



Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Technology and Science
Choice Based Credit System (CBCS) in the Light of NEP-2020
Diploma (Electrical Engineering)
(2021-2024)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
DTEE502	DCC	Industrial Electronics	60	20	20	30	20	3	0	2	4

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit;
*Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Objectives:

1. Understand the principles, merits and de-merits of Induction/ Di-electric heating
2. Draw and design regulated / controlled power supply , SMPS and UPS

Course Outcomes:

After the successful completion of this course students will be able to

1. Understand solid state devices as logic switches, power controller switches.
2. Understand heating and its properties.
3. List general and industrial applications of converters, invertors, choppers, and regulator.
4. Select proper device for a given application

Syllabus

UNIT I

Inverter Application

6 Hrs.

SMPS Types, Block diagram of SMPS, Various schemes of SMPS, advantages and disadvantages. UPS-Type (ON Line, OFF Line) and its comparison. Battery banks.

UNIT II

Electric Welding

9 Hrs.

Electric welding, resistance and arc welding, control devices and welding equipment. A.C. / D.C. timers using solid state devices, Synchronous and non synchronous timers, Sequence timer, Duty cycle of welding process, Electronic welding controls, SCR as electronic contactor in welding.

UNIT III

High frequency heating

9 Hrs.

Induction Heating: Basic Principle ,Factors Governing the process, Applications, merits & demerits over other systems , Di-electric heating: Basic Principle ,Factors governing the process, applications, merits & demerits over other systems.

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UNIT IV

9 Hrs.

General Applications

Static Switches, AC switches, DC Switches, Solid State Relays, DC Solid State Relays, AC Solid State Relays. Static Circuit Breakers, Static AC Circuit Breakers, Static DC Circuit Breakers, Battery Charger, Sawtooth generators, Flasher Circuits

UNIT V

9 Hrs.

Industrial Applications

HVDC Transmission, Types of HVDC link, Bipolar HVDC System, Temperature control, Liquid level controllers, Alarm actuator, High frequency welding, Ultrasonic Applications, Emergency Lighting System.

References:

1. Power Electronics by M. H. Rashid - PHI Publication-3 rd Edition.
2. Industrial Electronics and control by Biswanath Paul, PHI publications 2nd Edition.
3. Programmable Logic Controllers - "Frank D.Petruzela "PHI publications
4. Power Electronics by Dr.P. S. Bimbhra, Khanna publishers -2 nd Edition.
5. Industrial & Power Electronics By Harish C.Rai, Umesh Publication, 5 th Edition.
6. Programmable Logic Controller –Pradeep Kumar& Srivashtava- BPB Publications

List of Practical

1. Demonstration of SMPS.
2. Demonstration of UPS
3. Demonstration of High frequency heating
4. Demonstration of induction heating.
5. Demonstration of Sawtooth generators.
6. Study of circuit breaker.

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DTEE503	DCC	Estimating and Costing	60	20	20	0	0	3	0	0	3

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Course Objective:

The aim of this course is to enable the students to prepare the schedule of materials with specifications and estimates for different types of electrical installations.

Course Outcomes:

After the successful completion of this course students will be able to

1. Summarize the importance of estimation and specification.
2. Prepare the schedule of materials with specifications and estimates for service mains.
3. Draw the wiring plan for residential buildings, Prepare the schedule of materials with specifications and estimates for lighting Installations.
4. Prepare the schedule of materials with specifications for transmission lines, distribution line and substations.

UNIT I

9 Hrs.

Introduction

Meaning of estimation and specification, its importance and purpose and the factors to be considered while preparing estimations and specifications. Meaning of standardization and its advantages. Meaning of overhead charges, stock incidental charges, contingencies, supervision charges, labour charges, Inspection charges, transportation charges and miscellaneous charges.

UNIT II

8 Hrs.

Service Mains

Meaning of service mains, code of Practice for service mains, types of service mains- Over Head & UG Service Mains, materials and specifications, current ratings for Aluminium, copper conductors and selection of size of conduit pipe as per the size and number of wires. Load calculation, selection of size and type of conductor/UG cable, estimates for single phase OH service connection, three phase OH service connection.

