MOUNT ZION COLLEGE OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF EEE
REGULATION 2013
B.E EEE - COURSE OUTCOMES (CO)

Course Code	Course Name	Course Outcome(CO) Students will be able to	Knowledge Level
EE6604	DESIGN OF ELECTRICAL MACHINES	**CO1:** Analyze and calculate thermal rating of various types of electrical machines.	K4
		CO2: Describe about the major considerations in Electrical machine design, loadings and space factor.	K2
		CO3: Analyze and design armature and field systems for D.C. machines.	K4
		CO4: Describe the concept of Magnetic circuit calculations, Carter's Coefficient, Real and apparent flux density and Selection of number of poles	K2
		CO5: Analyze and design core, yoke, windings and cooling systems of transformers.	K4
		CO6: Apply the output equation to determine the overall dimensions of a transformer and operating characteristics to calculate the no load current.	K3
		CO7: Analyze and design stator and rotor of induction machines.	K4
		CO8: Calculate the magnetic leakage and losses and efficiency by using the operating characteristics of an induction machine	K3
		CO9: Analyze and design stator and rotor of synchronous machines and study their thermal behavior.	K4
		CO10: Solve and estimate air gap length and determine the full-load field mmf for salient pole machines.	K3

CO-PO MAPPING

COs	POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
	K Level	K3	K4	K5	K5	K3/K5/K6	K4	K2	K3	K3	K2	K3	K3
CO1	K4	3	4	3	3	-	-	-	-	-	-	-	-
CO2	K2	3	2	1	1	-	-	-	-	-	-	-	-
CO3	K4	3	4	3	3	-	-	-	-	-	-	-	-
CO4	K2	3	2	1	1	-	-	-	-	-	-	-	-
CO5	K4	3	4	3	3	-	-	-	-	-	-	-	-
CO6	K3	3	3	2	2	-	-	-	-	-	-	-	-
CO7	K4	3	4	3	3	-	-	-	-	-	-	-	-
CO8	K3	3	3	2	2	-	-	-	-	-	-	-	-
CO9	K4	3	4	3	3	-	-	-	-	-	-	-	-
CO10	K3	3	3	2	2	-	-	-	-	-	-	-	-

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EE6604 DESIGN OF ELECTRICAL MACHINES LT P C
3 1 0 4

UNIT I INTRODUCTION 9

Major considerations in Electrical Machine Design - Electrical Engineering Materials – Space factor –Choice of Specific Electrical and Magnetic loadings - Thermal considerations - Heat flow –Temperature rise and Insulating Materials - Rating of machines – Standard specifications.

UNIT II DC MACHINES 9

Output Equations – Main Dimensions – Choice of Specific Electric and Magnetic Loading - Maganetic Circuits Calculations - Carter's Coefficient - Net length of Iron –Real & Apparent flux densities – Selection of number of poles – Design of Armature – Design of commutator and brushes – performance prediction using design values.

UNIT III TRANSFORMERS 9

Output Equations – Main Dimensions - kVA output for single and three phase transformers – Window space factor – Design of core and winding – Overall dimensions – Operating characteristics – No load current – Temperature rise in Transformers – Design of Tank - Methods of cooling of Transformers.

UNIT IV INDUCTION MOTORS 9

Output equation of Induction motor – Main dimensions – Choice of Average flux density – Length of air gap- Rules for selecting rotor slots of squirrel cage machines – Design of rotor bars & slots – Design of end rings – Design of wound rotor – Magnetic leakage calculations – Leakage reactance of polyphase machines- Magnetizing current - Short circuit current – Operating characteristics- Losses and Efficiency.

UNIT V SYNCHRONOUS MACHINES 9

Output equations – choice of Electrical and Magnetic Loading – Design of salient pole machines – Short circuit ratio – shape of pole face – Armature design – Armature parameters – Estimation of airgap length – Design of rotor –Design of damper winding – Determination of full load field mmf – Design of field winding – Design of turbo alternators – Rotor design.

TOTAL (L: 45+T:15): 60 PERIODS

OUTCOMES:

Ability to model and analyze electrical apparatus and their application to power system

TEXT BOOKS:

1. Sawhney, A.K., 'A Course in Electrical Machine Design', Dhanpat Rai & Sons, New Delhi, 1984.
2. M.V.Deshpande "Design and Testing of Electrical Machine Design" Wheeler Publications, 2010.

REFERENCES:

- A.Shanmuga Sundaram, G.Gangadharan, R.Palani 'Electrical Machine Design Data Book', New Age International Pvt. Ltd., Reprint, 2007.
- R.K.Agarwal " Principles of Electrical Machine Design" Esskay Publications, Delhi, 2002.
- Sen, S.K., 'Principles of Electrical Machine Designs with Computer Programmes', Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi, 1987.

MOUNT ZION COLLEGE OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF EEE
REGULATION 2013
B.E EEE - COURSE OUTCOMES (CO)

Course Code	Course Name	Course Outcome(CO) Students will be able to	Knowledge Level
EE6651	COMMUNICATION ENGINEERING	CO1: Interpret the analog communication with its generation and degeneration.	K2
		CO2: Classify the various types of AM and their circuits.	K2
		CO3: Analyze different digital communication techniques.	K4
		CO4: Interpret the coding theorem for various coding techniques.	K2
		CO5: Structure the various codes for error control and primary communication.	K4
		CO6: Infer the various multiple access techniques in recent wireless communications.	K2
		CO7: Demonstrate the convolution and block codes for communicative channel.	K3
		CO8: Analyze the parameters of power line, satellite communication and optical fiber communication.	K4

CO-PO MAPPING

COs		POs											
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
		K3	K4	K5	K5	K3/K5/K6	K4	K2	K3	K3	K2	K3	K3
CO1	K2	2	1	-	-	-	-	-	-	-	-	-	-
CO2	K2	2	1	-	-	-	-	-	-	-	-	-	-
CO3	K4	3	3	2	2	-	-	-	-	-	-	-	-
CO4	K2	2	1	-	-	-	-	-	-	-	-	-	-
CO5	K4	3	3	2	2	-	-	-	-	-	-	-	-
CO6	K2	2	1	-	-	-	-	-	-	-	-	-	-
CO7	K3	3	2	1	1	-	-	-	-	-	-	-	-
CO8	K4	3	3	2	2	-	-	-	-	-	-	-	-

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EC6651 **COMMUNICATION ENGINEERING** **L T P C**
3 0 0 3

OBJECTIVES:

- To introduce different methods of analog communication and their significance
- To introduce Digital Communication methods for high bit rate transmission
- To introduce the concepts of source and line coding techniques for enhancing rating of transmission of minimizing the errors in transmission.
- To introduce various media for digital communication
- To introduce MAC used in communication systems for enhancing the number of users
-

UNIT I ANALOG COMMUNICATION **9**

AM – Frequency spectrum – vector representation – power relations – generation of AM – DSB, DSB/SC, SSB, VSB AM Transmitter & Receiver; FM and PM – frequency spectrum – power relations : NBFM & WBFM, Generation of FM and DM, Amstrong method & Reactance modulations : FM & PM frequency.

