

Shri Rawatpura Sarkar University, Raipur



Scheme of Teaching, Examination & Syllabus

for

Diploma (Electrical Engineering)

Semester-(IV)

(Effective from the session: 2022-23)



**SHRI RAWATPURA SARKAR UNIVERSITY, RAIPUR, CHHATTISGARH
FACULTY OF ENGINEERING**

Three Years Diploma in Engineering Programme

Scheme of Teaching and Examination of Diploma in Engineering Fourth

Semester

(Electrical Engineering)

Outcome Based Education (OBE) and Choice Based Credit System (CBCS)

(Effective from the Academic Year 2022-2023)

S.No.	Course Code	Course Title	Hours / Week			Credits	Maximum Marks			Sem End Exam Duration (Hrs)
			L	T	P		Continuou s Evaluation	Sem End Exa m	Total	
1	DENEE401 T	Electrical Measurements and Measuring Instruments	3	1	-	4	30	70	100	3
2	DENEE401 P	Electrical Measurements and Measuring Instruments	-	-	2	1	15	35	50	-
3	DENEE402 T	Electrical Machines –I	3	1	-	4	30	70	100	3
4	DENEE402 P	Electrical Machines –I	-	-	2	1	15	35	50	-
5	DENEE403 T	Electrical Power Generation Transmission & Distribution	2	1	-	3	30	70	100	3
6	DENEE403 P	Electrical Power Generation Transmission & Distribution	-	-	2	1	15	35	50	-
7	DENEE404 T	Industrial Management	2	1	-	3	30	70	100	3
8	DENEE405 T	Digital Electronics & Embedded Systems	3	1	-	4	30	70	100	3
9	DENEE405 P	Digital Electronics & Embedded Systems	-	-	2	1	15	35	50	-
10	DENEE406 P	Mini Project	-	-	2	1	15	35	50	-
						23			750	



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Course Title	ELECTRICAL MEASUREMENT AND MEASURING INSTRUMENTS				
Course Code	DENEE401T				
Course Credits	L	T	P	TC	
	3	1	-	4	
Prerequisites	Physics				
Course Objectives	<ul style="list-style-type: none"> • Apply knowledge and skills to provide solutions to Electrical and Electronics Engineering problems in industry and governmental organizations or to enhance student learning in educational institutions. • Work as a team with a sense of ethics and professionalism, and communicate effectively to manage cross-cultural and multidisciplinary teams. • Update their knowledge continuously through lifelong learning that contributes to personal, global and organizational growth. 				
Course Contents	<p>Unit I</p> <p>Introduction to Measurement Measuring systems , Requirements, Classification of measuring instruments (Indicating, recording & Integrating types) ,Accuracy, sensitivity ammeter Types of errors</p> <p>Basic Concepts of Electrical Measuring Instruments Necessity of different torques and arrangement of torque producing system, General description of PMMC, moving iron, induction type, dynamometers type instruments</p> <p>Unit II</p> <p>Current & Voltage Measurement Principle of current and voltage measurement ,Galvanometer ,Ammeter, Voltmeter, Extension of current range, voltage range ,Calibration of ammeter and voltmeter</p> <p>Unit III</p> <p>Measurement of Other Electrical Quantities Dynamometer , P.F. meter ,Weston Frequency meter ,Rotating type Phase sequence and maximum demand indicator ,Synchroscope ,Earth tester ,Megger</p> <p>A.C. Bridges Measurement of different types of resistances by bridge methods ,Measurement of frequency by Weins bridge ,Measurement of inductance by Anderson & Maxwell</p>				



