SVM Institute of Technology, Bharuch

Department of Electrical Engg.

Syllabus: Mid Semester Examination (Even semester 2018-19)

BE – III (6^{th} Semester) Electrical

Name of Faculty: Haresh S. Nankani

Subject Code: 2160912 Subject Name: Design of DC Machine & Transformer

Sr. No.	Unit	Topics
1	Unit 1	**GENERAL DESIGN ASPECTS:** Specific electric loading and Specific magnetic loading; Output coefficient; Output equations for transformers and rotating machines; Factors affecting size of machines, Related examples.
2	Unit 2	**DESIGN OF DC MACHINES**: Introduction; Output equation; MMF calculation; Selection of number of poles, Design of core length and armature diameter, Related examples.
3	Unit 3	**DESIGN OF THREE PHASE RANSFORMER:** Types of transformers; Position of HV and LV windings and its importance, Relation between core and yoke cross section area and its significance, Different types of transformer windings; Different positions of taping; Window space factor, Factors affecting window space factor; Relation between emf per turn and transformer rating, MAIN DIMENSIONS: Design of window dimensions, yoke dimensions and overall core dimensions; Related examples.

Text Books:

1. Electrical Machine Design By: A. K. SAWHNEY
2. Theory and Practice of Electrical Machine Design By: Dr. N. K. Datta

SVM Institute of Technology, Bharuch

Department of Electrical Engg.

Syllabus: Mid Semester Examination (Even semester 2018-19)

BE – III (6^{th} Semester) Electrical

Name of Faculty: Haresh S. Nankani

Subject Code: 2160908 Subject Name: Electrical Power System-II

Sr. No.	Unit	Topics
1	Unit 1	**Current and Voltage Relations on a Transmission Line:** Representation of line, The short transmission line, The medium-length line, The long transmission line: Solution of the differential equations, The long transmission line: Interpretation of the equations, The long transmission line: Hyperbolic form of the differential equations, The equivalent circuit of a long line, Power flow through a transmission line, Reactive compensation of transmission lines.
2	Unit 2	**Symmetrical Three-Phase Faults:** Transients in RL Series circuits, Short-Circuit currents and the reactances of Synchronous machines, Internal voltages of loaded machines under transient conditions, The bus impedance matrix in fault calculations, A bus impedance matrix equivalent network, The selection of circuit breakers.
3	Unit 3	**Corona:** Critical Disruptive Voltage, Corona Loss, Line Design based on Corona, Disadvantages of Corona, Radio Interference, Inductive interference between Power and Communication lines

Text Books:

1. Modern Power system Analysis by I J Nagrath, D P Kothari,4th Edition Tata McGraw Hill.
2. Electrical Power systems: C. L .Wadhwa, 5th Edition, New Age International Publishers.
3. Principles of power system By: V. K. Mehta, Rohit Mehta, S. Chand Publication

SVM Institute of Technology, Bharuch
Department of Electrical Engineering
Syllabus: Mid Semester examination (Even semester 2018-19)
BE – III (6^{th} Semester) Electrical

Name of Faculty: Prof.Abhishek Mehta & Prof. Chirayu Patel
Subject Code: 2160911 **Subject Name:**COMPUTER AIDED ANALYSIS AND DESIGN FOR ELECTRICAL ENGG

Sr. No.	Unit	Topics
1	Unit 1	**CONCEPT OF COMPUTER-AIDED DESIGN AND OPTIMIZATION** Introduction; Computer Aided Design; Explanation of details of flow chart; Input data to be fed into the program; Applicable constraints Max or Minimum permissible limits; Output data to be printed after execution of program; Various objective parameters for optimization in an electrical machine; Selection of optimal design; Explanation of lowest cost and significance of "Kg/KVA"; Flowcharts. **BASIC CONCEPTS OF DESIGN** Introduction; Specification; Output coefficient; Importance of specific loadings; Electrical Materials: Conducting Materials, Insulating Materials and Magnetic Materials; Magnetic circuit calculations; General procedure for calculation of Amp-Turns; Heating and Cooling; Modes of heat dissipation; Standard ratings of Electrical machines; Ventilation schemes in static machines (Transformers) and in rotating machines; Quantity of cooling medium; Types of enclosures; General design procedure; Steps to get optimal design.
2	Unit 2	**COMPUTER AIDED DESIGN OF TRANSFORMERS:** Introduction; Flowcharts and programs for computer aided design of transformers. 2D FEM open source software based transformer part design **COMPUTER AIDED DESIGN OF DC MACHINES:** Introduction; Flowcharts and programs for computer aided design of DC machines. 2D FEM open source software based DC machine part design

Text Book:

1. Computer aided design of electrical machines - K M Vishnu Murthy, B S Publications
2. Computer aided design of electrical machines – Maurya, Jallan, Shukla, Kataria publication

SVM Institute of Technology, Bharuch

Department of Electrical Engineering

Syllabus: Mid Semester Examination (Even semester 2018-19)

