Scheme of Teaching and Examination
VI Semester DIPLOMA in ELECTRICAL ENGINEERING

THEORY

Sr. No.	SUBJECTS	SUBJECT CODE	TEACHING SCHEME		EXAMINATION - SCHEME					
			Periods per Week	Periods in one Session (Year)	Hours of Exam.	Terminal Exam. (A) Marks	Final Exam. (B) Marks	Total Marks (A+B)	Pass Marks Final Exam.	Pass Marks in the Subject
1.	Professional Studies & Entrepreneurship	00601	06	60	03	20	80	100	26	36
2.	Power System – II	20602	06	60	03	20	80	100	26	36
3.	Electric Traction	20603	06	60	03	20	80	100	26	36
4.	Electrical Measurement & Measuring Instrument	20604	06	60	03	20	80	100	26	36
5.	Elective*		06	60	03	20	80	100	26	36
	CADD	20605A								
	Electrical Machine Design	20605B								
	Network Theory	20605C								
	Data Base Management	20605D								
Total:-			**30**					**500**		

PRACTICAL

Sr. No.	SUBJECTS	SUBJECT CODE	TEACHING SCHEME		EXAMINATION – SCHEME					
			Periods per Week	Periods in one Session (Year)	Hours of Exam.	Marks Internal Exam. (A)	Marks External Exam. (B)	Total Marks (A+B)	Pass Marks Final Exam.	Pass Marks in the Subject
6.	Electric Traction Lab.	20606	04	50	03	10	40	50	16	21
7.	Electrical Measurement Lab.	20607	04	60	04	10	40	50	16	21
Total:-			08					**100**		

SESSIONAL

Sr. No.	SUBJECTS	SUBJECT CODE	TEACHING SCHEME		EXAMINATION - SCHEME			
			Periods per Week	Periods in One Session (Year)	Marks of Internal Examiner (X)	Marks of External Examiner (Y)	Total Marks (X+Y)	Pass Marks in the Subject
8.	Professional Studies & Entrepreneurship	00607	04	50	20	30	50	25
9.	Project Work & Its presentation in Seminar	20609			40	60	100	50
Total:-			**04**				**150**	

Total Periods per Week	**42**	**Total Marks = 750**

PROFESSIONAL STUDIES & ENTREPRENEURSHIP

Subject Code 00601	Theory			No of Period in one session : 60		
	No. of Periods Per Week			Full Marks	:	100
	L	T	P/S	Annual Exam.	:	80
	06	-	-	Internal Exam.	:	20

Rationale:

The paper has been introduced to achieve dual purpose for the students. Firstly, this course provides the basics of Professional management and secondly it also prepares the student to develop self reliance by becoming an entrepreneur.

This makes them conversant with their duties and responsibility to make them successful in their career building by developing profession expertise.

Objectives:

With the input provided in this paper, the students will be able to :-

- Acquire basic knowledge of management.
- Understand the various area of management such as human resources, marketing, finance and commercial aspect, production & material management etc.
- Understand the benefit of becoming an entrepreneur.
- Handle a project efficiently and independently.
- To avail subsidies / grants / loan etc. from various agencies.

PART-I: PROFESSIONAL STUDIES

TOPIC:

01 – INTRODUCTION: [05]

01.01 Professional Ethics:
Definition, Objective, Right & Wrong, Duty & Obligation

01.02 Management: [05]
Definition, Function and Objectives.

01.03 Leadership: [05]
Definition, Types – Autocratic, Democratic and Laissez – faire, Functions and Characteristics of Leadership.

01.04 Motivation : [05]
Definition, Types and Importance / Benefits

01.05 Forms of Business organization: [05]
Sole proprietorship, Partnership, Joint Stock company and Co-operative Societies.

01.06 Supervisor's/Technician's role: [05]
Concept of supervisory management, career needs, Role of Technicians in an organization.

PART-II: ENTREPRENEURSHIP

TOPIC:

02 – INTRODUCTION:

02.01 Entrepreneurship: [10]
Concept, Characteristics of a successful entrepreneurship, basic ingredients of entrepreneurship:
1. Finance 2. Technology 3. Sales and Marketing

02.02 Project Report: [10]
Meaning, Project Identification, Project Selection, Contents of a project Report, Techno-Economic Feasibility Report (TEFR), Market Survey.

02.03 Sources of Finance: [05]

Government, Commercial Banks, Financial institutions:
SIDBI – Small Industries development Bank of India
SFC – State Financial Corporations
IDBI – Industrial Development Bank of India
IFCI – Industrial Finance Corporation of India
ICICI – Industrial Credit Investment Corporation of India

02.04 Acts : [05]

Indian factories Act 1948 (Main Provision Only)
Consumers Protection Act 1986 (Main Provision Only)

<u>03</u> – <u>PROJECT WORK</u>:

As elaborated in Sessional Paper (**00607**).