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	<p>bridge circuit .Measurement of unknown capacitance by Schering bridge</p> <p>Unit IV</p> <p>Magnetic measurement Measurement of flux by BG Gressort fluxmeter ,Determination of Hyteresis loop for ring and bar specimen ,Measurement o f iron loss by Lloyd fisher square</p> <p>Dielectric Measurement By Wattmeter ,By CRO ,By Schering bridge</p> <p>Unit V</p> <p>Power Measurement and Energy Measurement Principle of power measurement and energy measurement ,Types of Wattmeter's and energy meters ,Extension of wattmeter range ,Power measurement in three phase ,Effect of P.F. on the wattmeter measurement</p> <p>Cathode Ray Oscilloscope CRT ,Electrostatic and Magnetic deflection ,X & Y Amplifiers ,Control on CRO</p>
<p>Course Outcomes</p>	<p>At the end of this course student will be able to:</p> <ul style="list-style-type: none"> • To Measure low, medium & high Resistances using suitable bridges. • To determine the value of inductor and capacitor with the help of A.C. Bridge & they can draw phasor diagram of bridges. • To test and calibrate ammeter, voltmeter, and Wattmeter and energy meter. • To select proper instrument for measurement various Electrical elements.
<p>Text Books</p>	<ol style="list-style-type: none"> 1. Instrumentation for Engineering Measurements 5 th , 1986 Cerni & Foster; Tata McGraw Hill, New Delhi 2. Electronic instrumentation & measurement techniques 3 rd , 1989 Cooper, W.D. & Helfrick, A.D., New Delhi: Prentice Hall of India 3. Instrumentation for Engineering Measurements 1 st , 1984 Dally, J.W. et al; John Wiley & Sons, New York 4. Instrumentation, Measurement & Feedback 1 st, 1994 Jones; McGraw Hill, New York 5. Electronic Instrumentation 2 nd , 1987 Malvino; Tata McGraw Hill, New Delhi
<p>Reference Books</p>	<ol style="list-style-type: none"> 1. Electrical & electronic measurement & instruments 1 st , 1994 Rambhadran, S,;Delhi: Khanna Publishers 2. Electronic Measurements & Instrumentation 2 nd 1988 Rao & Sutrave; Nirali Prakashan, Pune 3. A course in electrical & electronic measurements and instrumentation 4 th , 1987 Sawhney, A.K., Delhi: Dhanpat rai & sons 4. A course in Electrical & Electronic Measurements & Instruments 11th ,2 000 Sawhney; Dhanpatrai & Sons, Delhi



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	5. Electrical measurements & measuring instruments 1 st , 1994 Suryanarayana, New Delhi, Tata McGraw Hill
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Course Title	ELECTRICAL MACHINES - I				
Course Code	DENEE402T				
Course Credits	L	T	P	TC	
	3	1	-	4	
Prerequisites	Elements of electrical engineering, FME, Electrical Circuit				
Course Objectives	<ul style="list-style-type: none"> • To study and understand different types of DC generators • To study Motors and Transformers, their construction, operation and applications. • To analyze performance aspects of various testing methods. 				
Course Contents	<p>UNIT-I Single Phase Transformers Construction of a single phase transformer ,Types of single phase transformers ,Principle of working, emf equations ,Voltage & current ratios ,Ratings of transformer ,No load & on load operation, ,Open circuit test ,Short circuit test ,Equivalent circuit diagram ,Regulation of a transformer Losses and efficiency ,All day efficiency and numerical problem,Auto transformer</p> <p>UNIT-II Three Phase Transformers Construction of a three phase transformer ,Classification of three phase transformers: - (Distribution of Power transformer) ,Ratings of three phase transformer ,Different types of transformer terminal connection ,Transformer Accessories</p> <p>UNIT-III Basic Concepts of D.C. Machines Need ,Construction of D.C. machines ,Materials used for constructional parts</p> <p>UNIT-IV D.C. Generators Types of D.C. generators ,Principle of working, emf equation ,Condition for building up emf in self excited generator ,Critical resistance, internal & external characteristics ,Armature reaction ,Commutation</p> <p>UNIT-V D.C. Motors Types of D.C. motors, Principle of working, back emf equations, Torque equations. ,Speed torque characteristics ,Speed control of shunt & series motors ,Reversing of D.C. motors ,Necessity of starters (3 & 4 point) ,Power stages of D.C. motors ,Losses & efficiency ,Condition for maximum efficiency</p>				