UNIT II DIGITAL COMMUNICATION **9**

Pulse modulations – concepts of sampling and sampling theormes, PAM, PWM, PPM, PTM, quantization and coding : DCM, DM, slope overload error. ADM, DPCM, OOK systems – ASK, FSK, PSK, BSK, QPSK, QAM, MSK, GMSK, applications of Data communication.

UNIT III SOURCE CODES, LINE CODES & ERROR CONTROL (Qualitative only)

9 Primary communication – entropy, properties, BSC, BEC, source coding : Shaum, Fao, Huffman coding : noiseless coding theorum, BW – SNR trade off codes: NRZ, RZ, AMI, HDBP, ABQ, MBnBcodes : Efficiency of transmissions, error control codes and applications: convolutions & block codes.

UNIT IV MULTIPLE ACCESS TECHNIQUES **9**

SS&MA techniques : FDMA, TDMA, CDMA, SDMA application in wire and wireless communication : Advantages (merits) : 67

UNIT V SATELLITE, OPTICAL FIBER – POWERLINE, SCADA **9**

Orbits : types of satellites : frequency used link establishment, MA techniques used in satellite communication, earth station; aperture actuators used in satellite – Intelsat and Insat: fibers – types: sources, detectors used, digital filters, optical link: power line carrier communications: SCADA

TOTAL : 45 PERIODS

OUTCOMES:

- Ability to understand and analyse, linear and digital electronic circuits.

TEXT BOOKS:

1. Taub & Schiling "Principles of Communication Systems" Tata McGraw Hill 2007.
2. J.Das "Principles of Digital Communication" New Age International, 1986.

REFERENCES:

1. Kennedy and Davis "Electronic Communication Systems" Tata McGraw hill, 4th Edition, 1993.
2. Sklar "Digital Communication Fundamentals and Applications" Pearson Education, 2001.
3. Bary le, Memuschmidt, Digital Communication, Kluwer Publication, 2004.
4. B.P.Lathi "Modern Digital and Analog Communication Systems" Oxford University Press, 1998.

MOUNT ZION COLLEGE OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF EEE
REGULATION 2013
B.E EEE - COURSE OUTCOMES (CO)

Course Code	Course Name	Course Outcome(CO) Students will be able to	Knowledge Level
EE6602	Embedded Systems	CO1: Introduce the Building Blocks of Embedded System	K2
		CO2: Understand the basics of Embedded Systems	K2
		CO3: Introduce Bus Communication in processors, Input/output interfacing	K2
		CO4: explain the serial peripheral interface	K2
		CO5: Carry out Various Embedded Development Strategies	K3
		CO6: Use basic productivity and development tools commonly used in Embedded design	K3
		CO7: Impart knowledge in Various processor scheduling algorithms.	K4
		CO8: Understand the basics of Embedded operating system and availability of various Embedded operating system in the market.	K2
		CO9: Introduce Basics of Real time operating system and example tutorials to discuss on one realtime operating system tool	K2
		CO10: Implement the embedded systems in automotive applications	K3

CO-PO MAPPING

Cos		Pos											
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
		K3	K4	K5	K5	K3/K5/K6	K4	K2	K3	K3	K2	K3	K3
CO1	K2	2	1	-	-	-	-	-	-	-	-	-	-
CO2	K2	2	1	-	-	-	-	-	-	-	-	-	-
CO3	K2	2	1	-	-	-	-	-	-	-	-	-	-
CO4	K2	2	1	-	-	-	-	-	-	-	-	-	-
CO5	K3	3	2	1	-	-	-	-	-	-	-	-	-
CO6	K3	3	2	1	-	-	-	-	-	-	-	-	-
CO7	K4	3	3	2	1	-	-	-	-	-	-	-	-
CO8	K2	2	1	-	-	-	-	-	-	-	-	-	-
CO9	K2	2	1	-	-	-	-	-	-	-	-	-	-
CO10	K3	3	2	1	-	-	-	-	-	-	-	-	-

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EE6602 EMBEDDED SYSTEMS **L T P C**
3 0 0 3

OBJECTIVES:

- To introduce the Building Blocks of Embedded System.
- To Educate in Various Embedded Development Strategies.
- To Introduce Bus Communication in processors, Input/output interfacing.
- To impart knowledge in Various processor scheduling algorithms.
- To introduce Basics of Real time operating system and example tutorials to discuss on one realtime operating system tool.

UNIT I INTRODUCTION TO EMBEDDED SYSTEMS **9**

Introduction to Embedded Systems – The build process for embedded systems- Structural units in Embedded processor , selection of processor & memory devices- DMA – Memory management methods- Timer and Counting devices, Watchdog Timer, Real Time Clock, In circuit emulator, Target Hardware Debugging.

UNIT II EMBEDDED NETWORKING **9**

Embedded Networking: Introduction, I/O Device Ports & Buses– Serial Bus communication protocols - RS232 standard – RS422 – RS485 - CAN Bus -Serial Peripheral Interface (SPI) – Inter Integrated Circuits (I^2C) –need for device drivers.

UNIT III EMBEDDED FIRMWARE DEVELOPMENT ENVIRONMENT **9**

Embedded Product Development Life Cycle- objectives, different phases of EDLC, Modelling of EDLC; issues in Hardware-software Co-design, Data Flow Graph, state machine model, Sequential Program Model, concurrent Model, object oriented Model.

UNIT IV RTOS BASED EMBEDDED SYSTEM DESIGN **9**

Introduction to basic concepts of RTOS- Task, process & threads, interrupt routines in RTOS, Multiprocessing and Multitasking, Preemptive and non-preemptive scheduling, Task communication shared memory, message passing-, Inter process Communication – synchronization between processes-semaphores, Mailbox, pipes, priority inversion, priority inheritance, comparison of Real time Operating systems: Vx Works, µC/OS-II, RT Linux.

UNIT V EMBEDDED SYSTEM APPLICATION DEVELOPMENT **9**

Case Study of Washing Machine- Automotive Application- Smart card System Application,.

TOTAL: 45 PERIODS

OUTCOMES:

- Ability to understand and analyse, linear and digital electronic circuits.

TEXT BOOKS:

1. Rajkamal, 'Embedded System-Architecture, Programming, Design', Mc Graw Hill, 2013.
2. Peckol, "Embedded system Design", John Wiley & Sons, 2010.
3. Lyla B Das," Embedded Systems-An Integrated Approach", Pearson, 2013.

REFERENCES:

1. Shibu. K.V, "Introduction to Embedded Systems", Tata Mcgraw Hill,2009.
2. Elicia White," Making Embedded Systems", O' Reilly Series,SPD,2011.
3. Tammy Noergaard, "Embedded Systems Architecture", Elsevier, 2006.
4. Han-Way Huang, "Embedded system Design Using C8051", Cengage Learning,2009.
5. Rajib Mall "Real-Time systems Theory and Practice" Pearson Education, 2007.

permanent magnet synchronous motor.