Books Recommended :

1.	Essential of Management, Tata McGraw Hill, Publishing Company Ltd., New Delhi.	-	Herald Koonz & Cyril O' Donnel.
2.	Business Organization and Management, S. C. Chand and Company (Pvt.) Ltd., Ram Nagar, New Delhi	-	M. C. Shukla.
3.	Managerial Economics, Sultan Chand & Sons, New Delhi	-	R. L. Vashney & K. L. Maheshwari
4.	Project Appraisal and Follow up, Govind Prakashan, Mumbai.	-	D. P. Sharda
5.	Modern Marketing Management, Progressive Corporation Pvt. Ltd., P51, Mahatma Gandhi Road, Bombay-400 001	-	Dr. Rustam S. Davar
6.	A hand book for new entrepreneurs (with special reference to science and technology target group)	-	Entrepreneurship Development Institute of India, 83-A, Swastic Society Navrangpura, Ahmedabad, PIN-380 009.

Reference Books :

1.	Leadership in Organisation	-	Published by I.S.T.E. Mysore
2.	Motivation	-	Published by I.S.T.E. Mysore
3.	Motivation - I.I.T. Kanpur	-	Published by I.S.T.E. Mysore
4.	A Hand book on Project Appraisal and follow up, Govind Prakashan, 204, Saraswati Kunj, 90, S. V. Road, Goregoan, Bombay-400 062.	-	D. P. Sarda
5.	Bihar Industrial Policy	-	Government of Bihar, Department of Industries.
6.	Entrepreneurship Guide	-	Bihar State Financial Corporation, Fraser Road, Patna-800 001.

POWER SYSTEM - II

Subject Code 20602	Theory			No of Period in one session : 60		
	No. of Periods Per Week			Full Marks	:	100
	L	T	P/S	Annual Exam.	:	80
	06	-	-	Internal Exam.	:	20

Rationale :

The whole network of Electrical Power sumptuous right from its generations, transmission & distribution to utilization has important stages of switch gear and circuit breakers. There are occasions of occurring various fault in different stages of the system during operations. There must be remedial approach to rectify such faults through relays.

Objective:

An Electrical Diploma holder must have the knowledge of functioning of switch gear control system as well as those of relays and faults finding circuits.

The proposed syllabus of Power System-II includes the relevant topics with the objectives of building up the skill of students. This will help them to face the situations when attached with responsibility.

S.No.	Topics	Periods
	Part-I	
01	Switch Gear	(07)
02	Fault Clearing & C. B. Ratings	(08)
03	HRC Fuses & their applications	(04)
	Part-II	
04	Fault Calculations	(08)
05	Reactors	(06)
06	Symmetrical Faults	(04)
07	Symmetrical Components	(04)
08	Un Symmetrical Faults	(05)
	Part-III	
09	Introduction of Protective Relaying	(04)
10	Relays and Protection	(10)
	Total :	**(60)**

CONTENTS:

Part-I

TOPIC: 01 –SWITCH GEAR: [07]

01.01 Introduction of switch gear, classification of circuit breakers. Air circuit breaker, Air blast circuit breaker.

01.02 Arc formation in circuit breakers. Models of Arc Extensions.

01.03 Insulation requirements of circuit breakers. Causes of failure of its insulations

01.04 Features of circuit breakers. Auto Reclosure. Maintenance of circuit breaker.

TOPIC: 02 –FAULT CLEARING AND C. B. RATINGS: [08]

02.01 Sudden short circuit of R-L series circuit problems.

02.02 Circuit breaker rating, Breaking Capacity, Making Capacity, Short time current ratings, Rated interrupting time.

02.03 Recovery voltage, Restriking voltage, Rate of rise of restriking voltage. Current chopping problems.

TOPIC: 03 – HRC FUSES AND THEIR APPLICATIONS : [04]

03.01 Types of devices with fuse construction of Rewirable and HRC fuses.

03.02 Action of HRC fuse. Characteristics of HRC fuse cut off, current Limiters.

03.03 Selection of fuse for different applications.

Part-II

TOPIC: 04 –:FAULT CALCULATIONS: **[08]**

04.01 Types of faults, procedure of fault calculation. Representations of Power System, Per unit method. Advantages of per unit system.

04.02 Selection of bases. Determination of base impedance in single and three phase systems.

04.03 Problems on fault calculations.

TOPIC: 05 –REACTORS: **[06]**

05.01 Construction and use of Reactors.

05.02 Different types of Reactors, their advantages and disadvantages.

05.03 Methods of locating Reactors. Problems.

TOPIC: 06 –SYMMETRICAL FAULTS: **[04]**

07.01 Percentage Reactance and short circuit currents. Problems.

07.02 Fault MVA and Fault current. Problems.

TOPIC: 07 –SYMMETRICAL COMPONENTS: **[04]**

07.01 Symmetrical Components of 3-ϕ systems.

07.03 Problems.

TOPIC: 08 –UNSYMMETRICAL FAULTS: **[05]**

08.01 Sequence Impedances, Sequence networks of alternator, Voltage equations.

08.02 Single line L-G fault, L-L-G & 3- ϕ fault in alternator.

08.03 Zero sequence diagrams of Generators and Transformers.

08.04 Problems.

Part-III

TOPIC: 09 –INTRODUCTION OF PROTECTIVE RELAYING: **[04]**

09.01 Introduction, importance and functions of Protective relaying.

09.02 Primary and back-up protection.

09.03 Selectivity, Relay time, Fault Clearing time, Sensitivity, Stability, Reliability, Trip Circuit (Only Definitions)

TOPIC: 10 –RELAYS & PROTECTIONS: **[10]**

10.01 Protection of Alternators, Merz Price Protection

10.02 Protection of Transformers, Buchalz Relay (or gas actuated relay)

10.03 Bus-bar feeder and transmission, over current protection.

10.04 Directional (or over current or Earth fault) Relay

Books Recommended:

1. Switch Gear and Protections - Sunil S. Rao
2. Electric Power (Generation, Transmission, Distribution Protection) - Soni Gupta & Bhatnagar
3. Electric Power (Hindi) - D. R. Nagpal

Reference Book :

1. Principles of Power System, S. Chand & Co., New Delhi - V. K. Mehta
2. Electrical Power System, New Age International Pvt. Ltd. Publishers, New Delhi - C. L. Wadhwa

ELECTRIC TRACTION

Subject Code 20603	Theory			No of Period in one session : 60		
	No. of Periods Per Week			Full Marks	:	100
	L	T	P/S	Annual Exam.	:	80
	06	-	-	Internal Exam.	:	20

Rationale :

With the fast moving development of Electrical world some expertisations are expected in the specialized topics.

The electric traction is the back bone of the material handling and different production stages of the industries. Electric Traction is also an easing aspect of transportation and helpful in improving the social and cultural out look of man kind as a whole. Electric Traction make any nation more and more competent in its industrial and developmental outlook. With this in view the subject is being introduced in the Part-III diploma in Electrical Engineering. It will help gain knowledge and build confidence when dealing with the problems of traction in the world of work.

Objective:

The role of electrical technician in Electric Traction system is most important. As such the syllabus has been formed to cover up the required aspects. The students opting for specialization in traction will definitely have a better and improved knowledge and skill when they are taught about the contents of the proposed syllabus.

S.No.	Topics	Periods
01	Electric Drive	(02)
02	Traction System	(08)
03	Electrification Systems	(05)
04	Traction Motors	(25)
05	Braking	(15)
06	Traction Mechanism	(05)
	Total :	**(60)**

CONTENTS:

TOPIC: 01 – ELECTRIC DRIVE: **[02]**

Introduction of Electric Drive, Advantages and Disadvantages of Electric Drive.

TOPIC: 02 –TRACTION SYSTEM: **[08]**

Introduction of Electric Traction, Types of Electric Traction, Ideal traction system, Various systems of traction their advantages and disadvantages, Electrification of Track their advantages and disadvantages.

TOPIC: 03– ELECTRIFICATION SYSTEMS: **[05]**

Different types of Electrification systems, Methods of supplying power to railway trains, Applications of systems for Railway Electrification.

TOPIC: 04 – TRACTION MOTORS : **[25]**

Introduction of Traction motors, Characteristics of traction motors, Torque-Armature current characteristics of D. C. Motors, Speed-Torque Characteristics of D. C. motors, Speed Armature current characteristics of D. C. Motors, A. C. Series motors, Comparison between series and shunt motors with regard to other suitability for traction, Series and shunt motors for traction services, Torque-slip characteristics of three phase induction motor, Single Phase series motors(only advantages and disadvantages regarding electric traction, Traction effort and Horse Power of motors problems.

TOPIC: 05 –:BRAKING: **[15]**

Introduction of Braking, Advantages and disadvantages of electric braking, types of Electric braking, Definition of plugging, Application of plugging on D. C. shunt motor, D. C. series motor. Definition of Rheostatic braking, Application of Rheostatic braking on D. C. shunt motor, D. C. series motor, Definition of Regenerative braking, Application of Regenerative braking on D. C. shunt motor, D. C. series motor.

TOPIC: 06 –TRACTION MECHANISM: **[05]**

Crest speed, Average speed, Schedule speed, Factors affecting schedule speed of a Train, Tractive effort, and Mechanics of Train movement.

Books Recommended:

1. Utilization of Electrical Power - Tuli, Soni and Bhatnagar
2. Utilization and Traction - G. C. Garg
3. Electric Traction - Hazra and Choudhary
4. Utilization of Electric Power and Traction, Khanna Publication - G. C. Garg

ELECTRICAL MEASUREMENT & MEASURING INSTRUMENT

Subject Code 20604	Theory			No of Period in one session : 60		
	No. of Periods Per Week			Full Marks	:	100
	L	T	P/S	Annual Exam.	:	80
	06	-	-	Internal Exam.	:	20

Rationale:

Objective:

S.No.	Topics	Periods
01	Unit & Dimension	(04)
02	Measurement of Resistance	(08)
03	Measurement of Inductance & Capacitance	(05)
04	Magnetic Measurement	(05)
05	High Voltage Measurement	(04)
06	Measuring Instrument	(04)
07	Ammeters & Voltmeters	(08)
08	Measurement of Power	(06)
09	Measurement of Energy	(04)
10	Digital Instrument & Special Purpose Instruments	(08)
11	Transducers	(04)
	Total :	**(60)**

CONTENTS:

