely Eastern Ltd. 2nd edition.
- 2. Introduction to microprocessor, Aditya P. Mathur, TATA MCGraw Hill Publishing Book Company.
- Introduction to microprocessors: Software, Hardware Programming, Lance A Leventhal, Prentice Hall of India.

VI - SEMESTER

### LIST OF PRACTICALS

### NAME OF SUBJECT : MICROPROCESSOR - I

Topic No	Topic Details	Hours of Study T+P=Total
4.	Student should first anticipate the contents of register A, B & flag register and memory location (2070 H). Then he should actually run the program & verify then contents of register (A&B) and memory location 2070 H.  Write 8085 assembly language program for the solution of some of the problems involving the:	1 · 1 · Iotal
	<ol> <li>(1) Addition</li> <li>(2) Subtraction</li> <li>(3) Logical AND, OR, NOT</li> <li>(4) Branching.</li> </ol>	

### REFERENCES

- Microprocessor Architecture, programming and 1. application, Ramesh Gaonkar, Wiely Eastern Ltd. 2nd edition.
- Introduction to microprocessor, Aditya P. Mathur, 2. TATA MCGraw Hill Publishing Book Company.
- Introduction to microprocessors: Software, Hardware 3. Programming, Lance A Leventhal, Prentice Hall of India.

# M.P. BOARD OF TECHNICAL EDUCATION, BHOPAL ADVANCED DIPLOMA IN INDUSTRIAL ELECTRONICS VI TH SEMESTER 31/129 SUBJECT: INDUSTRIAL ELECTRONICS-1

### RATIONALE

Modern Industries require various types of precise control at different stages in the process of production of Engineering and non-Engineering consumable, non-consumable and other products required in the market.

Precise control of temperature along with full control over various aspects in heating and welding is one requirement of the industry. Whereas, full control of speed, torque, output and duty cycle of ac and dc motors is another requirement in various machining operations for all types of industries.

In modern times these controls are achieved mainly by the solid state power devices as such a deep knowledge of solid state power devices and their control is of great importance in the advanced industrial electronics engineering courses.

In this syllabus main emphasis has been given to the dc applications of industrial electronics leaving the ac applications of industrial electronics to be covered in the next semester.

# M.P. BOARD OF TECHNICAL EDUCATION, BHOPAL ADVANCED DIPLOMA IN INDUSTRIAL ELECTRONICS VI TH SEMESTER SUBJECT: INDUSTRIAL ELECTRONICS – 1

### SCHEME OF STUDIES AND SPECIFICATION TABLE

S.	TOPIC	HOURS	OF	STUDY	K.	C	A	TOTAL
No.		Th.	Pr.	Total				
.1.	Review of S.C.R.	25	20	45	15	10	5	30
2.	Commutation	15	4	19	10	4	2	16
3.	Chopper	15	8	23	15	5	3	23
4.	Applications – I	25	8	33	7	8	8	23
5.	Applications - II	16	4	20	3	3	2	8
	Total	96	48	144	50	30	20	100

### Abbreviations:

K : Knowledge

C : Comprehension

A: Application

# M.P. BOARD OF TECHNICAL EDUCATION, BHOPAL ADVANCED DIPLOMA IN INDUSTRIAL ELECTRONICS VI TH SEMESTER

SUBJECT: INDUSTRIAL ELECTRONICS - 1

### CONTENT OUTLINES (SYLLABUS)

TOPIC TOPIC DETAILS HOURS OF STUDY

T+P = TOTAL

### L Review Of SCR:

Characteristics, working principle, specifications, calculation of average value, rms value, form factor, ripple factor, efficiency, TUF of single phase HW and FW controlled convertors on various loads, use of free wheeling diode, methods of turn-on, different triggering methods – R, RC, UJT, Schmitt trigger.

25+24=49

### 2. Commutation:

Definition, types – Natural and Forced commutation, classification – Class A, Class B, Class C, Class D, Class E, Class F.

15+4 = 19

### 3. Chopper:

Definition, Principle of working, chopper configurations

- Type A, Type B, Type C, Type D, Type E; Jone's

Chopper, Morgan's Chopper, Step-Up and Step-Down Chopper, Simple applications of chopper.

15+8=23

### 4. Applications - 1:

D.C. Drives: Introduction, dc motor control
characteristics, 4 quadrant operation, Single phase drive
– half controlled, fully controlled, dual converter
controlled, Three phase drive – half controlled, fully
controlled, dual converter controlled, chopper
controlled dc drive.

25+8=33

### 5. Applications-II:

Battery charger, temperature control, concept of use of power electronics in heating and welding.

16+4 = 20

TOTAL:

96+48 = 144

# ADVANCED DIPLOMA IN INDUSTRIAL ELECTRONICS VI TH SEMESTER 3//133

# SUBJECT: INDUSTRIAL ELECTRONICS – I LIST OF PRACTICALS

Ο.	TRACTICAL DETAILS	HR
NO.		
1.	Study of personal safety rules.	1
2.	Measurement of holding and latching current of a given SCR.	2
3.	Study of UJT triggering circuit and observation of waveforms at	
	various stages.	3
4.	Study of resistance triggering circuit and observation of waveforms at	
	various stages.	3
5.	Study of RC triggering circuit and observation of waveforms at	
	various stages.	3
6.	Observation and analysis of waveforms on single phase half	
	controlled converter with inductive load ( with and without free	
	wheeling diode)	3
7.	Observation and analysis of waveforms on single phase fully	
	controlled converter with inductive load ( with and without free	
	wheeling diode)	3
8.	Study of principle of forced commutation.	3
9.	Study and observation of waveforms of Jone's Chopper.	3
10.	Study and observation of waveforms of Morgan's Chopper.	3
11.	Speed Control of dc motor using single phase converter.	3
12.	Speed Control of dc motor using Chopper.	3
13.	Study of Battery Charger.	3
	TOTAL:	48

# M.P. BOARD OF TECHNICAL EDUCATION, BHOPAL ADVANCED DIPLOMA IN INDUSTRIAL ELECTRONICS VI TH SEMESTER 31/134

### SUBJECT: INDUSTRIAL ELECTRONICS - I

### REFERENCES (BOOKS)

### S.No. TITLE

### AUTHOR/PUBLISHER

- Power Electronics by Dr. P.S. Bimbhra, Pub Khanna Publications.
- Power Electronics by P.C. Sen, Pub Tata McGraw Hill.
- 3. Power Electronics by C.Y. Lander, Pub Tata McGraw Hill.
- Power Electronics Circuits, Devices and Applications by M.H. Rashid, Pub –
   Prentice Hall Of India.
- Industrial and Power Electronics by Harish C. Rai, Pub Umesh Publication,
   Delhi.
- 6. Thyristor Engineering by M.S. Berde, Pub Khanna Publications.

# M. P. BOARD OF TECHNICAL EDUCATION ADVANCED DIPLOMA IN INDUSTRIAL ELECTRONICS VI - SEMESTER 31//35

NAME OF SUBJECT: PROCESS CONTROL

### Rationale

Process control is one of the most vital field in almost every industry for the process line control. New controllers like PID & PLCs have come up in a big way in the industries, hence their knowledge is very essential.

For a professional in industrial electronics field, the concept and application of various controlling techniques and controllers, such as PID, PLC etc. are very essential to discharge their functions effectively and efficiently.

The contents of the subject is prepared with a view stated above and are divided into five chapter. Some practical experiences to be performed and references to be used are mainly incorporated in order to give complete guidelines. The main emphasis is put on the controller application side which will, in fact provide much more adaptability to the student in industries.

