

III	Parameters of synchronous machines, Analysis of 3- ϕ , short circuit oscillogram, slip test, measuring method of positive, negative and zero sequence reactances.	8	CO3
IV	Generalized theory of Electrical Machines: Basics for development of generalized approach for analysis of electrical machines, Kron's Primitive machine, Concept of speed and transformer voltage, development of electrical torque, Park's and Inverse Parks transformation.	8	CO4
V	Constructional features, operating principle, characteristics and applications of special induction machine: Induction generator, Synchronous induction motor, Linear induction motors, Eddy current slip coupling.	8	CO5
Expert Lecture			
Total Hours		40	
Suggestive list of experiments:			
<ol style="list-style-type: none"> 1) To determine the voltage regulation of alternator by synchronous impedance method. (CO2) 2) To plot the V-curves of a synchronous motor at no load. (CO2). 3) To perform the parallel operation of alternator with the existing bus-bar. (CO2) 4) To determine direct axis reactance (X_d) and quadrature axis reactance (X_q) of salient pole synchronous machine by slip test. (CO3) 5) Analysis of 3 phase short circuit fault of an alternator and determination of different reactance and time constants from oscillogram. (CO3). 6) Demonstration of eddy current clutch/ slip coupling (CO5). 7) Measurement of negative sequence reactance of synchronous machine. (CO3). 8) Measurement of zero sequence reactance of synchronous machine. (CO3). 9) Study of synchronous induction motor (CO5). 10) Study of linear induction motor (CO5). 			
Text Book-			
<ol style="list-style-type: none"> 1. Dr. P.S. Bimbhra, "Generalized Theory of Electrical Machines" Khanna Publishers, fifth Edition, 1995. 2. Dr. P.S. Bimbhra, "Electrical Machinery" Khanna Publishers, seventh Edition, 2007. 			
Reference Books-			
<ol style="list-style-type: none"> 1. Fitzgerald, C.Kingslay, S.D. Umans, "Electric machinery" (5th Ed.), McGraw Hills, 1992 2. GMC pherson and R.D.Laramorl, "An Introduction to Electric Machine & Transformer" (2nd Ed.) John Wiley & Sons, 1990. 3. J.B.Gupta, "Electrical Machines" S.K. Kothari & Sons. 4. Gopal K.Dubey "Fundamentals of Electrical Drives", Narosa Publishers. 5. Electrical Machines Nagrath & Kothari 6. R K Rajput "Electrical Machine" - Laxmi Publication. 			
Modes of Evaluation and Rubric			

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Theory 60	Midsem (20)	Assignment (10)	Quiz(10)	Total (100)
Practical (30)	Lab Work (10)	Quiz (10)		Total (50)
List/Links of e-learning resource				
1. NPTEL/ MOOCs				
2. https://onlinecourses.nptel.ac.in/noc22_ee06/preview				
Recommendation by Board of studies on		19 th June 2024		
Approval by Academic council on		28 th June 2024		
Compiled and designed by		Prof. C S Sharma/ Dr. Jitendra K. Tandekar		
Subject handled by department		Department of Electrical Engg.		

Signature of BoS members:



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 SAMRAT ASHOK TECHNOLOGICAL INSTITUTE (Engineering College), VIDISHA M.P. (An Autonomous Institute Affiliated to RGPV Bhopal) Department of Electrical Engineering											
Semester/Year		IV/II		Program				B.Tech.			
Subject Category		DC		Subject Code:		EE-403		Subject Name:		Digital Electronics	
Maximum Marks Allotted								Contact Hours			Total Credits
Theory				Practical			Total Marks	L	T	P	
ES	MS	Assig	Quiz	ES	LW	Quiz					L
60	20	10	10	30	10	10	150	3	0	2	4
Prerequisites:											
Mathematics, Basic Physics, Basic Electronics and Logic and Boolean Algebra											
Course Objective:											
1. The objective of this course is to provide the fundamental concepts associated with the digital logic and circuit design. 2. To familiarize students with the different number systems, logic gates, minimization of logic circuits and combinational and sequential circuits utilized in the different digital circuits and systems. 3. The course will help student to design and analyze the digital circuits and systems.											
Course Outcomes:											
Upon completion of this course, the student will be able to: CO1. Understand the different number systems and codes; perform different mathematical operations on them. CO2. Simplify and analyze the digital logic circuits using Boolean algebra and other mapping techniques. CO3. Analyze and design different combinational logic circuits using K- Map techniques. CO4. Analyze and design sequential circuits and their application is registers and Flip-flop. CO5. Analyse and design different type of asynchronous and synchronous counter.											
UNITs	Descriptions							Hrs.	CO's		
I	Introduction to Digital Electronics: Review of number system and conversions; Binary Arithmetic, Signed and Unsigned representation, Binary codes, Gray Code, Code Conversions, Error detection and correction codes - parity check codes and Hamming code.							8	CO1		
II	Boolean Algebra and Switching Functions - Study of basic logic gates, Basic postulates and fundamental theorems of Boolean algebra; Standard representation of logic functions - SOP and POS forms; Simplification of switching functions - K-map and Quine-McCluskey tabular methods.							8	CO2		
III	Combinational Logic Modules and their applications: Adders, Subtractors, Code Converters, parity generators and comparators, Encoders & Decoders, BCD to seven-segment decoder, Multiplexers & Demultiplexers and their applications.							9	CO3		