TOPIC: 01 –UNIT & DIMENSIONS:		**[04]**
01.01	Fundamental & Derived Units	(01)
01.02	Type of Units	(02)
01.02.01	C. G. S. Electrostatic & Electromagnetic Units	
01.02.02	S. I. Units	(01)
TOPIC: 02 –MEASUREMENT OF RESISTANCE:		**[08]**
02.01	Low, medium & high resistance	(02)
02.02	D. C. & A. C. Resistance	(01)
02.03	Measurement of low resistance by potentiometer & Kelvin's double bridge	(02)
02.04	Measurement of earth resistance by megger	(01)
02.05	Measurement of medium resistance by Wheatstone bridge method	(01)
02.06	Measurement of high resistance by loss of charge method	(01)
TOPIC: 03– MEASUREMENT OF INDUCTANCE & CAPACITANCE:		**[05]**
03.01	Measurement of inductance by Maxwell bridge.	(02)
03.02	Study & uses of Schering bridge.	(01)
03.03	Measurement of mutual inductance.	(01)
03.04	Universal bridge.	(01)

TOPIC: 04 – MAGNETIC MEASUREMENT:		**[05]**
04.01	Measurement of Magnetic flux by flux meter	(02)
04.02	Determination of B/H curve & hysterics loop.	(03)
TOPIC: 05 –:HIGH VOTAGE MEASUREMENT:		**[04]**
05.01	Testing of dielectric strength of transformer oil	(02)
05.02	High voltage d. c. measurement	(02)
TOPIC: 06 –MEASURING INSTRUMENTS:		**[04]**
06.01	Classification of different type of instrument	(02)
06.02	Deflecting & Controlling torque, Damping forces	(02)
TOPIC: 07– AMMETERS & VOLTMETERS:		**[08]**
07.01	Moving iron & moving coil type instrument	(02)
07.02	Dynamometer type instrument	(01)
07.03	Induction type instrument	(01)
07.04	Ammeter shunt & voltage meter multiplier	(02)
07.05	Instrument transformers: Current transformer(C.T.) & Voltage(Potential) Transformer(V.T.)	(02)
TOPIC: 08 –MEASUREMENT OF POWER:		**[06]**
08.01	Measurement of 1-ϕ power with ammeter& voltmeter.	(01)
08.02	Three phase power measurement by two wattmeter & three wattmeter method.	(02)
08.03	Construction & principle of operation of Dynamometer type wattmeter.	(01)
08.04	Construction & principle of operation of Induction type wattmeter.	(01)
08.05	Errors in wattmeter.	(01)
TOPIC: 09 –:MEASUREMENT OF ENERGY:		**[04]**
09.01	Construction & Operation of induction type watt hour meter	(02)
09.02	1-ϕ & 3-ϕ measurement of energy	(02)
TOPIC: 10 –MEASURING INSTRUMENTS:		**[08]**
10.01	Study of frequency meter.	(02)
10.02	Study of cathode ray oscilloscope.	(02)
10.03	Study of megger & multi-meter.	(02)
10.04	Concept of microprocessor based controlling.	(02)
TOPIC: 11 –TRANSDUCERS:		**[04]**
11.01	Introduction of different types of transducers.	(01)
11.02	Strain gauge & its application.	(01)
11.03	L. V. D. T.	(01)
11.04	Thermister.	(01)

Books Recommended:

1. Electrical & Electronics Measuring Instrument, Dhanpat Rai & Sons - A. K. Sawhney
2. Electrical Measurements & Measuring Instrument - E. W. Golding
3. Electrical Measurement & Measuring Instrument, Khanna Publisher - Rajendra Prasad

CADD

Subject Code 20605A	Theory			No of Period in one session : 60		
	No. of Periods Per Week			Full Marks	:	100
	L	T	P/S	Annual Exam.	:	80
	06	-	-	Internal Exam.	:	20

Rationale:

Objective:

CONTENTS:

S.No.	Topics	Periods
01	Introduction.	
02	Fundamental Properties.	
03	PCB Modeling.	
04	D. C. Analysis of Non-linear Circuit.	
05	Modeling of Semi Conductor Components	
06	2D Tools.	
07	Measurements.	
08	Symbol Library Creation (Blocks)	
09	Concept of layers and Layerisation	
10	Isometric Drawing.	
	Total :	**(60)**

CONTENTS:

TOPIC: 01 – INTRODUCTION:

01.01 Computer System.
01.02 Computer Aided Design.
01.03 Hardware.
01.04 Software transformation System.
01.05 Geometric Modeling.
01.06 Draughting Application of CAD/CAM.
01.07 Techniques to finite element Data Probation.

TOPIC: 02 – FUNDAMENTAL PROPERTIES:

02.01 Poissions Equation.
02.02 Continuity Equation.
02.03 Carrier Transport Equation.
02.04 Carrier concentration.

TOPIC: 03– P C B MODELING:

03.01 Introduction.
03.02 Single Layer PCB layout using AutoCAD.
03.03 Multi Layer PCB layout using AutoCAD.

TOPIC: 04– D. C. ANALYSIS OF NON LINEAR CIRCUITS:

04.01 Introduction non-linear equation.
04.02 Newton Rapson technique for many variable.
04.03 Linearised equivalent of non-linear circuits.
04.04 Linearised equivalent of hybrid formulation.

TOPIC: 05 – MODELING OF SEMI CONDUCTOR COMPONENTS:

05.01 Modeling of P N Junction.
05.02 Modeling of various diodes.
05.03 Modeling of B J T.
05.04 Modeling of F E T.
05.05 Modeling of M O S devices.

TOPIC: 06 – 2D TOOLS:

06.01 2 D Drawing Tools.

06.02 2 D Editing Tools.

06.03 2 D Display Tools.