UNIT V DESIGN OF CONTROLLERS FOR DRIVES 9

Transfer function for DC motor / load and converter – closed loop control with Current and speed feedback–armature voltage control and field weakening mode – Design of controllers; current controller and speed controller- converter selection and characteristics.

TOTAL: 45 PERIODS

OUTCOMES:

- Ability to understand and apply basic science, circuit theory, Electro-magnetic field theory control theory and apply them to electrical engineering problems.

TEXT BOOKS:

1. Gopal K.Dubey, Fundamentals of Electrical Drives, Narosa Publishing House, 1992.
2. Bimal K.Bose. Modern Power Electronics and AC Drives, Pearson Education, 2002.
3. R.Krishnan, Electric Motor & Drives: Modeling, Analysis and Control, Prentice Hall of India, 2001.

REFERENCES:

1. John Hindmarsh and Alasdain Renfrew, "Electrical Machines and Drives System," Elsevier 2012.
2. Shaahin Felizadeh, "Electric Machines and Drives", CRC Press(Taylor and Francis Group), 2013.
3. S.K.Pillai, A First course on Electrical Drives, Wiley Eastern Limited, 1993.
4. S. Sivanagaraju, M. Balasubba Reddy, A. Mallikarjuna Prasad "Power semiconductor drives" PHI, 5th printing, 2013.
5. N.K.De., P.K.SEN"Electric drives" PHI, 2012.
6. Vedam Subramanyam, "Thyristor Control of Electric Drives", Tata McGraw Hill, 2007.

EE6602 EMBEDDED SYSTEMS **L T P C**
3 0 0 3

OBJECTIVES:

- To introduce the Building Blocks of Embedded System
- To Educate in Various Embedded Development Strategies
- To Introduce Bus Communication in processors, Input/output interfacing.
- To impart knowledge in Various processor scheduling algorithms.
- To introduce Basics of Real time operating system and example tutorials to discuss on one real-time operating system tool

UNIT I INTRODUCTION TO EMBEDDED SYSTEMS 9

Introduction to Embedded Systems – The build process for embedded systems- Structural units in Embedded processor , selection of processor & memory devices- DMA – Memory management methods- Timer and Counting devices, Watchdog Timer, Real Time Clock, In circuit emulator, Target Hardware Debugging.

UNIT II EMBEDDED NETWORKING 9

UNIT V SATELLITE, OPTICAL FIBER – POWERLINE, SCADA 9

Orbits : types of satellites : frequency used link establishment, MA techniques used in satellite communication, earth station; aperture actuators used in satellite – Intelsat and Insat: fibers – types: sources, detectors used, digital filters, optical link: power line carrier communications: SCADA

TOTAL : 45 PERIODS

OUTCOMES:

- Ability to understand and analyse, linear and digital electronic circuits.

TEXT BOOKS:

1. Taub & Schiling "Principles of Communication Systems" Tata McGraw Hill 2007.
2. J.Das "Principles of Digital Communication" New Age International, 1986.

REFERENCES:

1. Kennedy and Davis "Electronic Communication Systems" Tata McGraw hill, 4th Edition, 1993.
2. Sklar "Digital Communication Fundamentals and Applications" Pearson Education, 2001.
3. Bary le, Memuschmidt, Digital Communication, Kluwer Publication, 2004.
4. B.P.Lathi "Modern Digital and Analog Communication Systems" Oxford University Press, 1998.

EE6601 SOLID STATE DRIVES L T P C
3 0 0 3

OBJECTIVES:

- To understand steady state operation and transient dynamics of a motor load system.
- To study and analyze the operation of the converter/chopper fed dc drive, both qualitatively and quantitatively.
- To study and understand the operation and performance of AC motor drives.
- To analyze and design the current and speed controllers for a closed loop solid state DC motor drive.

UNIT I DRIVE CHARACTERISTICS 9

Electric drive – Equations governing motor load dynamics – steady state stability – multi quadrant Dynamics: acceleration, deceleration, starting & stopping – typical load torque characteristics – Selection of motor.

UNIT II CONVERTER / CHOPPER FED DC MOTOR DRIVE 9

Steady state analysis of the single and three phase converter fed separately excited DC motor drive–continuous and discontinuous conduction– Time ratio and current limit control – 4 quadrant operation of converter / chopper fed drive.

UNIT III INDUCTION MOTOR DRIVES 9

Stator voltage control–energy efficient drive–v/f control–constant airgap flux–field weakening mode – voltage / current fed inverter – closed loop control.

UNIT IV SYNCHRONOUS MOTOR DRIVES 9

V/f control and self control of synchronous motor: Margin angle control and power factor control –

MOUNT ZION COLLEGE OF ENGINEERING AND TECHNOLOGY
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B.E EEE - COURSE OUTCOMES (CO)

Course Code	Course Name	Course Outcome(CO) Students will be able to	Knowledge Level
EE6601	Solid State Drives	CO1: Explain the steady state operation and transient dynamics of a motor load system	K2
		CO2: Analyze the different modes of operation of electrical drives	K4
		CO3: Determine the operation of the converter and chopper fed dc drive	K3
		CO4: Differentiate the types of chopper control	K2
		CO5: Explain stator voltage control and v/f control	K2
		CO6: Differentiate voltage and current fed AC drives	K2
		CO7: Analyze margin angle control and power factor control of synchronous motor	K4
		CO8: Determine the operation of permanent magnet synchronous motor	K3
		CO9: Explain closed loop speed control for voltage control and field weakening control	K2
		CO10: Design the current and speed controllers for a closed loop solid state DC motor drives	K4

CO-PO MAPPING

COs		POs											
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
		K3	K4	K5	K5	K3/K5/K6	K4	K2	K3	K3	K2	K3	K3
CO1	K2	2	1	-	-	-	-	-	-	-	-	-	-
CO2	K4	3	3	2	2	-	-	-	-	-	-	-	-
CO3	K3	3	2	1	1	-	-	-	-	-	-	-	-
CO4	K2	2	1	-	-	-	-	-	-	-	-	-	-
CO5	K2	2	1	-	-	-	-	-	-	-	-	-	-
CO6	K2	2	1	-	-	-	-	-	-	-	-	-	-
CO7	K4	3	3	2	2	-	-	-	-	-	-	-	-
CO8	K3	3	2	1	1	-	-	-	-	-	-	-	-

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CO9	K2	2	1	-	-	-	-	-	-	-	-	-	-
CO10	K4	3	3	2	2	-	-	-	-	-	-	-	-

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REGULATION 2013
B.E EEE - COURSE OUTCOMES (CO)