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IV	Sequential Circuits and Systems: Set-Reset latches and flip flops, D-flip flop, R-S flip-flop, J-K Flip-flop, Master slave Flip flop, edge triggered flip-flop, T flip-flops, Shift registers, classification of shift registers.	7	CO4	
V	Counters classification: asynchronous counters, synchronous counters, counters design, BCD counter, MOD counters, ripple counter, Introduction to finite state machines.	8	CO4	
Expert Lecture		--		
Total Hours		40		
List of Experiments:				
<ol style="list-style-type: none"> 1. Implementation of Logic gate on bread board. (CO2) 2. Implementation of Logic function using Gates on bread board. (CO2) 3. Implementation of reduction of Boolean expression using universal gates.(CO2) 4. Implementation of half adder on bread board. (CO3) 5. Implementation of full adder on bread board. (CO3) 6. Converting half adder to half subtractor. (CO3) 7. Converting full adder to full subtractor on bread board. (CO3) 8. Implementation of 4×1 Multiplexer on bread board. (CO3) 9. Implementation of 3-bit Binary to gray code converter circuit on bead board. (CO3) 10. Analysis of flip-flop using kit. (CO4) 11. Implementation of 7-segment display using up counter. (CO4) 12. Analysis of up and down synchronous/ asynchronous counter using kit. (CO5) 				
Text Books-				
<ol style="list-style-type: none"> 1. "Digital Logic and Computer Design", M. Morris Mano, Pearson Education (PHI). 2. "Fundamentals of Digital Circuits", A. Anand Kumar, PHI. 				
Reference Books:				
<ol style="list-style-type: none"> 1. "Digital Fundamentals", T. L. Floyd, Pearson Education. 2. "Digital Electronics, principle and integrated circuits", Anil K Maini, Wiley Publication. 3. "Digital Electronics", G.H.Kharate, Oxford, higher Education. 				
Modes of Evaluation and Rubric				
Theory 60	Midsem (20)	Assignment (10)	Quiz(10)	Total (100)
Practical (30)	Lab Work (10)	Quiz (10)		Total (50)
List/Links of e-learning resource				
https://de-iitr.vlabs.ac.in/				
MOOC, NPTEL, Coursera				
Recommendation by Board of studies on	19 th June 2024			
Approval by Academic council on	28 th June 2024			
Compiled and designed by	Dr. Monika Jain			
Subject handled by department	Electrical Engg.			

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 <p style="text-align: center;"> SAMRAT ASHOK TECHNOLOGICAL INSTITUTE (Engineering College), VIDISHA M.P. (An Autonomous Institute Affiliated to RGPV Bhopal) Department of Electrical Engineering </p>											
Semester/Year		IV/II		Program			B.Tech				
Subject Category		DE	Subject Code:		EE-404	Subject Name:		Power system -I			
Maximum Marks Allotted								Contact Hours			Total Credits
Theory				Practical			Total Marks	L	T	P	
ES	MS	Quiz	Assig	ES	LW	Quiz					L
60	20	10	10	30	10	10	150	3	0	2	4
Prerequisites:											
Fundamental knowledge of Basic Electrical Engineering											
Course Objective:											
<ul style="list-style-type: none"> • To understand the structure of Electric power system, generation scenario and different generating plants. • To inculcate the economic aspects of generating plants. • To impart knowledge of distribution electric power system and underground cables.. 											
Course Outcomes:											
CO1. Awareness of general structure of the power network and the generation sources. CO2. Illustrate the economic aspects of Generation and economic scheduling. CO3. Elucidate the knowledge of distribution system. CO4. Articulate the types of insulators and their application. CO5. Impart the knowledge of Underground Cables.											
UNITs	Descriptions								Hrs.	CO's	
I	Introduction: Typical Layout of an Electrical Power System, Overview of Generation, Transmission & Distribution, Generation Scenario in India. Generation of Electric Power from Conventional Sources and non Conventional Sources (Hydro, thermal, nuclear, solar, wind etc.)								8	CO1	