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Course Outcomes	<p>At the end of this course student will be able to:</p> <ul style="list-style-type: none">• Identify different parts of a DC machine & understand its operation• Carry out different testing methods to predetermine the efficiency of DC machines.• Understand different excitation and starting methods of DC machines.• Develop the speed control of a DC machines.• Understand and classify different parts of a transformer & understand its operation.• analyze 1-Ph and 3-Ph transformers circuits.
Text Books	<ol style="list-style-type: none">1. Electrical Machines 1997 Bhattacharya, S.K.; Tata McGraw-Hill, New Delhi2. Transformers 1991 BHEL Bhopal; Tata McGraw-Hill, New Delhi3. Transformers Design & Manufacture 1995 Dasgupta, Indrajit; Tata McGraw-Hill, New Delhi4. Electric Machinery 5 th , 1992 Fitzgerald , A.E., Charles Kingsley, Jr., Stephen D. Umans; McGraw-Hill, New York
Reference Books	<ol style="list-style-type: none">1. Electric Machinery and Transformers 2 nd , 1992 Irving L. Kosovo; Prentice Hall of India, New Delhi2. Electrical Machines 1996 Nagrath & Kothari; Tata McGraw-Hill, New Delhi3. Transformers and motors 1 st , 1989 Shultz; George patrick Howard W. Sams & Co. New York



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Course Title	ELECTRICAL POWER GENERATION TRANSMISSION AND DISTRIBUTION				
Course Code	DENEE403T				
Course Credits	L	T	P	TC	
	2	1	-	3	
Prerequisites	Element of electrical engineering, Physics, Electrical Circuit				
Course Objectives	<ul style="list-style-type: none"> • Discuss the history of electricity • Present a basic overview of today's electric power system • Discuss general terminology and basic concepts used in the power industry • Explain the key terms voltage, current, power, and energy • Discuss the nature of electricity and terminology relationships • Describe the three types of consumption loads and their characteristics 				
Course Contents	<p>UNIT-I Generation of Electrical Power Introduction an overview of a generalised power system, single line diagram of power generation systems, thermal, Hydro, Nuclear, Diesel, MHD Power plants line and block diagram of all power plants, Choice of site Equipment and their functions, Operation and control of the power plants Strengths and limitations, comparison of different power plants</p> <p>UNIT-II Variable Load on Power Plants Variable load on power plants, load curves, selection of size and number of units, base load and peak load.</p> <p>Economics of Power Generation Interest and depreciation, cost of electrical energy method of determining depreciation, importance of high load factor.</p> <p>UNIT-III Tariff Introduction of tariff ,types of tariff – simple, flat rate, block rate, two part, maximum demand, power factor, three part.</p> <p>Transmission Line Parameters Line Resistance and Inductance ,capacitance ,skin effect and effect of proximity, stranding and transposition of conductors,classification of transmission lines, performance of transmission lines, voltage regulation and efficiency, equivalent circuits, ferranti effect, line losses on open circuits</p> <p>UNIT-IV HVAC and HVDC Transmission System Economics of power transmission , operation and control of A.C.</p>				



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	<p>transmission system, concept of HVDC transmission, types of HVDC transmission system, layout and components of a typical HVDC transmission system, advantages and disadvantages of HVAC and HVDC transmission</p> <p>Distribution System Introduction, feeders, distributors and service mains, feeders (or primary distribution lines), distributors (or secondary distribution lines)</p> <p>UNIT-V Conductor Selection for a Distribution System Considerations for selection of conductor size for distribution systems Voltage drops in D.C. distributors, Voltage drop in A.C. distributors</p> <p>Power Cables Types of Underground cables, construction of cables, low-tension cables High tension (HT) cables, laying of underground cables, faults in Power cables</p>
<p>Course Outcomes</p>	<p>1. At the end of this course student will be able to:</p> <ul style="list-style-type: none">• Appreciate the different types of tariff, consumers and different types of power generation plants• Determine the significance of various components of the power generation plants• Correlate the importance of interconnected operation of different power generation systems• Plan an appropriate scheduling of electric power to satisfy the demand constraint
<p>Text Books</p>	<ol style="list-style-type: none">1. Power system engineering 1 st , 1994 Nagrath; Tata McGraw-Hill, New Delhi2. High Voltage Engineering 2 nd Naidu; Tata McGraw-Hill, New Delhi3. Transmission and Distribution 1994 Raina, K.B. et al; Tata McGraw Hill, New Delhi
<p>Reference Books</p>	<ol style="list-style-type: none">1. A course in electrical power 5 th , 1989 Soni M.L., Gupta J.L.; Dhanpat Rai & Sons, New Delhi2. A text book of electrical power 1996 Uppal S. L.; Khanna publisher, New Delhi3. Generation, Distribution & Utilisation of Electrical Energy 6 th , 1991 Wadhwa, C.L.; Wiley Eastern Ltd., New Delhi