Course Code	Course Name	Course Outcome(CO) Students will be able to	Knowledge Level
EE6002	POWER SYSTEM TRANSIENTS	CO1:retreiving about power system operation	K1
		CO2: categorizing the various sources of electromagnetic transients	K2
		CO3: illustrating the causes and effects of switching and lightning surges.	K3
		C4: model and estimate the over voltages in power system	K4
		CO5: apply insulation coordination principle	K3
		CO6:classifyingtheories in the formation of clouds and charge formation	K2
		CO7: describe the formation and characteristics of travelling waves in transmission lines	K1
		CO8:drawBewely's lattice diagram	K4
		CO9: apply the ATP/EMTP software for transient studies.	K3
		CO10: model power apparatus under transient studies	K4

CO-PO MAPPING

COs		POs											
		PO1	PO2	PO3	PO4	PO 5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
		K3	K4	K5	K5	K3/K5/K6	K4	K2	K3	K3	K2	K3	K3
CO1	K1	1	-	-	-	-	-	-	-	-	-	-	-
CO2	K2	2	1	-	-	-	-	-	-	-	-	-	-
CO3	K3	3	2	1	1	-	-	-	-	-	-	-	-
CO4	K4	3	3	2	2	-	-	-	-	-	-	-	-
CO5	K3	3	2	1	1	-	-	-	-	-	-	-	-
CO6	K2	2	1	-	-	-	-	-	-	-	-	-	-
CO7	K1	1	-	-	-	-	-	-	-	-	-	-	-
CO8	K4	3	3	2	2	-	-	-	-	-	-	-	-
CO9	K3	3	2	1	1	-	-	-	-	-	-	-	-
CO10	K4	3	3	2	2	-	-	-	-	-	-	-	-

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EE6002	POWER SYSTEM TRANSIENTS	L T P C 3 0 0 3

OBJECTIVES:

- To study the generation of switching transients and their control using circuit – theoretical concept.
- To study the mechanism of lighting strokes and the production of lighting surges.
- To study the propagation, reflection and refraction of travelling waves.
- To study the impact of voltage transients caused by faults, circuit breaker action, load rejection on integrated power system.

UNIT I INTRODUCTION AND SURVEY 9

Review and importance of the study of transients - causes for transients. RL circuit transient with sine wave excitation - double frequency transients - basic transforms of the RLC circuit transients. Different types of power system transients - effect of transients on power systems – role of the study of transients in system planning.

UNIT II SWITCHING TRANSIENTS 9

Over voltages due to switching transients - resistance switching and the equivalent circuit for interrupting the resistor current - load switching and equivalent circuit - waveforms for transient voltage across the load and the switch - normal and abnormal switching transients. Current suppression - current chopping - effective equivalent circuit. Capacitance switching - effect of source regulation - capacitance switching with a restrike, with multiple restrikes. Illustration for multiple restriking transients - ferro resonance.

UNIT III LIGHTNING TRANSIENTS 9

Review of the theories in the formation of clouds and charge formation - rate of charging of thunder clouds – mechanism of lightning discharges and characteristics of lightning strokes – model for lightning stroke - factors contributing to good line design - protection using ground wires - tower footing resistance - Interaction between lightning and power system.

UNIT IV TRAVELING WAVES ON TRANSMISSION LINE COMPUTATION OF TRANSIENTS 9

Computation of transients - transient response of systems with series and shunt lumped parameters and distributed lines. Traveling wave concept - step response - Bewely's lattice diagram - standing waves and natural frequencies - reflection and refraction of travelling waves.

UNIT V TRANSIENTS IN INTEGRATED POWER SYSTEM 9

The short line and kilometric fault - distribution of voltages in a power system - Line dropping and load rejection - voltage transients on closing and reclosing lines - over voltage induced by faults -switching surges on integrated system Qualitative application of EMTP for transient computation.

TOTAL : 45 PERIODS

OUTCOMES:

Ability to understand and analyze power system operation, stability, control and protection.

TEXT BOOKS:

1. Allan Greenwood, 'Electrical Transients in Power Systems', Wiley Inter Science, New York, 2nd Edition, 1991.
2. Pritindra Chowdhari, "Electromagnetic transients in Power System", John Wiley and Sons Inc., Second Edition, 2009.
3. C.S. Indulkar, D.P.Kothari, K. Ramalingam, 'Power System Transients – A statistical approach', PHI Learning Private Limited, Second Edition, 2010.

REFERENCES:

1. M.S.Naidu and V.Kamaraju, 'High Voltage Engineering', Tata McGraw Hill, Fifth Edition, 2013.
2. R.D. Begamudre, 'Extra High Voltage AC Transmission Engineering', Wiley Eastern Limited, 1986.
3. Y.Hase, Handbook of Power System Engineering," Wiley India, 2012.
4. J.L.Kirtley, "Electric Power Principles, Sources, Conversion, Distribution and use," Wiley, 2012.

MOUNT ZION COLLEGE OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF EEE
REGULATION 2013
B.E EEE - COURSE OUTCOMES (CO)

Course Code	Course Name	Course Outcome(CO) Students will be able to	Knowledge Level
EE6503	Power Electronics laboratory	CO1:analyze the characteristics of important power semiconductor devices and converters	K4
		CO2:analyze the gate circuit characteristics of phase controlled converters	K4
		CO3:find the performance of cyclo converters	K4
		CO4:find the performance of inverter with various PWM techniques	K4
		CO5:identify the characteristics, control and firing circuits for various power devices	K1
		CO6:compare the difference between buck converter and boost converter	K2
		CO7:analyze the concept of AC-DC, DC-DC, DC-AC converters	K4
		CO8:compare the electrical circuit concept behind the different working power modes of inverters so as to enable deep understanding of their operation	K2

CO-PO MAPPING

COs		Pos											
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
		K3	K4	K5	K5	K3/K5/K6	K4	K2	K3	K3	K2	K3	K3
CO1	K4	3	3	2	2	-	-	-	-	-	-	-	-
CO2	K4	3	3	2	2	-	-	-	-	-	-	-	-
CO3	K4	3	3	2	2	-	-	-	-	-	-	-	-
CO4	K4	3	3	2	2	-	-	-	-	-	-	-	-
CO5	K1	1	-	-	-	-	-	-	-	-	-	-	-
CO6	K2	2	1	-	-	-	-	-	-	-	-	-	-
CO7	K4	3	3	2	2	-	-	-	-	-	-	-	-
CO8	K2	2	1	-	-	-	-	-	-	-	-	-	-

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EE6611 POWER ELECTRONICS AND DRIVES LABORATORY LT P C

0 0 3 2

OBJECTIVES:

To provide hands on experience with power electronic converter design and testing

LIST OF EXPERIMENTS:

1. Gate Pulse Generation using R,RC and UJT.
2. Characteristics of SCR and Triac
3. Characteristics of MOSFET and IGBT
4. AC to DC half controlled converter
5. AC to DC fully controlled Converter
6. Step down and step up MOSFET based choppers
7. IGBT based single phase PWM inverter
8. IGBT based three phase PWM inverter
9. AC Voltage controller
10. Switched mode power converter.
11. SimulationofPEcircuits(1Φ&3Φsemiconverter,1Φ&3Φfullconverter,dc-dc converters, ac voltage controllers).