VI - SEMESTER 3//136

### NAME OF SUBJECT: PROCESS CONTROL

### SCHEME OF STUDIES AND SPECIFICATION TABLE

S.	Topic	Hrs. of Study		itudy	K	C	A	Total
No.		Th.	Pr.	Total				
1.	Introduction to Controller system	20	-	20	10	03	-	13
2.	Laplace Transforma- tion and Time Domain	12	-	12	10	-	-	10
3.	PID Controllers	26	20	46	08	10	10	28
4.	PLC	30	20	50	08	15	10	33
5.	Process Control System	08	08	16	06	-	10	16
		96	48	144	42	28	30	100

Abbreviations

K KNOWLEDGE

C COMPREHENSION

A APPLICATION

VI-SEMESTER 31/137

### NAME OF SUBJECT: PROCESS CONTROL

Topic No	Topic Details	Hours of Study T+P=Total
1.	Introduction to Control System	20+0=20
	Concept of Drawns & Control C	
	Concept of Process & Control System.  Various Control System	
	Open Loop Control System.	
	Close Loop Control System.	
	Block diagram,	
	Transfer Function.	
	Gain of Control System.	
	Open Loop Gain & Close Loop Gain.	
	Salient features of various Control System in process	
	line.	
	Concept of Analogy and Analogical Transformation	
	Stability of a Control System. ( Absolute, Relative &	
	Marginal)	
	Automatic Regulating System.	
1 1 1 1 1 1	Adaptive Control System, Distributed Control System.	
	Devices/ Components used in Control System.	
	Sensors, Detectors, Actuators etc.	
2.	Laplace Transformation & Time Domain Response	12+0=12
	Laplace Transformation and its utility.	
	Time Domain behavior in Control System.	
1 3 1	Steady state and Transient Response.	
	Test Sionals	
	Unit STEPS, Unit RAMP, Unit IMPULSE Signal.	
	Routh-Hurwit'z stability criterion and Root-Locus con-	
1 11 11	cept.	
411	NOTE: No mathematical treatment or derivation, only	
The state of the s	conceptual definition, figure, and final equation	

VI - SEMESTER 31/138

### NAME OF SUBJECT : PROCESS CONTROL

Topic No	Topic Details	Hours of Study T+P=Total
3.	P.I.D Controllers	26+20=46
	Concept of Proportional, Integral, Derivative Control action Pl and PID Control action.	
	PID parameters and their significance, Input/ Output characteristics.	
	Selection criteria for control action, in any process.	
4.	PLC	30+20=50
	Various Electrical Control Systems.  Matrix Board / Selector Switch connections in Industrial Control Sequence.  Hardware Connection in Control Sequence.  Concept of PLC and its features.	
	Various Types of PLCs  Compact Type / Modulator Type.	
	Internal Block Diagram of a PLC.  Components of a PLC i.e. Sensor, Timers, Counters,	
	Actuators, Programmer etc.  Specification of a Typical PLC.	

VI - SEMESTER

### NAME OF SUBJECT : PROCESS CONTROL

Topic No	Topic Details	Hours of Study T+P=Total
5.	PROCESS CONTROL SYSTEM	8+8=16
	Programming of a PLC.	THE PERSON
	Ladder Programming	-
	Statement List.	
	Control Signal Flow.	A CONTRACTOR
	Criteria for Selecting a PLC in any process.	
	Total	96+48=144

# M. P. BOARD OF TECHNICAL EDUCATION ADVANCED DIPLOMA IN INDUSTRIAL ELECTRONICS

VI - SEMESTER

### NAME OF SUBJECT : PROCESS CONTROL

### LIST OF PRACTICALS (TOTAL 48 HRS.)

- Study of Proportional Control action and Input/ Output characteristics of a controller.
- Study of Integral Control action and Input/ Output characteristics of a controller.
- Study of Derivative Control action and Input/ Output characteristics of a controller.
- Study of PI Control action and Input/ Output characteristics and compare the control action with P, I and D controller.
- Study of PID Control action and Input/ Output characteristics and compare the control action with all other P, I, D and PI controller.
- 6. Study of control action of Pressure Controlled Flow using PID.
- 7. Study the control action of Liquid Controlled Flow using PI/ PID Controller.
- 8. Control the speed of a DC-Motor using PLC and STL Programming.
- 9. Control the speed of a DC Motor using PLC and Ladder Programming.
- 10. Write Programme for different motor control using PLC (i.e. Star-Delta Starter Operation, Speed Reversal etc.)
- 11. Write Programme for different Mech./ Electrical/ Chemical Processes line using PLC

NAME OF SUBJECT : PROCESS CONTROL

### REFERENCE BOOKS

- Programmable Logic Controllers "Basic Level".
   Text Book TP-301 by Festo- Dieluctic Publication.
- 2. Modern Control Engineering by K. Ogata, Prentice Hall of India Ltd.
- 3. Control System Engineering by Nagrath & Gopal, Willey Eastern Ltd.
- 4. Automatic Control System by B. C. Kuo,
- Industrial Automation Circuit Design and Components (For PLC)
   by- David W. Pessen, Prentice Hall of India Ltd.
- Programmable Counters Hardware, Software & Application.
   by- George L. Bulten, Jr. M/c Graw- Hills.

## SUBJECT:- BUSINESS COMMUNICATION SCHEME OF STUDIES

S.No.	Topics	Theory Hours	Total Hours
1.	Communication	14	14
2.	External Barriers	12	12
3.	Oral Communication	. 08	08
4.	Professional Interviews	10	10
5.	Written Communication	20	20
Total		64	64

## M. P. BOARD OF TECHNICAL EDUCATION ADVANCED DIPLOMA IN INDUSTRIAL ELECTRONICS VI - SEMESTER

#### **BUSINESS COMMUNICATION**

#### TOPIC 1:- COMMUNICATION

Definition-nature-importance to Managers communication theories and process-symbolic interactionalism-Information theory-Interaction theory-transaction theory-elements of communication process Importance, feedback.

#### TOPIC 2:- EXTERNAL BARRIERS

Psychological barriers-linguistic barriers-Mechanical barriers-making communication effective.

Communication methods - oral media, written media, non verbal communication.

#### TOPIC 3:- ORAL COMMUNICATION

Speeches for different occasions-guidelines-listening value problem and guidelines-Interview-types of information.

#### TOPIC 4:- PROFESSIONAL INTERVIEWS

Interview process-problems-guidelines-group discussions - purpose and problem guideline. Conference responsibility of chairmen and participant, effective use of non verbal communication.

#### TOPIC 5:- WRITTEN COMMUNICATION

Writing techniques and guidelines - letter writing - basic principles - purpose - types of business letter - handling negative ideas effectively - report writing, types of reports - structure of report - drafting report.

## M. P. BOARD OF TECHNICAL EDUCATION ADVANCED DIPLOMA IN INDUSTRIAL ELECTRONICS VI-SEMESTER

#### SUBJECT :- BUSINESS COMMUNICATION

#### BOOKS RECOMMENDED:

- Jerry C. Voffered, A Gerloff & REbert C. Cumins: Organisational communication, Mcgraw Hills New York.
- Haston, Sandberg & Mills : Effective speaking in Business prentice Hall, New York.
- George L Mornisey :
   Effective business and technical presentations, Addission wesley Publn.,
   Co., London.
- 4. Raymond Lesikar :- Busi. Commn., Theory & Practice.
- 5. Essential of Business Communication by Rajendra Pal, & J.S. Korlahalli.
- 6. Business Communication U.S. Rai & S.N. Rai.
- 7. Business Communication Nomai Pradhen, D.S. Bhende, Vijay Thakur.

## M. P. BOARD OF TECHNICAL EDUCATION. ADVANCED DIPLOMA IN INDUSTRIAL ELECTRONICS VI - SEMESTER

NAME OF SUBJECT: MINOR PROJECT

#### Rationale

Project work leads the student to develop his original thinking, group discussion, interpersonal relation and entrepreneurship ideas and polishes his behaviour in the work environment.

The student can exhibit his creativity, knowledge and skill through the project work.

Keeping in view this fact it is aimed that the student shall make layout, construct; test and produce results for any one electronic circuit based on the curriculum.

With this view, project work may not be bound in any limit & boundary and therefore only certain guidelines have laid down for Minor Project Work.

### M. P. BOARD OF TECHNICAL EDUCATION ADVANCED DIPLOMA IN INDUSTRIAL ELECTRONICS

#### VI - SEMESTER

#### MINOR PROJECT

#### SUGGESTED AREA FOR PREPARATION OF MINOR PROJECT

Identification of project based on curriculum depending upon the availability of material component and facilities in the Institutions, keeping in mind the latest developments in new areas.

- Collection of latest information pertaining to the project.
- Design of circuit for the desired objective, through software or otherwise.
- Selection of components.
- Selection and use of Tools & Test Measuring Equipments.
- HARDWARE Design & Fabrication
- Fabrication of Cabinet / Housing and Mounting of control and display devices including drawing of wiring diagram, test points at intermediate stages.
- Testing of Project / Product.
- Making cost analysis of the project.
- Writing of project report and Presentation / Seminar.

#### REFERENCES

- Electronics Magazines & Journals.
- Industrial Visits.
- 3. Entrepreneurship Development Board Magazines.
- Data Books, Data Sheet for various Electronic Components.

CURRICULUM 31/147

## ADVANCED DIPLOMA IN INDUSTRIAL ELECTRONICS

(SEVENTH SEMESTER)



#### STATE CURRICULUM DEVELOPMENT CENTRE

#### M.P. BOARD OF TECHNICAL EDUCATION

A/4, OFFICE COMPLEX, GAUTAM NAGAR, BHOPAL - 462023 TEL: (0755) 583656, 583673, 583627

#### REPORT ON CURRICULUM DEVELOPMENT WORK-SHOP For Subjects of VII-Semester

AdvancedDiploma in "INDUSTRIAL ELECTRONICS"

A curriculum development workshop has been organised by MLP.Bbandi DA Dechnicali Education, Bhopal at the premises of S.V.Govt. Polytechnic, Bhopal from 19.01.1998 to 21.01.1998 for VII-Semester in "Advance Diploma in INDUSTRIAL ELECTRONICS", exclusively being run at Govt. Polytechnic, Dhar, M.P.