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II	Economic aspects of Generation and Economic Scheduling: Introduction, connected load, maximum demand, demand factor, load factor, diversity factor, Load duration curve, Base load and peak load plants. Cost of electrical energy-fixed cost, running cost, Electric Tariff, comparison of cost in various types of power plants, Economic scheduling of power plants.	8	CO2
III	Distribution system: Classification of Distribution system, Requirement and design features of distribution systems, Voltage drop calculations in DC distributor fed at one end and both end with equal/unequal voltages, Voltage drop calculations in AC distributors with point and uniform loading.	8	CO3
IV	Overhead Line Insulators: Introduction, Types of insulators, Potential distribution over a string of suspension insulators. String efficiency, Methods of equalizing the potential. Testing of insulators.	8	CO4
V	Underground cables: Classification of cables, Cable conductor. Insulation resistance of cables, capacitance of single and three core cables, losses and current carrying capacity, Grading of cables.	8	CO5
Expert Lecture			
Total Hours		40	
Suggestive list of Experiments.			
<ol style="list-style-type: none"> 1. Study of different types of distribution systems by physical inspection of these systems.(CO3) 2. Study of different types of insulators with ratings. Enumerate the different applications of the different types of insulators, with their properties.(CO4) 3. Study of Underground Cables (CO5) 4. Estimation and Costing of service mains for single face, three face domestic/industrial consumers.(CO3) 5. Study of grading of cables (CO5) 6. Study of generation scenario in India (CO1) 7. Study of comparison of different generating sources specifying efficiency of each.(CO1) 8. Matlab simulation of Economic load dispatch problem with transmission losses (CO2) 9. Matlab simulation of Economic load dispatch Problem without transmission losses(CO2) 10. Study of different types of tariff (CO2) 			
Text Book-			
<ol style="list-style-type: none"> 1. C.L. Wadhwa – Generation, Distribution and Utilization of Electrical Energy, New Age International, Second Edition, 2009. 2. I.J.Nagrath and D.P. Kothari, “Modern Power System Analysis”, Tata McGraw Hill, fourth edition, 2011. 			

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Reference Books-				
1. D. Das “Electrical Power Systems”, New Age International Publishers, 2006.				
2. Hadi Saadat, “Power System Analysis”, Tata McGraw Hill Edition, 2009.				
3. J.J. Grainger and W.D Stevenson, “Power System Analysis”, McGraw Hill, 1994.				
4. NPTEL Lecture Series on “Power System Engineering”, S.N. Singh, “Electrical Power Generation, Transmission & Distribution”, PHI Pvt. Ltd.				
Modes of Evaluation and Rubric				
Theory 60	Midsem (20)	Assignment (10)	Quiz(10)	Total (100)
Practical (30)	Lab Work (10)	Quiz (10)		Total (50)
List/Links of e-learning resource				
NPTEL/Moocs				
Recommendation by Board of studies on		19 th June 2024		
Approval by Academic council on		28 th June 2024		
Compiled and designed by		Dr. Shilpi Tomar		
Subject handled by department		Electrical Engineering		