MOUNT ZION COLLEGE OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF EEE
REGULATION 2013
B.E EEE - COURSE OUTCOMES (CO)

Course Code	Course Name	Course Outcome(CO) Students will be able to	Knowledge Level
EE6612	MICROPROCESSORS AND MICROCONTROLLERS LABORATORY	CO1: Understand the simple arithmetic operations using 8085	K2
		CO2: Analyze the programming with control instructions in 8085	K4
		CO3: Experiment the A/D & D/A interfacing	K3
		CO4: Experiment the traffic light controller	K3
		CO5: Analyze the I/O port and serial communication	K4
		CO6: Simulate the programming exercises	K5
		CO7: Test the keyboard/display interfacing	K5
		CO8: Demonstrate of basic instructions with 8051	K5
		CO9: Program for interfacing I/O Port 8051	K5
		CO10: Develop mini project	K5

CO-PO MAPPING

COs		POs											
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
		K3	K4	K5	K5	K3/K5/K6							
CO1	K2	2	1	-	-	3	-	-	-	-	-	-	-
CO2	K4	3	3	2	1	3	-	-	-	-	-	-	-
CO3	K3	3	2	1	-	3	-	-	-	-	-	-	-
CO4	K3	3	2	1	-	3	-	-	-	-	-	-	-
CO5	K4	3	3	2	1	3	-	-	-	-	-	-	-
CO6	K5	3	3	3	2	3	-	-	-	-	-	-	-
CO7	K5	3	3	3	2	3	-	-	-	-	-	-	-
CO8	K5	3	3	3	2	3	-	-	-	-	-	-	-
CO9	K5	3	3	3	2	3	-	-	-	-	-	-	-
CO10	K5	3	3	3	2	3	-	-	-	-	-	-	-
CO11	K2	2	1	-	-	3	-	-	-	-	-	-	-

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EE6612 MICROPROCESSORS AND MICROCONTROLLERS LABORATORY **L T P C**

0 0 3 2

OBJECTIVES:

- To provide training on programming of microprocessors and microcontrollers and understand the interface requirements.

LIST OF EXPERIMENTS:

1. Simple arithmetic operations: addition / subtraction / multiplication / division.
2. Programming with control instructions:

(i) Ascending / Descending order, Maximum / Minimum of numbers

(ii) Programs using Rotate instructions

(iii) Hex / ASCII / BCD code conversions.

3. Interface Experiments: with 8085

(i) A/D Interfacing. & D/A Interfacing.

4. Traffic light controller.
5. I/O Port / Serial communication
6. Programming Practices with Simulators/Emulators/open source
7. Read a key ,interface display
8. Demonstration of basic instructions with 8051 Micro controller execution, including:

(i) Conditional jumps, looping

(ii) Calling subroutines.

9.. Programming I/O Port 8051

(i) study on interface with A/D & D/A

(ii) study on interface with DC & AC motor .

10. Mini project development with processors.

TOTAL: 45 PERIODS

OUTCOMES:

- Ability to understand and analyse, linear and digital electronic circuits.
- To understand and apply computing platform and software for engineering problems.

MOUNT ZION COLLEGE OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF EEE
REGULATION 2013
B.E EEE - COURSE OUTCOMES (CO)

Course Code	Course Name	Course Outcome(CO) Students will be able to	Knowledge Level
EE6501	POWER SYSTEM ANALYSIS	**CO1:** Develop a mathematical model of a power system under steady state operating condition by single line diagram and per unit notations.	K – 3
		CO2: Describe about the restructuring of power industry and market models.	K – 2
		CO3: Apply direct inspection and singular transformation methods to determine Y-bus matrix of the given system.	K – 3
		CO4: Describe the concept of load flow problem formulation, classification of buses and the various numerical methods of solution.	K – 2
		CO5: Solve power flow problems using various numerical methods of solution.	K – 3
		CO6: Apply Z-bus building algorithm to determine Z-bus matrix of the given system.	K – 3
		CO7: Calculate the fault current for various types of faults both symmetrical and unsymmetrical on the given power system using Z-Bus & Thevenin's theorem.	K – 3
		CO8: Calculate the fault current using sequential network for the unbalanced fault conditions.	K – 3
		CO9: Explain the role of stability, swing equation and equal area criterion.	K – 2
		CO10: Solve swing equation by Modified Euler method and Runge-Kutta Method.	K – 3

CO – PO MAPPING

COs	POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
	K Level	K3	K4	K5	K5	K3/K5/K6	K4	K2	K3	K3	K2	K3	K3
CO1	K3	3	2	1	1	-	-	-	-	-	-	-	-
CO2	K2	2	1	-	-	-	-	-	-	-	-	-	-
CO3	K3	3	2	1	1	-	-	-	-	-	-	-	-
CO4	K2	2	1	-	-	-	-	-	-	-	-	-	-
CO5	K3	3	2	1	1	-	-	-	-	-	-	-	-
CO6	K3	3	2	1	1	-	-	-	-	-	-	-	-
CO7	K3	3	2	1	1	-	-	-	-	-	-	-	-
CO8	K3	3	2	1	1	-	-	-	-	-	-	-	-
CO9	K2	2	1	-	-	-	-	-	-	-	-	-	-
CO10	K3	3	2	1	1	-	-	-	-	-	-	-	-

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MOUNT ZION COLLEGE OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF EEE
REGULATION 2013
B.E EEE - COURSE OUTCOMES (CO)

Course Code	Course Name	Course Outcome(CO) Students will be able to	Knowledge Level
EE6502	Microprocessors and Microcontrollers	CO1: describe the function of 8085 processor.	K1
		CO2: illustrate the I/O ports and interrupt in a microprocessor.	K2
		CO3: illustrate the instructions set present in a processor for logical and arithmetic operations.	K2
		CO4: demonstrate programming proficiency using the various addressing modes and data transfer instructions of the 8085 microprocessor.	K3
		CO5: explain the 8051 architecture and memory organization of the processor.	K2
		CO6: compare the programming concepts of 8051 microcontroller with 8085 processor.	K4
		CO7: list and describe the peripherals in a microcontroller.	K1
		CO8: explain the use of peripherals with its various modes of operation.	K2
		CO9: design and implement the 8051 microcontroller based systems.	K6
		CO10: analyze and develop microcontroller programs for different applications.	K4

CO-PO MAPPING

Cos		Pos											
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
		K3	K4	K5	K5	K3/K5/K6	K4	K2	K3	K3	K2	K3	K3
CO1	K1	1	-	-	-	-	-	-	-	-	-	-	-
CO2	K2	2	1	-	-	-	-	-	-	-	-	-	-
CO3	K2	2	1	-	-	-	-	-	-	-	-	-	-
CO4	K3	3	2	1	1	-	-	-	-	-	-	-	-
CO5	K2	2	1	-	-	-	-	-	-	-	-	-	-
CO6	K4	3	3	2	2	-	-	-	-	-	-	-	-
CO7	K1	1	-	-	-	-	-	-	-	-	-	-	-
CO8	K2	2	1	-	-	-	-	-	-	-	-	-	-
CO9	K6	3	3	3	3	-	-	-	-	-	-	-	-
CO10	K4	3	3	2	2	-	-	-	-	-	-	-	-