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UNIT III

8 Hrs.

Lightning Installation

Interior Wiring types and their applications, factors to be considered, materials required for Interior wiring and their specifications, calculating the quantity of wiring materials and accessories for the Interior Wiring, load calculations for residential buildings, size of conductors.

UNIT IV

9 Hrs.

Power Installation

Code of Practice for Power Installations, materials required for power circuit wiring and their specifications, Prepare the layout diagram of machines showing clearances as per IS standards, load calculations, determine the size of conductors, main switch, Isolators, sub switches and protective devices,

UNIT V

9 Hrs.

Distribution Line and transformer centre

Code of practice for Distribution Lines and Transformer centre, types of transformer centres - Pole mounted, plinth mounted, indoor and outdoor types. Determining the rating of Distribution Transformer. Write Specifications of the Distribution Transformer. Code of practice for Transmission lines and substations, transmission line materials and their specifications, types of Towers, ACSR conductors and Number of Disc insulators in suspension string.

References:

1. KB Raina, SK Bhattacharya, "Electrical Design Estimating and Costing", New Age Publishers.
2. J.B.Gupta, "Electrical Installation Estimating and Costing", S.K.Kataria and Sons.
3. SL Uppal ,G.C.Garg, "Electrical Wiring Estimating and Costing", Khanna Publisher,
4. Surjit Singh, "Electrical Estimating and costing", Dhanpat Rai & Co.
5. Raghvendra Rao, "Electrical Design Estimating and Costing", published by sapna book house.

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DTEE504	DCC	Power System Operation and Protection	60	20	20	30	20	3	0	2	4

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Course Objectives:

1. To introduce the concepts power system operation.
2. To gain the concepts of various switchgear and protection equipment in power system.

Course Outcomes:

After the successful completion of this course students will be able to

1. Apply core concepts in of economics of generation.
2. Analyze the types of faults in power system.
3. Understand the operation and functioning of circuit breakers, lightning arrester, and relays.
4. Understand the types of substations and their components.

Syllabus

UNIT I

8 Hrs.

Economics of Power Generation

Terms commonly used in system operation: connected load, firm power, cold reserve, hot reserve, spinning reserve. Terms used in system operation such as Load curve, load duration curve, integrated duration curve. (Simple numerical based on plotting above curves.) Factors affecting the cost of Generation: Average demand, Maximum demand, plant capacity factor & plant use factor, Diversity factor & load factor. (Simple numerical based on above)

UNIT II

9 Hrs.

Power System Faults

Single line diagram, use of standard symbol. Per unit quantity - definition and advantages, base impedance conversion of per unit values from one base values to other base values. Type of faults - symmetrical and unsymmetrical: Phase sequence impedance, phase sequence networks, analysis of symmetrical faults. Analysis of L-G, L-L and L-L-G fault by symmetrical components, simple numerical problems.

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UNIT III

8 Hrs.

Relays

Principle and working of different types of relays- electromagnetic and induction type. Induction type over current relay, reverse power relay, time, and current settings. Differential relays., distance relays, thermal relays, inverse current characteristics.

UNIT IV

8 Hrs.

Circuit Breakers and Fuses

Function of fuse. fusing factor, fusing characteristic. Application of isolator and circuit breakers. Circuit breaker capacities. Arc formation in C.B. and methods of arc extinction. Definition of various terms with reference to circuit interruption wave form. working principle and operation of Bulk Oil/Minimum oil/air blast/SF CB. Merits and Demerits of different types of C.B.