A number of various teachers / lecturers from the various institutions and various stream of Engineering have actively participated and carried the work of curriculum development in different subjects of the said course. The group consisted of following members:

Mr. A.S.Rathore, 1. HDD(Maint.), S.V.Govt. Poly., Bhopal Mr. I.S. Aroxa, I/c.HOD(Elx.), S.V.Govt. Poly., Bhopal 3. Mr. K.C.Somaiya, Lect.(Elect.), S.V.Govt. Poly., Bhopal Mrs. ShobhmaUpadhyayay, Lect. (Mech.), S.V.Govt. Poly., Bhopal 4. Ms. Krishna Singh, Lect. (Elect.), S.V. Govt. Poly., Bhopal Ms. Vaishali Sohoni, Lect. (Elect.), S.V. Govt. Poly., Bhopal 5. 6. 7. Lect. (Comp.), S.V.Govt. Poly., Bhopal Mr. Prateek Bajpai, Lect. (Comp.), Govt. Women's Poly., Bhopal Mrs. Deepa Tuli, Lect.(Elx.), Govt.Women's Poly., Bhopal 10. Ms. Pushpa Vaswani, Lect. (Comp.), Govt. Women's Poly., Indore 11. Mr. G.C.Khaira, Research Officer, MPBTE, Bhopal 12. Mr. S.D. Burman, I/c.HOD(Elx.),Govt.Women's Poly., Raipur

Apart from the curriculum the group has rigourously discussed on Subjects, Topics and Scheme of studies and brought out the common theme in the print-out. The subject structure proposed for VII-Semester by the previous group of VI-Semester Workshop was accepted by this group also.

Keeping in mind the aforesaid facts and the guidelines of AICTE for the curriculum, the working group has prepared the following subjects' curriculum for the approval of "Board Of Studies".

- 1. Microprocessor-II
- 2. Industrial Electronics-II
- 3. Computer in Industry
- 4. Electronics Repair, Maintenance & Testing
- 5. Industrial Management
- 6. Major Project. [Entrepreneur dip]

Dated : 21.01.1998

Bhopal.

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- 7. Lect. (Comp.), S.V.Govt. Poly., Bhopal Mr. Prateek Bajpai, Lect. (Comp.), Govt. Women's Poly., Bhopal 8.
- 9. Mrs. Deepa Tuli, Lect. (Elx.), Govt. Women's Poly., Bhopal
- 10. Ms. Pushpa Vaswani, Lect. (Comp.), Govt. Women's Poly., Indore 11. Mr. G.C.Khaira,
- Research Officer, MPBTE, Bhopal 12. Mr. S.D. Burman, I/c. HOD(Elx.), Govt. Women's Poly., Raipur

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- 1. . Microprocessor-II
- 2. Industrial Electronics-II
- 3. Computer in Industry
- 4. Electronics Repair, Maintenance & Testino
- 5. Industrial Management
- Major Project. [Entrepreneur dip] 6.

Dated: 21.01.1998

Bhopal.

Co-Ordinator (T.R. ARORA)

#### परिशिष्ट-2

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आज दिनांक 21.1.98 को इंडस्ट्रीयल इलेक्ट्रॉनिक्स की बोर्ड डीज़ की बैठक शास. स.व. पोलिटेकनिक, भोपाल में 3 बजे की गई । बैठक में निम्न सदस्य उपस्थित रहे :-

श्री यू. के. जैन, संयोजक, प्राचार्य शास.पोली. भोपाल.

श्री के. सी. महाजन, सदस्य

श्री आई. एस. अरोरा -तथैव-

श्री एत.डी. बर्मन -तथैव-

श्री पी.के. श्रीवास्तव विषय विशेषज्ञ पी.डी.यू. विशेष

आमंत्रित

श्री टी. आर. अरोरा उपसचिव, तकनीकी शिक्षा मण्डल, भोपाल.

सदस्यों ने छटवें एवं सातवें सेमस्टर की पढ़ाई एवं परीक्षा योजना वं प्रत्येक विषय के पाठ्यक्रम का विस्तृत अध्ययन किया । सिमिति पाठ्-क्रम को अनुमोदित करती है साथ ही सिमिति इस पाठ्यक्रम को तत्काल ्यू करने की अनुशंसा करती है ।

्र के. जैन§ जक §के. सी. महाजन§ सदस्य १ँआई. ए. अरोरा१ १ एस. डी. बर्मन१ँ सदस्य सदस्य

( To be introduced from 1998)

## VII - SEMESTER

# SCHEME OF STUDIES AND EXAMINATION

NOTE:-	П			2 2		3 00		2 101			NO S
No of Theory Paper Total Theory Marks No of Practicals Total Practical Marks Indian Transport Marks		TOTAL	(ENTREPRENEURSHIP)	NOUSTRIAL MANAGEMENT	MAINTENANCE & TESTING	COMPUTER IN INDUSTRY	II	INDISTRIAL ELECTRONICS			NAME OF SUBJECT
500 500 05 300		17 (272)		4 (64)	2 (32)	4 (64)	4 (04)	3 (48)	INDOK! LAB	CONTEN	SCHE
		19 (304)	9 (144)		3 (48)	2 (32)	2 (32)	3 (48)	LAB	CONTENT HRS. PER WEEK (SEMESTER)	SCHEME OF STUDY
Ratio of Theory Marks and ( Sessional+Prog. A Practical+Inplant Train Total Marks		36 (576)	9(144)	4 (64)	5 (80)	6 (96)	6 (96)	6 (96)	TOTAL	R WEEK	UDY
Ratio of Theory Marks and ( Sessional+Prog. Assess+ Practical+Inplant Training Marks ) i.e. Total Marks		120	20	20	20	20	20	20	WORK	SESS	
Assess+ ning Marks	180	+60-	100		20	20	20	20	WORK	SESSIONAL MARKS	
ie	50	\$	#	10	01	10	10	10	-	PROGRESSIV E ASSIGNMENT	
500 / 700	500	\$	10	10	10	10	10	10	=	PROGRESSIV E ASSIGNMENT	
.0	Corrected on 1/1/98 and made e	5				-	-	-	THEORY		SCHEME OF EXAMINATION
PASSING MARKS FOR (a) Theory - 33% (b) Practicals - 40% (c) Sessionals - 60% (d) Inplant Trg 50%	on 1/2/9			1 Har	3 Hrs.	2 11	3 Hrs	3 Hrs	DUR A-		OF EXAN
MARKS  nals  t Trg	gand.	500	. 100	100	100	100	100	100	MKS	BOAR	IINATIC
FOR 13% 40% 60% 50%	mode	^	- ,		-	-	-	-	PRAC	D EXAM	Z
1.5			3 Hrs		3 Hrs	411	3 Hrs	3 Hrs	DUR	BOARD EXAMINATION	
	16 pm	200	100		50		50	50	MKS	2	
	Hective from 1298-99								REMARKS		

91/18

## M. P. BOARD OF TECHNICAL EDUCATION ADVANCED DIPLOMA IN INDUSTRIAL ELECTRONICS VII - SEMESTER

NAME OF SUBJECT : MICROPROCESSOR - II

RATIONALE

Electronics, Particularly Microelectronics Technology is advancing rapidly day by day. There is tremendous growth and advancement in microprocessor and computer technology too. Industries are being rather forced to tune with the Microprocessor Technological revolution and advancement.

So educational institution are required to align with this industrials and technological development. Thus it is very necessary to include the advanced microelectronics and microprocessors in the curriculum, theoretically as well as practically.

In this microprocessor-II Curriculum more emphasis is given to the study of readily available 16- bit microprocessor, interfacing devices and techniques. Introduction to advance microprocessor like Pentium is also covered.