BE – III year(6^{th} Semester)

Name of Faculty: Dhaval Patel

Subject Code:2160902 **Subject Name:**POWER ELECTRONICS – II

Sr. No.	Unit	Topics
1	Unit 1	DC TO AC CONVERTERS: INVERTERS Performance parameters of Inverters; Classification of Inverters: Voltage source inverters and Current source inverters; Single phase inverters: series, parallel and bridge type (Half wave and Full wave) inverters; Forced Commutated, Line commutated and Self-Controlled Switches based Inverters; Three phase bridge inverters: 180 degree conduction, 120 degree conduction and their comparison PWM Inverters: Principle of PWM control, PWM techniques classifications, Unipolar and Bipolar PWM, Effect of Switching frequency on Harmonic Spectrum, Sinusoidal PWM, Selective Harmonic Elimination, Hysteresis band current control PWM, Space vector pulse width modulation technique, Comparison of PWM techniques, Voltage and frequency control of single phase and three-phase inverters, Harmonic Cancellation techniques Gating circuits for switches of inverter, Current Source Inverters, Comparison of Voltage and Current source Inverters.
2	Unit 2	AC Voltage Controllers: Concept of On-Off or integral cycle control and Phase control; Various single phase full wave ac-ac controllers with R, L and RL load; Analysis for phase control and integral cycle control; Gating requirements; Sequence Control of AC regulators; 3-phase full wave converter configurations with Y and Δ connected loads and their analysis with R load; AC Voltage controller with PWM control; Basic principle of matrix converter
3	Unit 3	Cycloconverters: Introduction; Basic Principle; Single to single-phase cycloconverters; Three-phase half-wave cycloconverters; Cycloconverters for three phase output; Output voltage equation; Output harmonics in cycloconverter; Comparison between cycloconverter and DC link Converter; Load Commutated cycloconverter.

Text Book(s):

1) M D Singh and K B Khanchandani, “Power electronics”, TMH, New Delhi, 2nd ed., 2007.
2) P.S. Bimbhra, “Power Electronics”, Khanna Publishers, New Delhi, 2012.
3) Muhammad H. Rashid, “Power Electronics - Circuits, Devices and Applications”, Prentice Hall of India, 3rd ed., 2003.
4) Ned Mohan, Undeland and Robbins, “Power Electronics – Converters, Applications and Design”, John Willey & sons, Inc., 3rd ed., 2003.
5) V.R.Moorthi, “Power Electronics”, Oxford University press, 2005.

SVM Institute of Technology, Bharuch

Department of Electrical Engg.

Syllabus: Mid Semester Examination (Even semester 2018-19)

BE –III (6^{th} Semester)

Name of Faculty: N.Kalpana

Subject Code: 2160904

Subject Name: High Voltage Engineering

Sr. No.	Unit	Topics
1	Unit 1	**Generation of high voltages** : Generation of high direct voltages, half and full wave rectifier circuits, voltage multiplier circuits, Van de Graff generators, electrostatic generators, examples - generation of alternating voltages, testing transformers, cascaded transformers, resonant transformers, examples - impulse voltages, Standard lightning and switching surge and associated parameters and their corrections, impulse voltage generator circuits, Marx circuit, operation, design and construction of impulse generators, examples - impulse current generator - control systems
2	Unit 2	**Measurement of high voltages :** High direct voltage measurement, peak voltage measurements by spark gaps, sphere gaps, reference measuring systems, uniform field gaps, rod gaps, factors affecting sphere gap measurements, examples - electrostatic voltmeters - ammeter in series with high ohmic resistors and high ohmic resistor voltage dividers - generating voltmeters and field sensors - the measurement of peak voltages, the Chubb–Fortescue method, high-voltage capacitors for measuring circuits - voltage dividing systems and impulse voltage measurements, digital recorders, errors inherent in digital recorders

3	Unit 3	**Electrical breakdown in gases :** Gases as insulating media - ionization and decay processes, Townsend first ionization coefficient, photoionization, ionization by interaction of metastable with atoms, thermal ionization, deionization by recombination, deionization by attachment–negative ion formation, examples - cathode processes – secondary effects, photoelectric emission, electron emission by positive ion and excited atom impact, thermionic emission, field emission, Townsend second ionization coefficient, secondary electron emission by photon impact, examples - transition from non-self-sustained discharges to breakdown, the Townsend mechanism, examples - the streamer or 'kanal' mechanism of spark, examples - the sparking voltage–Paschen's law, penning effect, the breakdown field strength, breakdown in non-uniform fields- partial breakdown, corona discharges,
4	Unit-4	**Breakdown in Liquids:** Liquid as insulators, breakdown in liquids - electronic breakdown, suspended solid particle mechanism, cavity breakdown, examples - static electrification in power transformers, transformer oil filtration, transformer oil test, alternative liquid insulations like vegetable oils, esters and silicon oils

Text Book(s):

1. Naidu M. S. and Kamaraju V., "High Voltage Engineering", fourth Edition, Tata McGraw-Hill Publishing Company Limited, New Delhi, 2009.
2. Wadhwa C.L., "High Voltage Engineering", third edition, New Age publishers, New Delhi, 2010.