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 <p style="text-align: center;"> SAMRAT ASHOK TECHNOLOGICAL INSTITUTE (Engineering College), VIDISHA M.P. (An Autonomous Institute Affiliated to RGPV Bhopal) Department of Electrical Engineering </p>												
Semester/Year		IV/II		Program				B.Tech				
Subject Category		DC		Subject Code:		EE-405		Subject Name:		Electromagnetic Field Theory		
Maximum Marks Allotted								Contact Hours			Total Credits	
Theory				Practical			Total Marks	L	T	P		
ES	MS	Quiz	Assig	ES	LW	Quiz						
60	20	10	10	-	-	-	100	3	1	-	4	
Prerequisites:												
Knowledge of Electrostatics and Magneto statics and Fundamentals of Mathematics												
Course Objective:												
<ol style="list-style-type: none"> To outline importance and necessity of subject in curriculum. To illustrate the students with basic concepts of coordinate geometry. To familiarize the importance of Maxwell's equations. To develop the expression for electric and magnetic field of various charge and current expression. Explain the students about behaviour of EM wave and Transmission line. 												
Course Outcomes:												
CO1: Apply vector algebra and calculus, including vector operations and differentiation, in rectangular, cylindrical, and spherical coordinate systems. CO2: Analyze static electric fields, potential differences, and electrostatic energy, and solve related problems using Coulomb's law, Gauss's law, and Laplace/Poisson equations. CO3: Evaluate magnetic fields and forces using Biot-Savart and Ampere's laws, and understand the properties and behavior of magnetic materials, circuits, and inductance. CO4: Utilize Maxwell's equations to analyze time-varying electromagnetic fields and boundary conditions, incorporating Faraday's law and the concept of displacement current. CO5: Derive and solve the wave equation for electromagnetic waves in various media, and understand wave propagation, skin effect, and the Poynting theorem.												
UNITs	Descriptions										Hrs.	CO's
I	Review of Vector Calculus Vector algebra-addition, subtraction, components of vectors, scalar and vector multiplications, Triple products, three orthogonal coordinate systems (rectangular, cylindrical and spherical). Vector calculus differentiation, vector operator del, gradient, divergence and curl.										6	CO1

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II	<p>Static Electric Field Coulomb's law, Electric field intensity, Electrical field due different types of charges. Gauss law and its applications. Absolute Electric potential, potential difference, Calculation of potential differences for different configurations. Electric dipole, Electrostatic Energy and Energy density.</p> <p>Conductors, Dielectrics and Capacitance Current and current density, Ohms Law in Point form, Continuity of current, Boundary conditions of perfect dielectric materials. Permittivity of dielectric, Capacitance, Different types equations, Solution and Application of equations.</p>	6	CO2	
III	<p>Static Magnetic Fields Biot-Savart Law, Ampere Law, Magnetic flux and magnetic flux density, Types of Magnetic potentials. Steady magnetic fields produced by current carrying conductors.</p> <p>Magnetic Forces, Materials and Inductance Force on a moving charge, Nature of magnetic materials, Magnetization and permeability, Magnetic boundary conditions, Magnetic circuits, inductances and mutual inductances.</p>	6	CO3	
IV	<p>Time Varying Fields and Maxwell's Equations Faraday's law for Electromagnetic induction, Displacement current, Point form of Maxwell's equation, Integral form of Maxwell's equations. Boundary Conditions.</p>	6	CO4	
V	<p>Electromagnetic Waves Derivation of Wave Equation, Uniform Plane Waves, Maxwell's equation in Phasor form, Wave equation in Phasor form, Plane waves in free space and in a homogenous material. Wave equation for a conducting medium, Plane waves in lossy dielectrics, Propagation in good conductors, Skin effect. Poynting theorem.</p>	6	CO5	
Expert Lecture				
Total Hours		30		
Text Books-				
<ol style="list-style-type: none"> 1. "Element of electromagnetics Electromagnetic", Mathew N.O Sadiku, Oxford University Press. 2. "Elements of Engineering Electromagnetics", N. Rao, Prentice Hall. 3. "Electromagnetics for Engineers", Fawwaz T. Ulaby, Pearson Education. 				
Reference Books-				
<ol style="list-style-type: none"> 1. "Engineering Electromagnetics", William H. Hayt; Mc-Graw Hill. 2. "Electromagnetics Fields", P.V. Gupta Dhanpat Rai & Sons. 3. "Theory and Problems of Electromagnetics" Joseph A. Edminister, McGraw Hill. 				
Modes of Evaluation and Rubric				
Theory (60)	Mid Sem (20)	Assignment (10)	Quiz (10)	Total (100)
List/Links of e-learning resource				
Coursera - Artificial Intelligence by Andrew Ng: https://www.coursera.org/learn/ai-for-everyone				

Signature of BoS members:



Recommendation by Board of studies on	19 th June 2024
Approval by Academic council on	28 th June 2024
Compiled and designed by	Dr. Abhishek Sonker
Subject handled by department	Electrical Engg. Department

Signature of BoS members:

A series of seven handwritten signatures in black ink, arranged horizontally. The signatures are stylized and vary in complexity, with some appearing to be initials or names written in a cursive script.