#### M. P. BOARD OF TECHNICAL EDUCATION ADVANCED DIPLOMA IN INDUSTRIAL ELECTRONICS

VII - SEMESTER 2 31/152

#### NAME OF SUBJECT : MICROPROCESSOR-II

#### SCHEME OF STUDIES AND SPECIFICATION TABLE

S. No.	Topic	Н	rs. of	Study	K	C	A	Total
		Th.	Pr.	Total				Joran
1.	Memory Interfacing	4	0	4	5	5	-	
2.	Programmable Interface Serial I/O and Data	10	0	10	10	5	5	20
.	Communication	6	0	6	5	5	5	15
1.	Introduction to 8086	10	0	10	5	5	5	15
	Programming Application of	8	24	32	5	5	5	15
18	8085/ 8086	6	24	30	3	2	5	10
-   1	Advanced Microprocessor	4	0	4	5	5	0	10
-		48	48	96	38	32	30	100

Abbreviations : K- KNOWLEDGE

C- COMPREHENSION

A- APPLICATION

#### M. P. BOARD OF TECHNICAL EDUCATION

#### ADVANCED DIPLOMA IN INDUSTRIAL ELECTRONICS

VII - SEMESTER

31/153

Topic No	Topic Details	Hours of Study T+P=Total
1.	Memory Interface	4 + 0 = 4
	- Basic concepts in memory interfacing,	
	- Memory map and addressing decoding,	
	- Interfacing EPROM and R/W memory	
2.	PROGRAMMABLE interface devices	10 + 0 = 10
	- Basic concepts in programmable devices,	
į	- 8155/8156 the multipurpose programming devices,	
	- Block diagram ,	
- 1	- Control word ,	
	- Application of 8155: interfacing, seven segment LED	
	display etc	
	- 8255: programmable peripheral interface,	
	-Block diagram,	
	- Control word ,	
	- Different modes of operation : mode 0,1,2,	
	- Configuring 8255 in each of the three modes,	
	- 8254 : Programmable interval timer,	
	- Block diagram,	
	- control word ,	
	- study of different modes of operation,	
	-8257: Programmable DMA Controller	
	- Block diagram	
i	- Control Word	
i	- 8259: Programmable Interrupt Controller	
1	- Block diagram	
1	- Control Word	
	- Programming 8259	

#### M. P. BOARD OF TECHNICAL EDUCATION

#### ADVANCED DIPLOMA IN INDUSTRIAL ELECTRONICS

VII - SEMESTER 31/154

Topic No	Topic Details	Hours of Study T+P=Tota
	- 8279: Programmable Key board/ display controller - Block diagram - Control Word - Programming 8279	6+0=6
3.	Serial I/O and data communication, -Basic concepts in serial I/O, - comparison of various serial I/O standards, - Hardware controlled serial I/O using 8251: - 8251 programmable communication interface,	10 + 0 = 10
	<ul> <li>Block diagram ,</li> <li>Mode word format ,control word format , status word format</li> </ul>	
4.	Introduction to 8086 & its coprocessor  The internal architecture of 8086  The BIU: the queue, segment register, instruction pointer.  The E.U. Control circuitry, instruction decoder and ALU  flag register, general purpose registers, stack pointer registers, other pointer and index register.  Memory organisation in 8086  Accessing a byte, even addressed word or odd addressed word  Use of 8086 Max/Min mode  Various interrupt of 8086  8086 address and data bus concepts  clock generator for 8086.  Segmentation of memory in 8086.	8 + 24 = 32

### M. P. BOARD OF TECHNICAL EDUCATION ADVANCED DIPLOMA IN INDUSTRIAL ELECTRONICS

VII - SEMESTER

Topic No	Topic Details	Hours of Study T+P=Tota
5.	Introduction to 8086 Programming	1
	- Instruction set of 8086	1
	- Data transfer instructions	
	- Arithmetic instructions	
1	- Bit manipulation instructions	6 + 24 = 30
	- String instructions	
	- Branch instructions	
	- Iteration Control instructions	
	- Interrupt instruction	
	- Processor Control instructions	
6.	<u>Application of 8085/8086</u> :	
	- Use of 8085/8086 for the following application	
1	- DC Motor Speed and direction control	4+0=4
i	- Stepper Motor interfacing.	7 0 7
1	- Traffic Controller	
	- Temperature measurement and Control	
	- Frequency Measurement	
	- Interfacing LED Display	
7.	Advanced Microprocessors	
	- 80486	
	- Enlist various advance features of 80486 over previ-	
	ous microprocessors	
	- Distinguish between 80486-SX and 80486-DX	
	Pentium:	
	- Introduction and basic features	
	- Advancement and generations of Pentium	
	- Difference between RISC and CISC architecture.	
	- Difference between RISC and CISC architecture.	

## M. P. BOARD OF TECHNICAL EDUCATION ADVANCED DIPLOMA IN INDUSTRIAL ELECTRONICS

VII - SEMESTER

31/156

Topic No	Topic Details	
	LIST OF EXPERIMENTS	
1.	Writing simple 8086 Programmes	
2.	Prepare Hardware Interface for Numeric Keyboard/	
	Display for 8085/ 8086.	
3.	Configure a Microprocessor for Seven Segment LED	200
	Display, Write programme for Displaying decimal num-	
	ber 0-9.	
4.	Control the speed and direction of a DC motor using	
	microprocessor and 8254.	
5.	Using 8255 interface a stepper motor with a micropro-	
	cessor.	
6.	Preparing a model of Traffic Signalling System using	
i	Microprocessor.	
7.	Measure a given frequency using microprocessor	
	interfaced with 8255 and verify the frequency.	
	Total	48 Hrs.

## M. P. BOARD OF TECHNICAL EDUCATION ADVANCED DIPLOMA IN INDUSTRIAL ELECTRONICS

VII - SEMESTER

31/157

#### NAME OF SUBJECT : MICROPROCESSOR - II

#### REFERENCES

Sl. No	Title Author/ Publisher/ Edition
1.	Microprocessor, Architecture and Programming and Application Ramesh Gaonkar, Wiley Eastern, Ltd., 2nd edition.
2.	Microprocessor and interfacing programming and hardware- Dougla V. Hall, McGraw Hill International.
3.	Microprocessors Theory and Applications, Intel & Motorola, M Raffiquzzaman: Prentice Hall of India.
4.	Microprocessors and Microcontroller, B. P. Singh, Galgotiya Publications.
5.	Fundamentals of Microprocessors and Microcomputers, B.Ram  Dhanpat Rai & Sons Publication
6.	Introduction to Microprocessors 2nd edition by Aditya P. Mathur, Tata McGraw Hills.

## M.P. BOARD OF TECHNICAL EDUCATION, BHOPAL ADVANCED DIPLOMA IN INDUSTRIAL ELECTRONICS VII TH SEMESTER SUBJECT: INDUSTRIAL ELECTRONICS – II

#### RATIONALE

Power Electronics occupies an indispensable position in the field of battery charging, uninterrupted power supply, electroplating, electrolysis, galvanisation, heating, and welding. It also plays an important role in all sorts of electric drives and lighting control. The recently developed techniques provide improved and more efficient manufacturing methods, accurate control and regulation of almost every kind of process. By means of electronic control, mechanical drives can be given almost any desired speed – torque characteristics, the control apparatus being, to all intents and purposes, inertia less and practically instantaneous in action.

Electronically generated high frequency energy offers possibilities in the wood working and plastic industries. Hardening, soldering or smelting of metals by high frequency energy increases the production of metal goods and quality also.

Of late power electronics has also assumed an extremely important role in main line electric traction and power supply for urban transport system as well as in HVDC transmission.

Keeping in view the above advancement, this syllabus has been designed in such a way so that the students will achieve the required knowledge of the subject. However more stress has been given to the ac applications of power electronics since the dc applications has already been considered in the previous Industrial Electronics—I syllabus.

## M.P. BOARD OF TECHNICAL EDUCATION, BHOPAL ADVANCED DIPLOMA IN INDUSTRIAL ELECTRONICS VII TH SEMESTER SUBJECT: INDUSTRIAL ELECTRONICS – II

#### SCHEME OF STUDIES AND SPECIFICATION TABLE

S.	TOPIC	HOURS	OF	STUDY	K.	C	A	TOTAL
No.		Th.	Pr.	Total		im		
1.	Inverter	9	6	15	6	6	2	10
2.	Cyclo-converter	7	3	10	6	6	2	10
3.	Electric Heating	15	8	23	9	6	6	21
4.	Welding	10	5	15	7	5	6	18
5.	Applications – I	18	4	22	8	5 '	8	21
6.	Applications – II	5	6	11	4	2	6	12
	Total	64	32	96	40	30	30	100

#### Abbreviations:

K : Knowledge

C: Comprehension

A: Application

## M.P. BOARD OF TECHNICAL EDUCATION, BHOPAL ADVANCED DIPLOMA IN INDUSTRIAL ELECTRONICS VII TH SEMESTER 31/10

SUBJECT: INDUSTRIAL ELECTRONICS - II

#### CONTENT OUTLINES (SYLLABUS)

TOPIC NO.	TOPIC DETAILS	HOURS OF STUDY T+P = TOTAL
1.	Inverter:	
	Definition, Principle of inversion, Need of inversion,	
	type of inverters ( their circuit diagrams, working and	
	waveforms) - Centre tapped dc supply type, Centre	
	tapped load type, Single phase bridge, 3 phase bridge	
	(120 and 180 degree conduction), series and parallel	1
	inverter, methods of output voltage control (only	
	principle).	9+6 = 15
2.	Cycloconverter:	
	Definition, Principle, Need, Types - Circuit diagram,	
	waveform and explanation of single phase to single	
	phase cycloconverter, circuit diagram and principle of	
	working of three phase to single phase cycloconverter,	
- 1111	comparison of cycloconverter.	7+3 =10

Advantages of electric heating over other methods, classification – Power frequency and High frequency heating, Principle and application of power frequency heating methods.