SVM Institute of Technology, Bharuch

Department of Electrical Engineering

Syllabus: Mid Semester Examination (Even semester 2018-19)

BE – III (6^{th} Semester) EED

Name of Faculty: Meghna Vaghela

Subject Code: 2160907 **Subject Name:** UTILIZATION OF ELECTRICAL ENENRGY AND TRACTION

Sr. No.	Unit	Topics
1	Unit 1	**Electric Drives:** • Advantages of electric drives, Characteristics of different mechanical loads, Types of motors used in electric drive • Electric braking, Plugging, Rheostat braking, Regenerative braking Methods of power transfer by direct coupling by using devices like belt drive, gears, pulley drives etc. Examples of selection of motors for different types of domestic loads • Selection of drive for applications such as general workshop, textile mill, paper mill, steel mill, printing press, crane, lift etc. Application of flywheel • Speed control of DC shunt and series motor, Starting methods of DC series and shunt motor, Speed control of 3-phase induction motor, examples, Starting methods of 3-phase induction motor • Four Quadrant Operation of electric Drive[1]
2	Unit 2	**Electric Traction:** • Electric traction, Advantages of electric traction • Different systems of electric traction, DC and AC systems, diesel electric system, types of services urban, suburban, and main lines and their speed time curves • Different accessories for track electrification such as overhead capacitor wire, conductor rail system, current collector pantograph • Factors affecting scheduled speed • Electrical block diagram of an electric locomotive

		with description of various equipment and accessories, Types of motors used for electric traction, Starting and braking of traction motors • Introduction to EMU and metro railways[2]
3	Unit 3	**Electric Heating:** • Advantages of electrical heating, Heating methods , Resistance heating – direct and indirect resistance heating, electric ovens, their temperature range, properties of resistance heating elements, domestic water heaters and other heating appliances and thermostat control circuit, • Induction heating; principle of core type and coreless induction furnace, • Electric arc heating, direct and indirect arc heating, construction, working and applications of arc furnace, • Dielectric heating, applications in various industrial fields, Infra-red heating and its applications, Microwave heating, Simple design problems of resistance heating element[1,3]

Text Books:

1. Utilization of Electrical Energy by J.B.Gupta, Kataria Publications
2. Modern Electric Traction by H. Partap, Dhanpat Rai & Sons
3. Utilization of Electrical Energy by O.S.Taylor, Pitman Publications

SVM Institute of Technology, Bharuch

Department of Electrical Engineering

Syllabus: Mid Semester Examination (Even semester 2018-19)

BE – III year (6^{th} Semester)

Name of Faculty: Dhaval Patel, Payal Patel

Subject Code:2160913 **Subject Name:**Control of Electric Drives

Sr. No.	Unit	Topics
1	Unit 1	Introduction: History Of DC Drive, Electronic Control and Solid State Control; State Of Art Of DC Drive; Block Diagram Of Drive - Components Of Electrical Drive and their functions
2	Unit 2	Dynamics of Electrical Drives :Types of Load, Quadratal diagram of speed – torque characteristics, Types and Characteristics of load torque , Dynamics of motor- load combination, steady state & transient stability of an electrical drive, Determination of moment of inertia, Load equalization
3	Unit 3	Dynamic modeling and Vector control Dynamic model of induction motor: ABC reference frame, Arbitrary reference frame, stationary reference frame, rotating reference frame; Principle of Vector control, Field oriented control: Stator Flux Control and Rotor Flux Control; Direct torque control; Comparison of FOC and DTC.
4	Unit 4	DC drives: Speed-torque characteristics: DC separately excited, shunt and series motors; Modified speed-torque characteristics with resistive control;Analysis for speed-torque equations in terms of firing angle and duty cycle; Modified speed-torque characteristics with phase controlled converters and DC-DC converters for continuous conduction and discontinuous conduction; Closed loop speed control schemes; Dynamic model of DC machine; Speed and position control scheme using the dynamic model

Text Book(s):

1) G..K. Dubey, " Fundamentals of Electrical Drives", Narosa Publishing House, New Delhi,2nd ed. 2001.
2) Bimal K. Bose, "Modern Power Electronics and AC Drives", Pearson Education

3) VedamSubrahmanyam, “Electric Drives”, TMH (I), Second Edition,
4) G. K. Dubey, “Power Semiconductor Controlled Drives”, Prentice Hall InternationalEdition. 1989.
5) R.Krishnan, “Electric Motor Drives–Modeling, Analysis and Control”
6) Werner Leonhard, “Control of Electrical Drives”, 3rd ed., Springer, 2001