TOPIC: 07 –MEASUREMENTS:

07.01 Drawing Scales.

07.02 Drawing Limits and Measurements.

TOPIC: 08 – SYMBOL LIBRARY CREATION (BLOCKS):

08.01 Symbol Library Creation (blocks).

08.02 Insert, Minsert, Attribute, Wblock.

08.03 Hatching Techniques, Boundary Hatching and Editing of Hatches.

TOPIC: 09 – CONCEPT OF LAYERS AND LAYERISATION:

09.01 Concept of layers & layerisation.

09.02 Line types.

09.03 Line weight.

09.04 Colours.

09.05 Text.

09.06 Dtext.

09.07 Text styles, Mtext.

09.08 Spell, Ddedit.

09.09 Point Styles.

09.10 Multilines Styles Creation.

TOPIC: 10 – ISOMETRIC DRAWING:

10.01 Isometric Drawing Preparation, Snap, Isoplane, Blips, Qtext, Grids, Slide Shows.

Books Recommended:

1. Computer Fundamental. - Dr. B. Ram.
2. Computer Today (III Edition) - D. H. Sandrs.
3. Computer Aided Analysis of Electronic Circuits. - Chua & Lin.
4. Computer Architecture and Organisation. - J. P. Hayes.
5. Principles of Computer Aided Design. - Joe Rooney and Philip.
6. Analysis & Simulation of Semi Conductor Devices. - Siefried & Selberher
7. Computer Aided Electronic Circuit Design. - Raghuram
8. AutoCAD. - Rice
9. AutoCAD. - Oumera
10. S P I C E. - Mannual

ELECTRICAL MACHINE DESIGN

Subject Code 20605B	Theory			No of Period in one session : 60		
	No. of Periods Per Week			Full Marks	:	100
	L	T	P/S	Annual Exam.	:	80
	06	-	-	Internal Exam.	:	20

Rationale :

Objective:

CONTENTS:

S.No.	Topics	Periods
01	Elementary Design of Rotating Machines	(05)
02	Design of D. C. Machines(Series & Shunt types)	(10)
03	Design of Transformer(1-ϕ & 3-ϕ types)	(15)
04	Design of 1-ϕ & 3-ϕ induction motors of various ratings	(15)
05	Design Synchronous Machine	(15)
	Total :	**(60)**

Books Recommended:

1. Electrical Machine Design - A. K. Sawhney

NETWORK THEORY

Subject Code 20605C	Theory			No of Period in one session : 60		
	No. of Periods Per Week			Full Marks	:	100
	L	T	P/S	Annual Exam.	:	80
	06	-	-	Internal Exam.	:	20

Rationale :

Objective:

S.No.	Topics	Periods
01	Basic Circuit Elements & Waveforms	(07)
02	Mesh and Node Analysis	(09)
03	Fourier Series	(06)
04	Laplace Transform & their application	(07)
05	Resonance	(03)
06	Two-Port Network	(12)
07	Passive Network Synthesis	(10)
08	Introduction of First order & Second order System with Examples	(06)
	Total :	**(60)**

CONTENTS:

TOPIC: 01 – BASIC CIRCUIT ELEMENTS & WAVEFORMS: [07]

- 01.01 Circuit components
- 01.02 Standard Input Signals
- 01.03 Sinusoidal Signals

TOPIC: 02 –MESH AND NODE ANALYSIS: [09]

- 02.01 Kirchoff's Laws.
- 02.02 Source Transformation.
- 02.03 Mesh & Node analysis.
- 02.04 Magnetic coupling.

TOPIC: 03– FOURIER SIERIES: [06]

- 03.01 All forms of Fourier Series including trigonometry, Exponential etc.
- 03.02 Fourier Transform.

TOPIC: 04 –LAPLACE TRANSFORM & THEIR APPLICATION: **[07]**

04.01 Introduction.

04.02 Laplace transformation.

04.03 Application of Laplace transform in the solution of Linear Differential Equation.

04.04 Inverse Laplace Transform.

TOPIC: 05 –RESONANCE: **[03]**

05.01 Series Resonance

05.02 Parallel Resonance

TOPIC: 06 –TWO-PORT NETWORK: **[12]**

06.01 Introduction.

06.02 Open Circuit Impedance Parameters.

06.03 Short Circuit Admittance

06.04 Two Port Symmetry

TOPIC: 07 –PASSIVE NETWORK SYNTHESIS: **[10]**

07.01 Introduction.

07.02 Positive real function.

07.03 Two Terminal R-L Network.

07.04 Two Terminal R-C Network.

TOPIC: 08 –INTRODUCTION OF FIRST ORDER & SECOND ORDER SYSTEMS WITH EXAMPLES: **[06]**

Books Recommended:

1. Network & System - D. Roy Choudhury
2. Network & System - G. K. Mittal
3. Network & System - Vulkenberg
4. Network & System - Dacsur & Kuo

DATABASE MANAGEMENT SYSTEMS

Subject Code 20605C	Theory			No of Period in one session : 60		
	No. of Periods Per Week			Full Marks	:	100
	L	T	P/S	Annual Exam.	:	80
	06	-	-	Internal Exam.	:	20

Rationale:

This subject will allow students to develop understanding of the basic concepts of data in general and Relational Database System in particular. The students will learn Database concept, Data Structure, Data Models, various approaches to Database design, strengths of relational model, Normalization.