High frequency heating – classification (Induction and Dielectric), Induction heating – introduction, principle, relation of depth of penetration, power density and heat produced, merits and demerits, applications, high frequency power source for induction heating, Dielectric Heating – Introduction, principle, circuit diagram, expression for heat generated, methods of coupling of electrodes to the R . F. generator, thermal losses in dielectric heating, simple numerical problems, merits and demerits, applications.

15+8 = 23

#### 4. Electric Welding:

Definition, classification – plastic and fusion welding, various welding processes used in general engineering purposes, resistance welding – definition, resistance welding process, basic circuit for ac resistance welding, types of resistance welding, electronic welding controls (circuit / block diagram and explanation) – line contactor, its advantages over conventional contactor,

heat control circuits, synchronous and non-sy	nchronous
operations, sequence timer	10+5=15
Applications – 1:	
	LEGISLAND IN N. III
A.C. drives - introduction, induction motor p	performance
characteristics, different methods of speed co	ontrol of
Induction motors, three phase induction motor	or speed
control by antiparallel connected SCRs, Bloc	k diagrams
of closed loop speed control (stator voltage c	ontrol),
inverter controlled single and three phase ind	luction
motor, introduction to PWM control, cycloc	onverter
controlled single phase induction motor, slip	power
recovery scheme - introduction, method, rot	ary and
static Kramer and Scherbius drives.	
Microprocessor Controlled AC and DC drive	es –
introduction, application.	18+4 = 22
Applications – II :	
Applications of power electronics (Block / C	ircuit
diagram and explanations) in HVDC transmi	ssion,
thyristorised circuit breaker, emergency tube	light.
Principle of ac voltage controllers	5+6 = 11
	64+32 = 96

## M.P. BOARD OF TECHNICAL EDUCATION, BHOPAL ADVANCED DIPLOMA IN INDUSTRIAL ELECTRONICS VII TH SEMESTER

SUBJECT: INDUSTRIAL ELECTRONICS - II

#### LIST OF PRACTICALS

S. NO.	PRACTICAL DETAILS	HRS.
1.	Study and observation of waveforms of series inverter.	3
2.	Study and observation of waveforms of parallel inverter.	3
3.	Study and observation of waveforms of single phase to single phase	
	cycloconvertor.	3
4.	Study and control of heat in induction heating.	3
5.	Study and compare rise of temperature in different dielectric	
	materials in dielectric heating.	5
6.	Study of electronic controls used in resistance welding.	5
7.	To control the speed of single phase induction motor used in	
	electronic method.	4
8.	Study of emergency tube light circuit.	3
9.	Study of HVDC Transmission.	3
	THE RESERVE OF THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED	
	TOTAL:	32

## M.P. BOARD OF TECHNICAL EDUCATION, BHOPAL ADVANCED DIPLOMA IN INDUSTRIAL ELECTRONICS VII TH SEMESTER 31 / 1/2/2

SUBJECT: INDUSTRIAL ELECTRONICS - II

#### REFERENCES (BOOKS)

S.No.	TITLE AUTHOR / PUBLISHER
1.	Power Electronics by Dr. P.S. Bimbhra, Pub - Khanna Publications.
2.	Power Electronics by P.C. Sen, Pub - Tata Mc Graw Hill.
3.	Power Electronics by C.Y. Lander, Pub - Tata Mc Graw Hill.
4.	Power Electronics Circuits, Devices and Applications by M.H. Rashid, Pub -
	Prentice Hall Of India.
5.	Industrial and Power Electronics by Harish C. Rai, Pub - Umesh Publication,
	Delhi.
6.	Thyristor Engineering by M.S. Berde, Pub - Khanna Publications.
7.	Industrial Electronics by G.K. Mithal, Pub - Khanna Publishers.
8.	Industrial Electronics by R.G. Kloffler.
9.	Utilization of Electric Power and Electric Traction by J.B. Gupta, Pub - S.K.
	Kataria and Sons, Delhi.
10.	Electric Drives by Vedam Subrahmanyam, Pub - TATA McGraw Hill.
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### M. P. BOARD OF TECHNICAL EDUCATION ADVANCED DIPLOMA IN INDUSTRIAL ELECTRONICS

VII - SEMESTER

131/165

NAME OF SUBJECT : COMPUTER IN INDUSTRY

#### RATIONALE

Computers have become an indispensable tool for business and industry. Their applications are numerous and vary from maintaining of on-line calender of personal engagements to design and production of complex physical machines. Knowledge of computers and its computing application therefore has become essential. Hence subject COMPUTER IN INDUSTRY, in the studies of technical diploma programme, is well justified.

This course aims to providing students with basic knowledge of recent operating systems, Information technology and Numerical computing softwares. In fundamental unit focus is on some understanding of basic commands of Operating System and basic knowledge of recent fields of application like Multimedia and Internet. Major inputs on programming in "C" have been included with a focus on hands on experience in program development and execution. "C" has been chosen because of its most important application in the field of Scientific Computing. It is said that first Industrial Revolution was experienced in eighteenth century, when attempts were made to substitute muscle power by mechanical energy. The world is now passing through second industrial revolution with fantastic development occurring continuously in the field of electronics and Computer Science. CNC, CAD/CAM and ROBOTICS play an important role in this regard.

## M. P. BOARD OF TECHNICAL EDUCATION ADVANCED DIPLOMA IN INDUSTRIAL ELECTRONICS VII- SEMESTER

31/166

#### NAME OF SUBJECT: COMPUTER IN INDUSTRY

#### SCHEME OF STUDIES AND SPECIFICATION TABLE

S.	Topic	Hrs. of Study			K	C	A	Total
No.		Th.	Pr.	Total				
1.	Fundamentals	12	08	20	06	-	09	15
2.	Programming in 'C'	16	08	24	09	06	15	30
3.	CAD/CAM	08	02	10	06	04	05	15
4.	CNC	13	08	21	05	05	05	15
5.	Robotics	15	06	21	10	05	10	25
-							i ! !	
-								1
- 1		64	32	96	36	20	44	100

Abbreviations :

K KNOWLEDGE

C COMPREHENSION

A APPLICATION

#### M. P. BOARD OF TECHNICAL EDUCATION

#### ADVANCED DIPLOMA IN INDUSTRIAL ELECTRONICS

VII - SEMESTER

31/167

#### NAME OF SUBJECT: COMPUTER IN INDUSTRY

Topic N	o Topic Details	Hours of Study T+P=Total
1.	FUNDAMENTALS  UNIX:  - Introduction - Characteristics - Structure - Basic UNIX Commands: Is, cp, mv, cat, date, cal, lp, cd, grep, kill, mail, mkdir, pwd, rm, who.  WINDOWS 95: - Introduction - Hardware Requirements - Security Features - Parts of Window screen: Desktop, Icons Anotomy of a Window: The Title bar,	12+8=20
	Minimize, Maximize and Close, The Control Box, Scroll Bars, Scroll Buttons and Scroll Boxes.  MULTIMEDIA:	
	- Introduction - Hardware Requirements - CD ROM, Video Capture Card, Sound Card, Speakers, Video Card & Monitors, Microphones Multimedia input and output devices - Elements of Multimedia program.	
	COMPUTER NETWORK:  - Introduction  - Goals  - Applications  - Network Structure	

#### M. P. BOARD OF TECHNICAL EDUCATION

#### ADVANCED DIPLOMA IN INDUSTRIAL ELECTRONICS

VII - SEMESTER

31/ 168

#### NAME OF SUBJECT: COMPUTER IN INDUSTRY

Topic No	Topic Details	Hours of Study T+P=Total
	- OSI reference model  - Network Topology  - Types of Network : LAN, MAN and WAN.  INTERNET:  - Introductory knowledge of:	
	TCP/IP Protocol, Internet Services, Ethernet, Bridges, Router, Repeaters, Internet Addressing Scheme, WWW, SLIP, PPP, FTP, E-Mail, TELNET.	
2.	PROGRAMMING IN 'C'	16+8=24
	- Variables: Declaration of Variables, Assignment of Variables, Arithmatic Expressions, Data Types Decision Making: Relational Operators, Logical Operators, IF Statement, SWITCH Statement Iteration: FOR, WHILE, DOWHILE loops Functions.	
	- Arrays, Pointers and Structures Input/Output and Files Introduction to C++ - Advantages of C++ over C.	