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DEPARTMENT OF EEE
REGULATION 2013
B.E EEE - COURSE OUTCOMES (CO)

Course Code	Course Name	Course Outcome(CO) Students will be able to	Knowledge Level
IC6501	CONTROL SYSTEMS	CO1: Compare the open loop and closed loop systems.	K2
		CO2: Explain the electrical analogy of mechanical and thermal systems.	K2
		CO3: Explain I and II order systems response.	K2
		CO4: Apply root-locus technique to analyze control systems.	K4
		CO5: Analyze the Correlation between frequency domain and time domain specifications.	K4
		CO6: Analyze the effects of lag, lead and lag-lead compensation on frequency response.	K4
		CO7: Explain the concepts of Controllability and Observability	K2
		CO8: Design lag-lead compensator using bode plots.	K6
		CO9: Analyze the effect of P, PI & PID controllers of feedback control.	K4

CO-PO MAPPING

COs		POs											
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
		K3	K4	K5	K5	K3/K5/K6	K4	K2	K3	K3	K2	K3	K3
CO1	K2	2	1	-	-	-	-	-	-	-	-	-	-
CO2	K2	2	1	-	-	-	-	-	-	-	-	-	-
CO3	K2	2	1	-	-	-	-	-	-	-	-	-	-
CO4	K4	3	3	2	2	-	-	-	-	-	-	-	-
CO5	K4	3	3	2	2	-	-	-	-	-	-	-	-
CO6	K4	3	3	2	2	-	-	-	-	-	-	-	-
CO7	K2	2	1	-	-	-	-	-	-	-	-	-	-
CO8	K6	3	3	3	3	-	-	-	-	-	-	-	-
CO9	K4	3	3	2	2	-	-	-	-	-	-	-	-

MOUNT ZION COLLEGE OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF EEE
REGULATION 2017

MOUNT ZION COLLEGE OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF EEE
REGULATION 2013
B.E ECE - COURSE OUTCOMES (CO)

Course Code	Course Name	Course Outcome(CO) Students will be able to	Knowledge Level
EE6503	Power Electronics	CO1: describe the characteristics of important power semiconductor devices and converters	K1
		CO2: analyze the gate circuit characteristics of phase controlled converters	K4
		CO3: explain the performance of cyclo converters	K2
		CO4: explain the performance of inverter with various PWM techniques	K2
		CO5: identify the characteristics, control and firing circuits for various power devices	K1
		CO6: compare the difference between buck converter and boost converter	K2
		CO7: describe the concept of AC-DC, DC-DC, DC-AC converters	K1
		CO8: compare the electrical circuit concept behind the different working power modes of inverters so as to enable deep understanding of their operation	K2

CO-PO MAPPING

COs		Pos											
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
		K3	K4	K5	K5	K3/K5/K6	K4	K2	K3	K3	K2	K3	K3
CO1	K1	1	-	-	-	-	-	-	-	-	-	-	-
CO2	K4	3	3	-	-	-	-	-	-	-	-	-	-
CO3	K2	2	1	-	-	-	-	-	-	-	-	-	-
CO4	K2	2	1	-	-	-	-	-	-	-	-	-	-
CO5	K1	1	-	-	-	-	-	-	-	-	-	-	-
CO6	K2	2	-	-	-	-	-	-	-	-	-	-	-
CO7	K1	1	-	-	-	-	-	-	-	-	-	-	-
CO8	K2	2	-	-	-	-	-	-	-	-	-	-	-

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MOUNT ZION COLLEGE OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF EEE
REGULATION 2013
B.E EEE - COURSE OUTCOMES (CO)

Course Code	Course Name	Course Outcome(CO) Students will be able to	Knowledge Level
EE6504	Electrical Machines II	CO1: Explain the construction and working principle of synchronous motor & generator, single phase & three phase induction motor	K2
		CO2: Apply the condition of synchronizing for parallel operation of alternators	K3
		CO3: Analyze EMF, MMF, ZPF and A.S.A methods	K4
		CO4: Explain the starting methods of synchronous motor	K2
		CO5: Design equivalent circuit of three phase induction motor by using no load and blocked rotor test	K3
		CO6: Calculate losses and efficiency of three phase induction motor	K3
		CO7: Explain double field revolving theory and operation	K2
		CO8: Analyze the performance of single phase induction motors	K4
		CO9: Explain the special electrical machines	K2

CO-PO MAPPING

COs		POs											
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
		K3	K4	K5	K5	K3/K5/K6	K4	K2	K3	K3	K2	K3	K3
CO1	K2	2	1	-	-	-	-	-	-	-	-	-	-
CO2	K3	3	2	1	1	-	-	-	-	-	-	-	-
CO3	K4	3	3	2	2	-	-	-	-	-	-	-	-
CO4	K2	2	1	-	-	-	-	-	-	-	-	-	-
CO5	K3	3	2	1	1	-	-	-	-	-	-	-	-
CO6	K3	3	2	1	1	-	-	-	-	-	-	-	-
CO7	K2	2	1	-	-	-	-	-	-	-	-	-	-
CO8	K4	3	3	2	2	-	-	-	-	-	-	-	-
CO9	K2	2	1	-	-	-	-	-	-	-	-	-	-

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MOUNT ZION COLLEGE OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF EEE
REGULATION 2013
B.E EEE - COURSE OUTCOMES (CO)

Course Code	Course Name	Course Outcome(CO) Students will be able to	Knowledge Level
EE6511	CONTROL AND INSTRUMENTATION LABORATORY	CO1: Test the P, PI and PID controllers	K5
		CO2: Experiment the design of Lag, Lead and Lag-Lead Compensators	K5
		CO3: Analyze the Simulation of Control Systems by Mathematical development tools	K4
		CO4: Monitor the Synchro-Transmitter-Receiver and Characteristics	K5
		CO5: Test the Characteristics of RTD and Thermistor	K5
		CO6: Analyze the Characteristics of Strain Gauge and Optical sensor	K4
		CO7: Design, setup and test the analog to digital converter using DAC	K5
		CO8: Design of instrumentation amplifier	K6
		CO9: Test the time response of first and second order type –0 and type- 1 systems.	K5
		CO10: Test the Calibration of Single Phase Energy Meter	K5
		CO11: Detect of transfer function of separately excited dc generator	K5