Objective:

At the end of the course the student will be able to:

- Develop Database System to handle the real world problem.
- Understand Database design and normalization techniques.
- Use Standard Query Language and its various versions.
- Understand Importance

S.No.	Topics	Periods
01	Introduction to Database Systems(DBMS)	(04)
02	Database Architecture and Modelling	(04)
03	Entity Relationship Model	(03)
04	Relational Model	(04)
05	Relational Algebra and Relational Calculus	(06)
06	Introduction to SQL	(12)
07	Database Normalization	(06)
08	Backup and Recovery	(06)
09	Database Security and Integrity	(05)
10	Design and Development of Database Applications on Commercial RDBMS Platforms	(10)
	Total :	**(60)**

CONTENTS:

TOPIC: 01 – INTRODUCTION TO DATABASE MANAGEMENT SYSTEMS (DBMS): [04]

Why Database, Characteristics of Data in Database, DBMS, What is database Advantage of DBMS

TOPIC: 02 – DATABASE ARCHITECTURE AND MODELLING: [04]

Conceptual, physical and logical database models, Role of DBA, Database Design

TOPIC: 03 – ENTITY RELATIONSHIP MODEL: [03]

Components of ER Model, ER Modelling Symbols, Super Class and Sub Class types. Attribute Inheritance. Specialization, Generalization, Categorization.

TOPIC: 04 – RELATIONAL DBMS: [04]

Introduction to Relational DBMS. RDBMS Terminology.

TOPIC: 05 – RELATIONAL ALGEBRA AND RELATIONAL CALCULUS: [06]

Relational Algebraic operations, Tuple Relational Calculus, Domain Relational Calculus

TOPIC: 06 – INTRIDUCTION TO SQL: **[12]**

History of SQL. Characteristics of SQL. Advantages of SQL. SQL in Action SQL data types and Literals. Types of SQL commands. SQL Operators and their precedence. Tables, Views and Indexes. Queries and Sub queries. Aggregate functions. Insert, Update and Delete operations. Joins, Unions, Intersection, Minus, Cursors in SQL, Embedded SQL.

TOPIC: 07 – DATABASE NORMALISATION: **[06]**

Keys, Relationships, First Normal Form, Functional dependencies, Second Normal Form, Third Normal Form, Boyce-Codd Normal Form, Fourth Normal Form, Fifth Normal Form, Case Study

TOPIC: 08 – BACK UP AND RECOVERY: **[06]**

Database backups. Why plan backups? Hardware protection and redundancy. Transaction logs. Importance of backups. Database recovery. Data Storage. Causes of failures. Recovery concepts and terminology. Recovery facilities. Recovery techniques. Detached transaction actions, Disaster Database Management System

TOPIC: 09 – DATABASE SECURITY AND INTEGRITY: **[05]**

Types of Integrity constraints. Restrictions on Integrity constraints. Data security risks. Complex user management requirements. Dimensions of security. Data security requirements. Database users. Protecting data within the database. Granting and revoking privileges and roles. System viability factors. Authenticating users to the database.

TOPIC: 10 – DESIGN AND DEVELOPMENT OF DATABASE APPLICATIONS ON COMMERCIAL RDBMS PLATFORMS: **[10]**

Student is expected to achieve a level of competence in at least one of the standard commercial RDBMS products under desktop or multi-user environment to be able to develop a small to medium application; the student must also acquire skills for independently designing on-line database applications. The skills required for design and developments are; Database design. Applications design. SQL. Embedded SQL. Trouble-shooting. Performance tuning and documentation.

In application design, focus should be on on-line applications in database environments; the students should get sufficient insight into issues in menu design, screen design, data validations in data entry screens, report designs and an overview of GUI design. These skills must be demonstrated through the course project including the project report and viva-voce.

Concepts of DBMS will be implemented by using the popular relational DBMS package such as ORACLE/ MS-SQL.

Books Recommended:

Text Books

1. Database Management Systems, First Edition, 2002, Vikas Publishing House - A. Leon & M. Leon
2. Fundamentals of Database Systems, Third Edition, 2000, Addison Wesley - R. Elmasri, S. Navathe

Reference Books:

1. Database System Concepts, Third Edition, 1997, McGraw-Hill Internation - H. Korth, A. Silberschatz
2. An Introduction to Database Systems, Galgotia Publication - B. Desai
3. Database Processing: Fundamentals, Design Implementation, Prentice Hall of India. - D.K. Kroenke
4. Database Management Systems, First Edition, 1996, McGraw Hill - P. Bhattacharya and A.K. Majumdar
5. Database System Concepts, Fourth Edition, 1997, Tata McGraw Hill - Abraham Silberschtz, Henry Korth & S. Sudarshan

ELECTRIC TRACTION LAB

Subject Code 20606	Practical			No of Period in one session : 50		
	No. of Periods Per Week			Full Marks	:	50
	L	T	P/S	Annual Exam.	:	40
	-	-	2	Internal Exam.	:	10

Rationale:

The background of theoretical knowledge about Electric Traction has been imparted in the theoretical portions.

However, the electrical diploma holders will require to handle various traction equipments in the field whenever they are given charge of. So, it is essential that the students are able to handle the model equipments physically.