#### M. P. BOARD OF TECHNICAL EDUCATION

#### ADVANCED DIPLOMA IN INDUSTRIAL ELECTRONICS

VII - SEMESTER

#### NAME OF SUBJECT : COMPUTER IN INDUSTRY

ropic N	Topic Details	Hours of Study T+P=Total
3	Computer Aided Designing/ Computer Aided Manufacturing (CAD/CAM) :	8 + 2=10
	- Introduction	
	- Potential application area	1
	- Software and Hardware for CAD/CAM	
	- Functioning of CAD/CAM system.	
	- Manufacturing automation protocol.	-
	- General awareness of AUTOCAD.	
4	Computerised Numerical Control (CNC):	13 + 8 = 20
	- Introduction	
	- Analog and Digital Control	
	- Programmed Automation and Numerical Control.	
	- Different possible numerical Control used in CNC's	
	- Tape and Tape Punching	
	- Computer Aided Part Programming.	
	- Elements of CNC Systems	1
	- Machine rebuilding and updating	
	- Control retrofitting	
	- Advantages and applications	
5	Robotics:	15 + 6 = 21
	- Introduction of Robot and Robotics	
	- Reasons for using Robot	
	- Basic elements of Robots	
	- Type of joints	1
	- Notations for Robot manipulator	

## M. P. BOARD OF TECHNICAL EDUCATION ADVANCED DIPLOMA IN INDUSTRIAL ELECTRONICS

VII - SEMESTER

#### NAME OF SUBJECT: COMPUTER IN INDUSTRY

Topic No Topic Details	THE PROPERTY OF STREET	Hours of Study T+P=Total
	<ul> <li>Configuration of Robot</li> <li>Classification of Robot</li> <li>Robot arm, Hands,</li> <li>End effectors</li> <li>Designing of gripper</li> <li>Operational unit and control</li> <li>Control systems for Robot</li> <li>Expected qualities in Robot:</li> <li>Vision, Tactile sensing and Mobility</li> <li>Specification of Robot</li> <li>Precautions in the use of Robot and their application.</li> <li>Application and economics of Robot.</li> <li>Robot Programming:</li> <li>Sequencing operations</li> <li>Teach by showing.</li> </ul>	

#### M. P. BOARD OF TECHNICAL EDUCATION

#### ADVANCED DIPLOMA IN INDUSTRIAL ELECTRONICS

VII - SEMESTER

31/171

NAME OF SUBJECT: COMPUTER IN INDUSTRY

#### REFERENCES

#### UNIX:

A User Guide to the UNIX : Dr. Rebecca Thomas, Jean Yates
 Mc Graw Hill Publication

#### WINDOWS 95 & MULTIMEDIA:

 Mastering Windows 95 : Robert Cowart BPB Publication

#### COMPUTER NETWORK:

I. Computer Networks : Andrew S. Tenenbaum Prentice Hall India Publication

#### INTERNET:

Internetworking with TCP/IP Vol.-1 : Douglas E. Comer
 Prentice Hall India Publication

#### PROGRAMMING IN 'C'

1. The Spirit of 'C' : Mallish Cooper

#### CAD/CAM

CAD/CAM/CIM : P. Radhakrishnan, S. Subramanayan.

Wiley Eastern Limited.

#### CNC / ROBOTICS :

- Production Technology : R.K. Jain, S.C. Gupta Khanna Publications.
- Robotics : James W. Masterson, Elmer C. Poe and Stephen W. Fardo Prentice Hall Publications.

### M. P. BOARD OF TECHNICAL EDUCATION ADVANCED DIPLOMA IN INDUSTRIAL ELECTRONICS

VII - SEMESTER

#### NAME OF SUBJECT: COMPUTER IN INDUSTRY

**TOTAL PRACTICAL HRS: 32** 

#### **PRACTICALS**

- Practice on following UNIX Commands: ls, cp, mv, cat, date, cal, lp, cd, grep, kill, mail, mkdir, pwd, rm, who.
- Windows95: Running Windows95, Making new folders, Moving & Copying items between folders, Deleting Items, Copying files & folders to and from Floppy Disks.
- 3. Writing a document using MS-WORD, Printing, Spell Checking.
- 4. Writing, Printing & Graph Designing using MS-Excel.
- 5. Playing Multimedia files with Media Player.
- 6. Working on any Web-Browser, E-mail.
- 7. Simple Programs in 'C'.
- 8. Work on general menu driven commands of AUTOCAD.
- 9. Study of CNC/DNC.
- 10. Job Preparation on CNC machine.
- 11. Study of Robotics machinery.

#### M.P. BOARD OF TECHNICAL EDUCATION

#### ADVANCED DIPLOMA IN INDUSTRIAL-ELECTRONICS

VII-SEMESTER 31/173

#### ELECTRONICS REPAIR, MAINTENANCE & TESTING

#### RATIONALE

In the present context it is very much required that a technician must know the various aspects of Fault-Diagnosis & Repair / Maintenance. As, most of the industries, today expect that the Supervisor / Employee, specially at the Shopfloor must be well aware and capable of performing the Preventive Maintenance, Minor-Fault Repairing / Servicing of the machineries being used at the floor. Apart from these, he must, also be having the adequate knowledge of Safety-Precautions at Shopfloor as well as about the various Safety Devices and their uses. The members present in the curriculum design strongly felt that the subject must be more practice-oriented. Therefor, in the curriculum, it is always taken care that student must learn through practice and develop his skills, namely in Fault-Finding, Identifying components / items for repairing / replacements and maintenance of Machine / Circuit with the help of Manuals, Trouble-Shooting Charts, Circuit Diagram etc. He will also be able to prepare Preventive Maint. Chart, Safety-Precaution Chart etc. for future reference. Which will definitely help the student for his confidence to work more comfortably as well as efficiently on the floor & maintain the machineries.

#### M. P. BOARD OF TECHNICAL EDUCATION

#### ADVANCED DIPLOMA IN INDUSTRIAL-ELECTRONICS

VII - SEMESTER 31/174

NAME OF SUBJECT: ELECTRONICS REPAIR, MAINTENANCE & TESTING

#### SCHEME OF STUDIES AND SPECIFICATION TABLE

S. No.	Topic	Hrs. of Study			K	С	A	Total
. 10.	- yankak lank hari	Th.	Pr.	Total				
1	And Equipments	04	04	08	05	05	10	20
2	Electronic Equipments	12	24	36	15	05	15	35
3	Electrical Circuits	05	06	11	10	05	10	25
4	Electrical Machines	05	10	15	03	03	04	10
5	Safety	06	04	10	05	02	03	10
			en lice					
	TOTAL	32	48	80	38	20	42	100

#### Abbreviations:-

- K Knowledge
- C Comprehension
- A Application

#### M. P. BOARD OF TECHNICAL EDUCATION

#### ADVANCED DIPLOMA IN INDUSTRIAL-ELECTRONICS

VII - SEMESTER

#### NAME OF SUBJECT ELECTRONICS REPAIR, MAINTENANCE & TESTING

Theory per week :

Theory per	week : Practical Po	er week :
Topic No		Hours of Study T+P=Total
1	INTRODUCTION TO TOOLS & EQUIPMENT  - Concept of Repair, Maintenance & Testing  - Various Tools used for Repair & Maint.  Common / General Tools.  Special Tools (Crimping-Tool, Cutters, IC-Pullers Bearing-Pullers).  - Various Measuring & Testing Equipments and Instruments.  Megger, Earth-Tester, Tong-Tester, Techo-Meter, Multimeter, Ammeter, Voltmeter, Wattmeter, Energy-Meter, Oscilloscope, RLC Bridge etc.  - IC Testers  Analog IC Tester & Digital IC Teste r  - Accessories used in Electrical/Electronics Application.  Connectors, Contactors, MCB, Fuses, Cables Ferrules, Caution Plates, Terminal Identifiers, Protecting Devices, Color-Coding, Lugs.	04+04=8
2	ELECTRONIC EQUIPMENTS  Electrical Circuit  (Power Input, Indication, Protection etc.)  - Identification of Mountings & Components. Power-Cord, Switches, Fuses, Fuse-Holders, Relays, Heat-Sinks, Light-Switches, Displays, Connectors, Sockets etc.  - Specification of Mountings & Components Electrical Rating and Physical Size etc.  - Testing & Replacement of above-said items  Simple Electronic Circuit  - Identification of Conventional Circuit & Chassis Mounting Components and Devices.	