 SAMRAT ASHOK TECHNOLOGICAL INSTITUTE (Engineering College), VIDISHA M.P. (An Autonomous Institute Affiliated to RGPV Bhopal) Department of Electrical Engineering											
Semester/Year		IV /II		Program				B.Tech			
Subject Category		DL	Subject Code:		EE-406	Subject Name:		Lab- MATLAB Programming			
Maximum Marks Allotted								Contact Hours			Total Credits
Theory				Practical			Total Marks	L	T	P	
ES	MS	Quiz	Asst.	ES	LW	Quiz					L
-	-	-	-	30	10	10	50	-	-	6	3
Prerequisites:											
Basic Mathematics, Computer Literacy, Basic Programming Concepts, Basic electrical and Electronics											
Course Objective:											
1. To get familiar with MATLAB Software, modelling as well as simulation. 2. To introduce the basic toolboxes required in Electrical Engineering. 3. To get familiar with MATLAB Software so that new circuits can be tested before its implementation											
Course Outcomes:											
On the successful completion of this course student should be able to: CO1. Students will be able to describe the components of the MATLAB desktop and the types of files used in MATLAB. CO2. Students will be able to explain the search path in MATLAB and its significance and students will understand the purpose and usage of input-output commands in MATLAB. CO3. Students will apply their knowledge of MATLAB to perform basic arithmetic operations and generate random numbers CO4. Students will utilize MATLAB's plotting capabilities to create 2D and 3D plots, and students will analyze and interpret different types of plots in MATLAB, understanding their characteristics and applications. CO5. Students will assess and critique the tools used in Simulink for power system and electrical drives simulation.											
UNITs	Descriptions							Hrs.	CO's		
I	Introduction to MATLAB: MATLAB desktop, components of MATLAB desktop, Help Browser, types of files, important commands.							6	CO1		
II	MATLAB Basics: MATLAB search path, basic arithmetic operations, display format, generation of random number							6	CO2		
III	Operators: Logic operator, Arithmetic operator, array, loop, input-output command							6	CO3		
IV	Introduction to Plotting: The plot command, 2 dimension plot, 3 dimension plot, Different types of plots							6	CO4		
V	Simulink: Introduction of Simulink, various tools used in power system and electrical drives.							6	CO5		
Expert Lecture											

Signature of BoS members:



Total Hours	30		
Suggestive list of experiments:			
<ol style="list-style-type: none"> 1. Introduction of MATLAB and various types of window. (CO1) 2. Plotting of sine and cosine wave. (CO2) 3. Performance of matrix operation using MATLAB. (CO2) 4. Performance of Array, long array, string, array function, array addressing using MATLAB. (CO3) 5. Plotting of sine wave using for loop. (CO3) 6. Designing of RLC circuit using simulink block. (CO5) 7. Program to find the sum of even number using while loop. (CO3) 8. Creation of 2 D and 3 D plots, inserting title, label, grid in the plot. (CO4) 9. Programming to draw the pie chart using MATLAB. (CO4) 10. Program to find current and power in parallel resistive circuit. (CO5) 			
Text Books-			
<ol style="list-style-type: none"> 1. Modelling and Simulation using MATLAB Simulink by Dr. Shailendra Jain, Wiley 2. "MATLAB for Engineers and Scientists" by R.K. Jain, S.R.K. Iyengar, and R. K. Jain., McGraw-Hill. 			
Reference Books-			
<ol style="list-style-type: none"> 1. "Getting Started with MATLAB" by Rudra Pratap., Oxford University press, 1999 2. "MATLAB: A Practical Introduction to Programming and Problem Solving" by Stormy Attaway: 3. "MATLAB for Engineers" by Holly Moore, Salt Lake Community College. 4. "Introduction to Simulink with Engineering Applications" by Steven T. Karris, Orchard Pubns 			
Modes of Evaluation and Rubric			
Practical (30)	Lab Work (10)	Quiz (10)	Total (50)
List/Links of e-learning resource			
MOOC, NPTEL			
Recommendation by Board of studies on		19 th June 2024	
Approval by Academic council on		28 th June 2024	
Compiled and designed by		Dr. Monika Jain	
Subject handled by department		Electrical Engg.	

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