CO-PO MAPPING

COs		POs											
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
		K3	K4	K5	K5	K3/K5/K6							
CO1	K5	3	3	3	3	3	-	-	-	-	-	-	-
CO2	K5	3	3	3	3	3	-	-	-	-	-	-	-
CO3	K4	3	3	3	3	3	-	-	-	-	-	-	-
CO4	K5	3	3	3	3	3	-	-	-	-	-	-	-
CO5	K5	3	3	3	3	3	-	-	-	-	-	-	-
CO6	K4	3	3	3	3	3	-	-	-	-	-	-	-
CO7	K5	3	3	3	3	3	-	-	-	-	-	-	-
CO8	K6	3	3	3	3	3	-	-	-	-	-	-	-
CO9	K5	3	3	3	3	3	-	-	-	-	-	-	-
CO10	K5	3	3	3	3	3	-	-	-	-	-	-	-
CO11	K5	3	3	3	3	3	-	-	-	-	-	-	-

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Course Code	Course Name	Course Outcome(CO) Students will be able to	Knowledge Level
EE6512	Electrical Machines II Laboratory	CO1: Analyze the performance of three phase alternator by EMF, MMF, ZPF and A.S.A methods	K4
		CO2: Analyze the relation between field current, armature current & power factor of three phase synchronous motor	K4
		CO3: Determine equivalent circuit parameters of single phase and three phase induction motor	K3
		CO4: Calculate various losses of three phase induction machine	K3
		CO5: Analyze the load performance of single phase and three phase induction machine with various loads	K4
		CO6: Study of induction motor starters	K1

CO-PO MAPPING

COs		POs											
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
		K3	K4	K5	K5	K3/K5/K6	K4	K2	K3	K3	K2	K3	K3
CO1	K4	3	3	2	2	-	-	-	-	-	-	-	-
CO2	K4	3	3	2	2	-	-	-	-	-	-	-	-
CO3	K3	3	2	1	1	-	-	-	-	-	-	-	-
CO4	K3	3	2	1	1	-	-	-	-	-	-	-	-
CO5	K4	3	3	2	2	-	-	-	-	-	-	-	-
CO6	K1	1	-	-	-	-	-	-	-	-	-	-	-

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Mount Zion College of Engineering & Technology

COURSE MAPPING CHART

COURSE NAME: POWER PLANT ENGG

YEAR & SEMESTER: II & III Electrical and electronics engineering

COURSE	CO Statement At the end of the course, the students will	PO1(k3)	PO2(k4)	PO3(k5)	PO4(k5)	PO5 (k3,5,6)	PO6	PO7	PO8	PO9	P10	P11	P12
ME 6701 – POWER PLANT ENGINEERING	classify the energy sources (k2)	2	1	-	-	-	-	-	-	-	-	-	-
	Calculate the performance of steam power plants(K3)	3	2	1	-	-	-	-					
	Describe the working of diesel and gas turbine power plants.(K2)	2	1										
	Compute the performance of Diesel engine power plant(K5)	3	3	3	3	3	-	-	-	-	-	-	-
	Describe the working principle of different types of Nuclear reactors.(K2)	2	1	-	-	-	-	-	-	-	-	-	-
	Explain the methods of waste disposal in nuclear power plants.(k2)	2	1	-	-	-	-	-	-	-	-	-	-
	Classify and demonstrate the types of power plants using Non-conventional energy sources such as wind, Tidal, solar thermal,(k2)	2	1	-	-	-	-	-	-	-	-	-	-
	Compare various types pollution control technologies involved in thermal and nuclear power plant (k4)	3	3	2	-	-	-	-	-	-	-	-	-
	Identify the methods to calculate various types of cost in power plant and justify the best.(k5)	3	3	3	3	-	2	-	-	-	-	-	-
AVERAGE		2.44	1.77	1	0.66	0.33	0.22						

NAME OF THE STAFF: P.SIVAPANDIAN

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MOUNT ZION COLLEGE OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF ECE
REGULATION 2013
B.E EEE - COURSE OUTCOMES (CO)

Course Code	Course Name	Course Outcome(CO) Students will be able to	Knowledge Level
EE6008	MICRO CONTROLLER BASED SYSTEM DESIGN	CO1: Interpret the instruction set, register files and memory architecture for PIC microcontroller.	K2
		CO2: Classify the various interrupts and timer circuits for various state machines.	K2
		CO3: Analyze different peripheral interfacing using ARM processor.	K4
		CO4: Interpret the PIC controller and programming them.	K2
		CO5: Structure the Hardware/software co-design aspects for development tools.	K4
		CO6: Infer the microcontroller software development tools such as a compiler, make files, or compile scripts.	K2
		CO7: Demonstrate this system using its interrupt, timer/counter, analog to digital converter, and serial communication facilities	K3
		CO8: Analyze the pipeline stage and coprocessor interface for embedded ARM application.	K4

CO-PO MAPPING

COs		POs											
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
		K3	K4	K5	K5	K3/K5/K6	K4	K2	K3	K3	K2	K3	K3
CO1	K2	2	1	-	-	-	-	-	-	-	-	-	-
CO2	K2	2	1	-	-	-	-	-	-	-	-	-	-
CO3	K4	3	3	2	2	-	-	-	-	-	-	-	-
CO4	K2	2	1	-	-	-	-	-	-	-	-	-	-
CO5	K4	3	3	2	2	-	-	-	-	-	-	-	-
CO6	K2	2	1	-	-	-	-	-	-	-	-	-	-
CO7	K3	3	2	1	1	-	-	-	-	-	-	-	-
CO8	K4	3	3	2	2	-	-	-	-	-	-	-	-

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Course Code	Course Name	Course Outcome(CO) Students will be able to	Knowledge Level
MG6851	Principles of Management	CO1: describe the Principles of Management and explain the steps and processes involved in managing an organization.	K1
		CO2: explain the process of planning, policies, decision making.	K2
		CO3: summarize the concept behind human resource management.	K2
		CO4: explain and implement the leadership role	K3
		CO5: execute budgetary and non budgetary control techniques in controlling	K3
		CO6: compare the different types of organization structure in management	K2

CO-PO MAPPING

COs		Pos											
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
		K3	K4	K5	K5	K3/K5/K6	K4	K2	K3	K3	K2	K3	K3
CO1	K1	1	-	-	-	-	-	-	-	-	-	-	-
CO2	K2	2	1	-	-	-	-	-	-	-	-	-	-
CO3	K2	2	1	-	-	-	-	-	-	-	-	-	-
CO4	K3	3	2	-	-	-	-	-	-	-	-	-	-
CO5	K3	3	2	-	-	-	-	-	-	-	-	-	-
CO6	K2	2	1	-	-	-	-	-	-	-	-	-	-

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MOUNT ZION COLLEGE OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF EEE
REGULATION 2013
B.E EEE - COURSE OUTCOMES (CO)