M. P. BOARD OF TECHNICAL EDUCATION

#### ADVANCED DIPLOMA IN INDUSTRIAL-ELECTRONICS

VII - SEMESTER

NAME OF SUBJECT - ELECTRONICS REPAIR, MAINTENANCE & TESTING
Theory per week:

Practical Per week

neory per	Practical Po	Practical Per week :		
Topic No	Topic Details	Hours of Study T+P=Total		
	<ul> <li>Circuit Tracing</li> <li>Identification of Testing-points &amp; Testing of Components and Circuit.</li> <li>Identification of Faulty Equipments and Components and Replacement.</li> <li>Complex Electronic Circuit</li> <li>Identification of Sub-Functional Blocks / Circuits of a Complex Circuit</li> </ul>			
	Complex Circuit.  - Identification of Testing Points and Testing of Circuit.(Using CRO / DMMs etc.)  - Identification of Interconnection of Sub functional Blocks as a whole.  - Fault Diagnosis and replacement of faulty  Components / Circuitry. (Use of Manuals / Maint. & Service Charts)			
	High-Tech Electronic Equipments  - Identification of various High-Tech. Eqpt. Modules / Cards.  - Identification of functionability of var. Section / Modules / Cards.  - Identification and Listing of faults & Faulty Modules / Cards. (Using Troubleshooting-Charts & Mannuals)			
	Documentation - Preparation of Maintenance Chart, History-Sheet, Inventory-Chart, Spare-Invent. etc.			
3.	ELECTRICAL CIRCUIT  Power-Wiring & Circuit  - Testing / Availability of 3-Phase Supply. (Using Voltmeter, Multimeter, Test-Lamp)	05+06=11		

#### M. P. BOARD OF TECHNICAL EDUCATION

#### ADVANCED DIPLOMA IN INDUSTRIAL-ELECTRONICS

VII - SEMESTER

NAME OF SUBJECT: ELECTRONICS REPAIR, MAINTENANCE & TESTING
Theory per week:

Practical Per week

Theory per	week: Practical	Per week:
Topic No	Topic Details	Hours of Study T+P=Total
	<ul> <li>Checking of Fuses/Fuse-Wire and Selection and Replacement.</li> <li>Checking of ICDP / ICTP / MCB for proper functioning and Contact conditions.</li> </ul>	
	Earthing - Checking of Proper Earthing Earth-Resistance Testing Earth-Pit Repairing / Maintenance	
	- Checking the Contact Points and Cleaning - Checking the soundness of Coil.  Starters (DOL / Star-Delta	
	<ul> <li>Checking the Main &amp; Auxiliary Contacts, Polish / Replace the Pitted Contacts.</li> <li>Checking the Spring Tension / Replacement.</li> <li>Checking Overload Setting / Adjustments &amp; Time-Setting / Adjustments.</li> </ul>	
4.	ELECTRICAL MACHINES 05+10=15  - Cleaning / Blowing Air on Elect. Machines.  - Checking of Over-Temperature and Bearing Noise etc  - Overhauling small Motor.(Checking Starting Current Speed,IR-Value Bearing Condition, Earthing etc.)	
5.	- Preparing Preventive Maintenance-Schedule.  SAFETY  O6+04=10  - Checking the condition for Personal Safety Rubber Matting, Hand-Gloves, Insulated Hand-Tools, Insulation Resistance of M/c. etc.  - Checking of Earth Connection & its continuity.	1
	- Special Protection & Safety Devices Fire-Fighting Equipments and Uses	

# ADVANCED DIPLOMA IN INDUSTRIAL-ELECTRONICS

VII - SEMESTER

NAME OF SUBJECT : ELECTRONICS REPAIR, MAINTENANCE & TESTING

#### REFERENCES

Sl. No.	Name of the book	Name of the Author/Publicher
1.	Modern Electronic Equipment (Troble-shooting Repair & Maintenance)	R.S.Khandpur T.M.H.
2.	Electronic Testing and Fault Diagnosis.	G.C.Loveday Wheeler
3.	Electrical & Electronic Maintenance. ETG-24 (Engg. Training Guide)	EITB
4.	Circuit Diagram Book for Various TV & VCR	BPB
5.	SAMS, IBM PC Truobleshooting And Guide	Robber S.C.Benner BPB
6.	Maintenance Mannuals	

#### M.P. BOARD OF TECHNICAL EDUCATION

#### ADVANCED DIPLOMA IN INDUSTRIAL-ELECTRONICS

#### VII-SEMESTER

#### **INDUSTRIAL MANAGEMENT**

#### RATIONALE

In the present industrial environment it is very much needed that one should be well aware of the Organization setup and its functionability. The industries also expect that the supervising employee must also know the management behavior and activities. One should also able to handle situation based difficulties arises time-to-time. Today it is also highly desirable that the Supervisor / Employee can handle Shopfloor activities independently when required.

The members present in the curriculum design strongly felt that the subject must provide adequate knowledge about the Industrial Management Techniques & its internals as well as Organizational behavior for developing a good working environment. Therefor, in the curriculum, it is always taken care that student must also gain enough knowledge to develop inter-personal skills, Environmental & Safety Components related to the Industry.

## M. P. BOARD OF TECHNICAL EDUCATION

#### ADVANCED DIPLOMA IN INDUSTRIAL-ELECTRONICS

VII - SEMESTER

NAME OF SUBJECT: INDUSTRIAL MANAGEMENT

#### SCHEME OF STUDIES AND SPECIFICATION TABLE

S. No.	Topic	Hrs. of Study			K	C	A	Total
		Th.	Pr.	Total				
1	Management Overview	04	-	04	10	-	-	10
2	Inventory Control	08	-	08	10	05	05	20
3	Organization & Org nizational Climate	20	-	20	10	05	10	25
4	Organ. Changes and Organ. Conflicts	10	- 11	10	10	05	-	15
5	Management Qualities	12	-	12	10	-	05	15
6	Environment Pollution & Control	10	-	10	05	05	05	15
	TOTAL	64	-	64	55	20	25	100

#### Abbreviations :-

- K Knowledge
- C Comprehension
- A Application

## ADVANCED DIPLOMA IN INDUSTRIAL-ELECTRONICS

VII - SEMESTER

### NAME OF SUBJECT : INDUSTRIAL MANAGEMENT

Theory per week

Theory per week:		Practical Per week:	
Topic No	Topic Details	Hours of Study T+P=Total	
1	MANAGEMENT OVERVIEW  - Concept of Organization and Organizational Management.  - Brief History of Management.  - Function Of Management.  Planning, Organizing, Staffing, Directing, Co-ordinating,	1	
	Controlling, Reporting, Innovating, Budgeting, Evaluation  - Management Phases  Pre-Planning, Planning, Implementation & Control.  - Application of Management In Personnel / Marketing / Finance / Purchase / Production / Stores etc.		
2.	INVENTORY CONTROL  - Concept of Inventory & Inventory Control.  - Necessity and Advantages.  - Types of Inventory Control.  - Techniques of Inventory Analysis.  - Techniques of Inventory Control.  - Organisation of Inventory Control.	08+00=08	
3.	ORGANIZATION & ORGANIZATIONAL CLI  MATE  - Concept of Organization Definition & Illustration  - Principles of Organization  - Organizational Structure & Organizational chart.  - Types of Organization.  - Formal Organization, Line, Functional, Line & Staf Communities, Project, Matrix		

## ADVANCED DIPLOMA IN INDUSTRIAL-ELECTRONICS

VII - SEMESTER

## NAME OF SUBJECT : INDUSTRIAL MANAGEMENT

Theory per week: Practical Per wee

Theory per week : Practical P		Per week :
Topic No	Topic Details	Hours of Study T+P=Total
1	MANAGEMENT OVERVIEW	04+00=4
	<ul> <li>Concept of Organization and Organizational Management.</li> <li>Brief History of Management.</li> <li>Function Of Management.</li> <li>Planning, Organizing, Staffing, Directing, Co-ordinating, Controlling, Reporting, Innovating, Budgeting, Evaluation</li> <li>Management Phases</li> </ul>	
	Pre-Planning, Planning, Implementation & Control.  - Application of Management In Personnel / Marketing / Finance / Purchase / Production / Stores etc.	
2.	INVENTORY CONTROL  - Concept of Inventory & Inventory Control.  - Necessity and Advantages.  - Types of Inventory Control.  - Techniques of Inventory Analysis.  - Techniques of Inventory Control.  - Organisation of Inventory Control.	08+00=08
3.	ORGANIZATION & ORGANIZATIONAL CLI- MATE  - Concept of Organization Definition & Illustration  - Principles of Organization  - Organizational Structure & Organizational chart.  - Types of Organization.  - Formal Organization, Line, Functional, Line & Staff, Communities, Project, Matrix	