UNIT V

8 Hrs.

Substations

Introduction, Classification of indoor & outdoor sub-stations, Advantages & Disadvantages, Selection & location of site, Main connection schemes, Equipment's circuit element of substations, In coming & outgoing lines, Transformers, CT&PT, Isolators, batteries, lightning arresters. Insulators and Bus bar's material, types in detail. Connection diagram and layout of sub-stations

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References:

1. Leonard L. Grigsby; Electric Power Generation, Transmission, and Distribution; CRC Press, 3rd edition.
2. S.N. Singh, 'Electric Power Generation, Transmission and Distribution', Prentice Hall of India Pvt. Ltd, New Delhi, Second Edition.
3. Soni, Gupta, Bhatnagar, Electrical Power (Generation, Transmission, Distribution, Protection and Utilization), Dhanpath Rai And Sons, Delhi.
4. B.R.Gupta, S.Chand, 'Power System Analysis And Design' New Delhi, Fifth Edition.
5. C.L.Wadhwa, 'Electrical Power Systems', New Age International Publishers.
6. D.P.Kothari, I.J. Nagarath, 'Power System Engineering', Tata McGraw-Hill Publishing Company Limited, New Delhi, Second Edition.

List of Practical

1. To Check the Polarity of Current Transformer and Potential Transformer.
2. To Study the various kinds of switchgear equipment and write its specification and symbols.
3. To study the parts of various circuit breakers and their specifications.
4. To Perform and calculate the fusing factor of a given fusing material.
5. To study a Vacuum circuit breaker.
6. Identify the various components of the SF6 circuit breaker.
7. To perform Test on overload relay and plot Time-Current characteristic.
8. To study Buchholz relay for transformer protection.

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DTEE604	AECC	Energy Conservation and Management	60	20	20	0	0	3	0	0	3

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Course Objectives:

The aim of this course is to impart the basic knowledge of different types of energy audits, and to equip them with waste heat recovery techniques, HVAC system, DSM and EEM and Drives.

Course Outcomes:

After the successful completion of this course students will be able to

1. Understand the various types of renewable and non-renewable energy sources.
2. Identify the causes of low power factor and advantages of power factor improvement.
3. Understand the demand side management tariff techniques.

Syllabus

UNIT I

9 Hrs.

Energy Scenario

Various types of renewable and non-renewable energy, energy consumption and use pattern, energy consumption and environment. Energy Management and audit-Energy Management and its objectives, energy audit, need of energy audit, types of energy audit, energy auditing instruments.

UNIT II

9 Hrs.

Waste Heat Recovery

Sources of waste heat, advantages of waste heat recovery, commercial waste heat recovery devices- Recuperators, Heat regenerators, heat pumps etc. Agricultural use of waste heat.

UNIT III

8 Hrs.

Heating Ventilation and Air Conditioning

Definition of Heating, ventilation and air conditioning, Energy saving opportunities in heating ventilation and air conditioning, Conducting Audit in heating ventilation and air conditioning.

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UNIT IV

9 Hrs.

Demand Side Management

Benefits, Demand side management Techniques, implementation of Demand side management program, Tariff options of Demand side management.

UNIT V

9 Hrs.

Energy Efficient Motor and Drives

Motor efficiency, energy efficient motors, energy efficient electric drives, use of variable speed drives, Power factor improvement-Causes of low power factor, advantages of power factor improvement, methods of power factor improvement.

References:

1. Energy Conservation and Management by S. K. Soni and Manoj Nair, Satya Prakashan, New Delhi
2. Energy management- W.R. Murphy & G.M. ckey, Butter worths.
3. Electrical Energy utilization & conservation – Dr. S.C.Tripathi

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DTEE509	SEC	Computer Aided Electrical Drafting Laboratory	0	0	0	30	20	0	0	4	2

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Course Objectives:

1. Symbols widely used in Electrical and Electronics circuits.
2. Single line diagram of different types of starter.

Course Outcomes:

After the successful completion of this course students will be able to

1. Comprehend with ELECTRIC CAD software.
2. To understand the structure of cables.
3. To know the physical structure of insulator
4. To Know the operation of starters

List of Practical

1. To draw and modify simple geometrical figures with the CAD tools.
2. To draw cross sectional elevation of XLPE cable.
3. To draw the half sectional elevation of pin insulator.
4. To develop DC lap winding with equalizer ring and wave winding for a DC machine.
5. To develop DC wave winding for a DC machine.
6. To draw the line diagram of DOL starter.
7. To draw the line diagram of fully automatic star delta starter.

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