Course Code	Course Name	Course Outcome(CO) Students will be able to	Knowledge Level
EE6702	PROTECTION AND SWITCHGEAR	CO1: Know about various protective systems- how it works and where it works.	K1
		CO2: Describe the basic structure of protection scheme and main criteria for detecting faults.	K2
		CO3: Identify various types of faults in Power system	K1
		CO4: Protect transmission line and feeder from various faults	K3
		CO5: Protect transformer, alternator, motor and bus bar.	K3
		CO6: Design the relevant protection systems for the main elements of a power system.	K3
		CO7: Analyze the purpose and working principle of different circuit breakers and tests.	K5
		CO8: Acquire skill to design the feasible protection systems needed for each main part of a power system	K4
		CO9: Protect power system against over voltages	K3
		CO10: Apply conventional and numerical relays to the protection of rotating machines, bus bars, transformers, transmission lines and distribution network.	K3

CO-PO MAPPING

COs		POs											
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
		K3	K4	K5	K5	K3/K5/K6	K4	K2	K3	K3	K2	K3	K3
CO1	K1	1	-	-	-	-	-	-	-	-	-	-	-
CO2	K2	2	1	-	-	-	-	-	-	-	-	-	-
CO3	K1	1	-	-	-	-	-	-	-	-	-	-	-
CO4	K3	3	2	1	1	-	-	-	-	-	-	-	-
CO5	K3	3	2	1	1	-	-	-	-	-	-	-	-
CO6	K3	3	2	1	1	-	-	-	-	-	-	-	-
CO7	K5	3	3	3	3	-	-	-	-	-	-	-	-
CO8	K4	3	3	2	2	-	-	-	-	-	-	-	-
CO9	K3	3	2	1	1	-	-	-	-	-	-	-	-
CO10	K3	3	2	1	1	-	-	-	-	-	-	-	-

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Course Code	Course Name	Course Outcome(CO) Students will be able to	Knowledge Level
EE6701	High Voltage Engineering	CO1: Know the different types of generation of over voltages, causes of over voltages and protection devices	K1
		CO2: Solve the problem of lightning discharges using surge arrester	K3
		CO3: Use proper power system design for limiting corona discharges	K3
		CO4: Differentiate the dielectric breakdown	K2
		CO5: Describe the principles behind generating high DC,AC and impulse voltages	K2
		CO6: Design the Marx circuit for required voltage level generation	K3
		CO7: Calculate the maximum output voltage of the generator of different stages of impulse generator	K3
		CO8: Analyze the high voltage testing techniques of power apparatus	K4
		CO9: Use the sphere gap for measuring high voltage	K3
		CO10: Infer about the types of insulation coordination	K4

CO-PO MAPPING

COs		POs											
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
		K3	K4	K5	K5	K3/K5/K6	K4	K2	K3	K3	K2	K3	K3
CO1	K1	1	-	-	-	-	-	-	-	-	-	-	-
CO2	K3	3	2	1	1	-	-	-	-	-	-	-	-
CO3	K3	3	2	1	1	-	-	-	-	-	-	-	-
CO4	K2	2	1	-	-	-	-	-	-	-	-	-	-
CO5	K2	2	1	-	-	-	-	-	-	-	-	-	-
CO6	K3	3	2	1	1	-	-	-	-	-	-	-	-
CO7	K3	3	2	1	1	-	-	-	-	-	-	-	-
CO8	K4	3	3	2	2	-	-	-	-	-	-	-	-
CO9	K3	2	1	-	-	-	-	-	-	-	-	-	-
CO10	K4	3	3	2	2	-	-	-	-	-	-	-	-

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EE6703 -SPECIAL ELECTRICAL MACHINES Staff Name: R.Muthukumar AP/EEE

Course Code		CO No	COURSE OUTCOMES	Knowledge level
EE6703	SPECIAL ELECTRICAL MACHINES	CO 1	To explain Construction, principle of operation of special electrical machines.	K1
		CO 2	To differentiate axial and radial flux motors.	K2
		CO 3	To compute the voltage and torque equations of Synchronous Reluctance motors, Stepper motors, Permanent Magnet Brushless d.c. motor and PMSM.	K3
		CO 4	To analyse the performance characteristics of Synchronous Reluctance motors, Stepper motors, Permanent Magnet Brushless d.c. motor,SRM and PMSM.	K4
		CO 5	To design a Microprocessor control of stepper motors in Closed loop control and apply the speed control, angle control techniques using Proteous simulation.	K4
		CO 6	To analyze the Steady state performance by Analytical method.	K4
		CO 7	To design Power Converters and their controllers Switched Reluctance Motors (SRM).	K4
		CO 8	To analyze and draw the phasor disgram of Synchronous Reluctance Motors, Permanent Magnet Synchronous Motors (PMSM).	K4
		CO 9	To model and analyze electrical apparatus and their application to power system	K3,K4
		CO 10	To understand the Sensor less operation of Switched Reluctance Motors (SRM).	K1
		CO 11	To explain the real world applications of special electrical machines.	K1
		CO 12	To interpret the modes excitation of coils in stepper motor.	K2

Mapping

COsPOs	PO 1 K3	PO 2 K4	PO 3 K5	PO 4 K5	PO 5 K3/K5/K6	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO 1 K1	1	-	-	-	1							
CO 2 K2	2	1	-	-	1							
CO 3 K3	3	2	1	1	3							
CO 4 K4	3	3	2	2	3							
CO 5 K4	2	2	1	1	3							
CO 6 K4	3	3	2	2	3							
CO 7 K4	3	3	2	2	3							
CO 8 K4	3	3	2	2	3							
CO 9 K3, K4	3	3	2	2	3							
CO 10 K1	1	-	-	-	-							
CO 11 K1	1	-	-	-	-							
CO12 K2	2	1	-	-	2							
	27	21	12	12	22							
CO703	2	2	1	1	2							

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B.E EEE - COURSE OUTCOMES (CO)

Course Code	Course Name	Course Outcome(CO) Students will be able to	Knowledge Level
EE6004	FLEXIBLE AC TRANSMISSION SYSTEMS	CO1: Understand the importance of controllable parameters and benefits of FACTS controllers.	K2
		CO2: Know the significance of shunt, series compensation and role of FACTS devices on system control.	K1
		CO3: Analyze the functional operation and control of GCSC, TSSC and TCSC.	K5
		CO4: Describe the principles, operation and control of UPFC and IPFC.	K2
		CO5: Predict the impact of FACTS controllers on AC transmission system.	K4
		CO6: Choose the appropriate FACTS controllers for reactive power compensation in AC transmissionsystem to improve the quality of power.	K5

CO-PO MAPPING

COs		POs											
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
		K3	K4	K5	K5	K3/K5/K6	K4	K2	K3	K3	K2	K3	K3
CO1	K2	2	1	-	-	-	-	-	-	-	-	-	-
CO2	K1	1	-	-	-	-	-	-	-	-	-	-	-
CO3	K5	-	2	-	-	-	-	-	-	-	-	-	-
CO4	K2	3	3	2	2	-	-	-	-	-	-	-	-
CO5	K4	3	3	2	2	-	-	-	-	-	-	-	-
CO6	K5	3	3	2	2	-	-	-	-	-	-	-	-

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