Objectives:

The coverage of syllabus of the subject is made in such a way that the students will get thorough knowledge of handling the machines & instruments. By performing such experiments they will gain confidence to face the problems from front and take proper steps for their rectification and removal. The students will be able to understand the theory that they have read, better by performing the prescribed experiments besides developing better skill.

Name of Experiments:

01 Determination of control of D. C. Shunt motor by thyristor control method.

02 Study of speed-time curves for Train movement.

03 Determination of Tractive force-speed characteristics of a slip-ring Induction motor.

04 Study of Rheostatic Braking in a D. C. Shunt motor.

05 Study of Rheostatic Braking in an Induction motor.

06 Determination of Torque-slip characteristics of three phase Induction motor.

07 Study of Regenerative braking in a D. C. Shunt motor/D.C. series motor.

08 Determination of Tractive force speed characteristics of a D. C. series motor under different diverter positions.

09 Study of systems of Electrification for Traction purposes.

10 Determination of speed-current characteristics of D. C. shunt motor.

11 Determination of speed-torque characteristics of D. C. series motor.

12 Study of Train movement mechanism.

Books Recommended:

1. Electric Traction - Hazra and Choudhary.
2. Laboratory Expects in Electrical Power, Khanna Publishers. - C. S. Indulkay.
3. Utilization of Electrical Power and traction, Khanna Publishers. - G.C. Garg.
4. Study of Electrical Appliances and Drives, Khanna Publishers. - K. B.Bhatia.

ELECTRICAL MEASUREMENT LAB

Subject Code 20607	Practical			No of Period in one session : 60		
	No. of Periods Per Week			Full Marks	:	50
	L	T	P/S	Annual Exam.	:	40
	-	-	3	Internal Exam.	:	10

Rationale:

The background of theoretical knowledge about Electrical instrument and m/c has been imparted in the theoretical papers.

However, the electrical Diploma Holders will require to handle various Electrical Instruments and m/cs in the field whenever they are given change of. So, it is necessary to acquaint the students with the practical aspects handling the Instruments & m/cs to increase their confidence and develop skill of level measurements, data entry, graph reading, analysis of the experimental results, etc.

Objectives:

The coverage of syllabus is made in such a way that the students will get through knowledge of Handling the m/cs & Instruments. By performing such experiments they will gain confidence to face the problems and rectify they boldly. The students will develop skills of measuring taking data, their tabulations, plotting graphs, interpreting the data and the graphs to develop analytical skill.

S.No.	Topics	Periods
01	Calibration of Ammeter by D. C. Potentiometer.	(06)
02	Study of Transducers.	(06)
03	Extension of Range of Ammeter and Voltmeters.	(06)
04	Calibration of Wattmeter.	(06)
05	Testing of Energy Meter.	(06)
06	Measurement of single phase power without using wattmeter.	(06)
07	Measurement of R, L, & C using Kelving Double Bridge Method.	(06)
08	Measurement of Dielectric strength of Transformer Oil.	(09)
09	Measurement of Point of fault in a given cable.	(09)
	Total :	**(60)**

Books Recommended:

1. Laboratory Expects in Electrical Power - C. S. Indulkay
2. Projects and Molecules in Electrical Electronics, Khanna Publishers - Bhatia
3. Study Electrical Appliances & Drives, Khanna Publishers - K. B. Bhatia
4. Testing Commissioning & Maintenance of Electrical Equipments, Khanna Publishers - S. Rao
5. Text Book & Laboratory Course in Electrical Engineering, S. Chand & Company - S. G. Jarnekar

PROFESSIONAL STUDIES & ENTREPRENEURSHIP

Subject Code 00607	Sessional			No of Period in one session : 50		
	No. of Periods Per Week			Full Marks	:	50
	L	T	P/S	Annual Exam.	:	30
	-	-	04	Internal Exam.	:	20

Rationale:

The paper has been introduced to achieve dual purpose for the students.

Firstly, this course provides the basics of Professional management and secondly it also prepares the student to undertake independent venture by becoming an entrepreneur.

This makes them conversant with their duties and responsibility to make them successful in their career building.

Objectives:

With the input provided in this paper, the students will be able to :-

- Acquire basic knowledge of management.
- Understand the area of management such as human resources, marketing, finance and commercial aspect.
- Understand the benefit of becoming an entrepreneur.
- Handle a project efficiently and in dependently.

To prepare a Project Report on any of the followings:

S.No.	Topics
01	Project Identification and formulation Report.
02	Project Profile/Pre-feasibility Report.
03	Techno-economical Feasibility Report (TEFR).
04	Market Survey Report.

CONTENTS

- Means of Finance.
- Cost of Production.
- Annual Turnover.
- Profit.
- Profit on Investment.

TOPIC – 03: TECHNO-ECONOMICAL FEASIBILITY REPORT (TEFR).

- Introduction on product.
- Market Prospects and Marketing.
- Location.
- Manufacturing Programme and Annual Turnover.
- Manufacturing Process.
- Cost of Project.
- Means of Finance.
- Requirement of Raw materials, Consumables, Utilities and Working Capital.
- Organisational Structure, Management and Man Power.
- Project Implementation Schedule.
- Profitability and Cash Flow.