# M. P. BOARD OF TECHNICAL EDUCATION

#### ADVANCED DIPLOMA IN INDUSTRIAL-ELECTRONICS

VII - SEMESTER

## NAME OF SUBJECT : INDUSTRIAL MANAGEMENT

Theory per week:

Practical Per week

Topic No	Topic Details	Hours of Study T+P=Total
	- Internal Organization	
	- Classification Of Organization	
	- Authority & Delegation Of Authority	Del Comp.
	- Centralization & De-centralization	1000 1000
	- Authority & Responsibility	
	GROUP-DYNAMICS	
	- Concept	
	- Basic Characteristics of Group	
	- Reasons for Formation Of Group	
	- Advantages & Dis-advantages of Group	
4.	ORGANIZATIONAL CHANGE & ORG	GANIZA-
	TIONAL 10+00=10	
	CONFLICTS	100
	Organizational Change	
	Concept of Managing Changes in Org.	
	- Cause Of Org. Changes	
	- Response Of Changes	
	- Process Of Changes	
	Organizational Conflict	
	- Concept Of Org. Conflict	
	- Types Of Conflict	
	- Conflict between Groups in an Org.	
	- Conflict between Org.	
	- Process / Stages Of Conflict	
	- Sources & Impact Of Conflict	
	- Resolution/ Mode of Conflict Management	
5.	MANAGEMENT QUALITIES	12+00=12
1800	- Introduction to qualities of a Manager	T- 10 13 10 10 10
	- Concept and Factors affecting Motivation	

## ADVANCED DIPLOMA IN INDUSTRIAL-ELECTRONICS

VII - SEMESTER

## NAME OF SUBJECT : INDUSTRIAL MANAGEMENT

Theory per week:

2 1	Practical	Practical Per week :	
Topic No	Topic Details	Hours of Study T+P=Total	
	- Motivation Process		
	- Secondary Motivation Drives		
	- Aggressiveness, Acquisitiveness, Self assertion, Con-		
	structiveness, Gregoriousness Expression, Repression		
	- Various Behavioural Theories		
	Leadership Qualities		
	- Definition of Leadership		
	- Personal Skills required for Leadership Persuation,	1-11	
	Influence, Rapport etc.		
	- Relationship between Motivation and Leadership.	1	
	- Type Of Leadership Autocratic, Democratic, Free Rein		
	Supervision		
	- Concept of Supervision		
	- Personal Attitude of Supervisor		
	- Duties & Responsibilities of Supervisor		
	Time Management		
	- Definition of Time Management		
	- Importance		
	- Procedure Communication		
	- Concept of Communication		
	- Types, Process, Channels & Barriers		
	- Effective Communication Person to person With Groups		
	In Meetings / Committees		
	Grievances		
	- Definition	1-11-11	
	- Cause of Grievances		
	- Recognising Grievances		
	- Solving of Grievances		

### ADVANCED DIPLOMA IN INDUSTRIAL-ELECTRONICS

VII - SEMESTER

### NAME OF SUBJECT : INDUSTRIAL MANAGEMENT

Theory per week:

Topic No	Topic Details	Hours of Study T+P=Total
6.	ENVIRONMENT POLLUTION & CONTROL  10+00=10  - Factors Causing Pollution  - Effects of Pollution on Human-Health  - Types of various Pollution and its effects  Air Pollution  - Sources of Air-Pollution  - Effect of Air-Pollution and related Device  - Method / Device of Air-Pollution Control  Water Pollution  - Introduction to Water-Pollution  - Effect of Water-Pollution  - Sources of Water Pollution  - Control of Water-Pollution  Noise-Pollution & its Control	

### M. P. BOARD OF TECHNICAL EDUCATION

#### ADVANCED DIPLOMA IN INDUSTRIAL-ELECTRONICS

VII - SEMESTER

#### ME OF SUBJECT: INDUSTRIAL MANAGEMENT

#### REFERENCES

No.	Name of the book	Name of the Author/Publicher
1.	Belts, P.W., Supervisory Management,	(ELBS with 6th Edition, Pitman Publishing, 1994)
2.	Khanna, O.P., Industrial Engineering and Management,	(Dhanpat Rai and Sons 1995)
3.	Koontz, O'Donnell, Weihrich, Essentials of MAnagement,4th Edition,	Mc Graw-Hill Book Company 1986
4.	Indira Gandhi National Open University,	Module Published for Diploma in Management Course.
5.	Buffa, Modern Production Operations Management,7th Edition	Wiley Eastern Ltd. 1983
6.	Goel, B.S., Production Operations Management,	(Pragati Prakashan, 1986)

# M.P. BOARD OF TECHNICAL EDUCATION, BHOPAL ADVANCED DIPLOMA IN INDUSTRIAL ELECTRONICS VII TH SEMESTER

SUBJECT: MAJOR PROJECT

#### RATIONALE

The approach to this subject is basically different from other subjects, in the sense that while in other subjects the entire learning experience is totally controlled by the teachers, in this subject the students are exposed to self learning. This strategy promotes in the students the habit of enquiry, develops confidence to tackle new problems, develops the attitudes leading to creativity etc. This is deemed necessary because every student after leaving the institute has to solve many live problems in his job all on his own.

With this view the project work may not be bound in any limit or boundary. As such this curriculum has been designed with the objective that the student should be able to design and develop complete electronic system by his initiative and develops confidence to solve problems in industrial processes. Assuming that the student has the ability to conduct all tasks and processes stated in minor project work independently.

# ADVANCED DIPLOMA IN INDUSTRIAL ELECTRONICS VII TH SEMESTER 31/187

SUBJECT: MAJOR PROJECT

# EXPECTED QUALITIES TO BE DEVELOPED IN THE STUDENT AFTER COMPLETION OF PROJECT:

- A student should have idea about market survey, financial implications and marketability of his project.
- Student should develop the ability to judge the impact of ambient conditions on his project.
- Student should have complete knowledge of the raw materials, machine tools,
   equipment and processes used in his project and its relevance to the industry.
- Student should develop skills in measurement, testing, maintenance and repair aspects for various processes and equipment.
- Student should have an insight into the upgradation and further modification / improvements that could be carried out on the project made by him.
- Student should have knowledge about alternative solutions if any to achieve the same goal in his project.
- Student should be able to adapt himself for latest developments and to handle independently new situations.
- Student should develop entrepreneurship and leadership qualities.
- Student should develop an inquiring aptitude and confidence to solve small industrial problems. He should develop take initiative in all tasks demanding group coordination.
- He should develop good expression power and presentation abilities.

# M.P. BOARD OF TECHNICAL EDUCATION, BHOPAL ADVANCED DIPLOMA IN INDUSTRIAL ELECTRONICS

# VII TH SEMESTER 31 / 188 SUBJECT: MAJOR PROJECT

#### PROCESS TO BE ADOPTED (IN 16 WEEKS):

	Task / Process	No. Of Week	Evaluation	Marking
	Orientation of students by HOD / Guide about project.	1	- Seminar I at	
ide	Selection and finalisation of topic in front of a committee*.	1	the end of the	10
•	Market Survey and resource collection.	2 to 3	-	20
•	Detailing and preparation of project.	4 to 5	-	35
•	Testing, improvements and finalisation of project.	4	-	35
	Report writing and presentation in front of committee*.	2 to 3	Seminar II on the last day	10
•	Compilation of information and writing a report on a small scale industry / entrepreneurship development program.	1 to 2		10 120

\*Committee: Comprising of (1) HOD, (2) Guide, (3) One representative of

industry.

# M.P. BOARD OF TECHNICAL EDUCATION, BHOPAL ADVANCED DIPLOMA IN INDUSTRIAL ELECTRONICS VII TH SEMESTER SUBJECT: MAJOR PROJECT

# UGGESTED AREA FOR PREPARATION OF MAJOR ROJECT:

entifying the project based on curriculum depending upon the availability of aterial component and facilities in the institution, working model or demonstration / ainer model may be prepared in the following areas:

Electronics - Analog, Digital, Power, Industrial etc.

Microprocessor - Software / Hardware.

Computer - Software / Hardware.

Communication

Process Control - PLC etc.

Electrical Machines.

CAD, CAM etc.

CNC, Robotics etc.

Study of concepts related to any advanced field having contemporary importance.

# M.P. BOARD OF TECHNICAL EDUCATION, BHOPAL ADVANCED DIPLOMA IN INDUSTRIAL ELECTRONICS VII TH SEMESTER SUBJECT: MAJOR PROJECT

#### REFERENCES

- Magazines, Periodicals, Journals etc. in related field.
- Industrial Bulletins.
- Entrepreneurship Development Board's magazines.
- Design Data books, Data sheets and manuals for various components used.
- · Relevant I.S. Codes.
- Engineering Experimentation Course, T.T.T.I., Bhopal.