TOPIC - 04 : MARKET SURVEY REPORT:

- Data Collection & Processing through Primary & Secondary Sources- Questionnaire method, e-mail, by post, by phone.
- Present Status.
- Growth of the Industry.
- Import and Export.
- Present market Demand.
- Forecast.
- Future Prospect/Scope.
- Market Segmentation.

Books Recommended:

1. Essential of Management, Tata McGraw Hill, Publishing Company Ltd., New Delhi. - Herald Koonz & Cyril O' Donnel.
2. Business Organisation and Management, S. C. Chand and Company (Pvt.) Ltd., Ram Nagar, New Delhi - M. C. Shukla
3. Managerial Economics, Sultan Chand & Sons, New Delhi - R. L. Vashney & K. L. Maheshwari
4. Project Appraisal and Follow up, Govind Prakashan, Mumbai. - D. P. Sharda
5. Modern Marketing Management, Progressive Corporation Pvt. Ltd., P51, Mahatma Gandhi Road, Bombay-400 001 - Dr. Rustam S. Davar

6.	A hand book for new entrepreneurs (with special reference to science and technology target group)	- Entrepreneurship Development Institute of India, 83-A, Swastic Society Navrangpura, Ahmedabad, PIN-380 009.
7.	Student discipline	- Published by I.S.T.E. Mysore
8.	Communication Skill	- Published by I.S.T.E. Mysore
9.	Decision Making	- Published by I.S.T.E. Mysore
10.	Pollution Control in Industry	- Published by I.S.T.E. Mysore
11.	S.S.M. in Environmental Engineering	- Published by I.S.T.E. Mysore
12.	Leadership in Organisation	- Published by I.S.T.E. Mysore
13.	Small Enterprise Management	- Published by I.S.T.E. Mysore
14.	Motivation	- Published by I.S.T.E. Mysore
15.	Fundamentals of Environmental Pollution	- Krishnan and Kannan
16.	Enviromental Engineering, T.T.T.I., Madras	- Tata Mcgraw Hill
17.	Motivation I.I.T. Kanpur	- Published by I.S.T.E. Mysore
18.	Mine Management	- V.N. Singh, Bangle Prining Press Ranchi
19.	Hand book on Project Appraisal and follow up, Govind Prakashan, 204, Saraswati Kunj, 90, S. V. Road, Goregoan, Bombay-400 062.	- D. P. Sarda
20.	Bihar Industrial Policy	- Government of Bihar, Department of Industries.
21.	Entrepreneurship Guide	- Bihar State Financial Corporation, Fraser Road, Patna-800 001.
22.	Management Economics, S. Chand & Sons, 4792/23, Dariaganj, New Delhi-110 002.	- R. L. Varshney & G. L. Maheshwari
23.	Management Principles & Practices, S. Chand & Sons, 4792/23, Dariaganj, New Delhi-110002.	- L. Prasad & S. S. Gulshan

PROJECT WORK AND ITS PRESENTATION IN SEMINAR

Subject Code 20609	Sessional			No of Period in one session :		
	No. of Periods Per Week			Full Marks	:	100
	L	T	P/S	Annual Exam.	:	60
	-	-	-	Internal Exam.	:	40

Rationale:

The Project work and its presentation in seminar is an important subject for a Diploma holder technician. The course is designed to help a student develop confidence, skill in report writing, skill to analyse, design, estimating and costing, deciding a process etc, the course will also help in developing communication skill, skill of quality documentation.

Objective:

A student will be able to:

- Identify a Problem
- Analyse the Problem
- Develop logical approach to solution of a Problem.
- Design of a product
- Make estimate of materials and processes and calculate the cost of production and decide the price of the product.
- Manufacture / assemble /fabricate the product in the workshop.
- Test the product for its quality.
- Prepare a project report (Computer printed / typed)
- Present in the form of seminar.

CONTENTS

S.No.	Topics
01	Load survey and rural electrifications.
02	To make a small electronic / electrical appliences.
03	To make a choke and a Capacitor.
04	To make a small transformer.
05	To make a starter for motors.
06	To make a Battery charger.
07	To make an Electric Iron.
08	To make an eliminator.
09	To make a ceiling fan Regulator.
10	Other similar Problems.

REPORT WRITING:

A report must include

S.No.	Topics
01	Introduction.
02	Design.
03	Estimating of materials.
04	Calculation of cost of the materials.
05	Operation time estimation.
06	Cost of Operation.
07	Process of Manufacture / Assembly / fabrication.
08	List of tools/equipments used with specification.

OR

A project on live industrial problems that may be—

- Technical
- Human Relation
- Welfare
- Safety
- Any other

The Project Report should consist of :-

01	Introduction.
02	Problem statement.
03	Background of Industry.
04	Organisational set –up.
05	Plant Lay –out.
06	Reason for selecting a problem.
07	Analysis of Problem.
08	Probable solution.
09	Best solution possible.
10	Any other.

Project work/ project report should be presented in the form of a seminar for developing confidence and communication skill among the students.

NOTE:-

Project work will be allotted to the students just in the beginning of the session. Each student will be give a separate work under the supervision of a teacher. Total number of students may be divided among the number of teachers available. The teacher concerned will select separate problem for each student under him and allot it to him at the beginning of the session. The work allotted should be completed with in scheduled time. i e. by the end of the session. Problems selected should preferably conform to the syllabus. If it is outside of the syllabus then it must be within the field of electrical engineering.