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Course Title	Industrial Management				
Course Code	DENEE404T				
Course Credits	L	T	P	TC	
	2	1	-	3	
Prerequisites	Environmental studies, communication skill				
Course Objectives	<ul style="list-style-type: none"> • Contribute to the success of companies through effective problem solving • Design, develop, implement, and improve integrated systems that include people, materials, information, equipment, and environments • Effectively manage business operations and project management teams • Continue to develop holistically, including the personal and professional skills necessary to adapt to our changing societal, technological, and global environments 				
Course Contents	<p>UNIT-I</p> <p>MANAGEMENT & SYSTEM THINKING CONCEPTS: Management- definition, activities, theories-decision, quantitative, mathematical, Behavioral Sciences, system definition and parameters, production system, non-production system and objectives.</p> <p>MATERIALS MANAGEMENT: Introduction & function of purchase system, inventory, need & advantages of inventory control different techniques of Inventory control -A.B.C. analysis, simple treatment only correlation, stock turn over, order quantity, lead time purchase cycle.</p> <p>UNIT-II</p> <p>PRODUCTION PLANNING AND CONTROL: Production system, concept of planning, meaning of PPC, classification & characteristics of each type, function of & place of PPC in a organization, production and consumption rate, job, Batch and Mass production, batch size, buffer stock, production cost components, concept of production scheduling .</p> <p>PROJECT PLANNING USING NETWORK TECHNIQUES: Network –meaning & objectives, network formation, representation of activities and event on network, rules for drawing network diagram, Fulkerson’s rule, different techniques-PERT & CPM., dependency of activities, dummy activities, different Time estimates- Optimistic, Pessimistic & Most likely Time, ET, LT, EST, LST, LCT, ECT, Floats & Slacks.</p> <p>UNIT-III</p> <p>INDUSTRIAL RELATIONS: Scope, definition, need, objective and function of personnel management.</p>				



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communication in Industry its need and importance, classification, technique and barriers in communication and their effects grievances, its meaning, factors responsible for grievances, process and condition for handling of grievances, strikes and lockouts, conditions, conciliation and adjudication machinery motivation.

SUPERVISION AND LEADERSHIP:

Meaning and Role of supervisor in an industry, need of supervision, older workers and their supervision, concept of leadership, qualities of a good leader effectiveness of leadership system industrial act introduction, factory acts, industrial disputes act, boiler act, Workman's compensation act, Indian electricity act, Pollution control act, ESI act.

UNIT-IV

ORGANISATIONAL DYNAMICS:

Organization structure, characteristic and principle of organization, Modern organization approach, Types of organization, meaning and signification of various types, Organization change, resistance to change, employee's attitude, factors for reducing the resistance to change.

OPERATION RESEARCH:

- Definition and concept & methods of Operation Research.,
- Linear programming-problem formulation and Graphical methods

UNIT-V

PLANNING AND PREPARING A PROJECT REPORT:

Selection of project, Scheduling of activities Involved, Model format, project planning, preparation of action plan for implementation, preparation of project, Cases: - illustrate some real cases.

VALUE ANALYSIS & COMPUTERS IN MANAGEMENT

Concept of Cost and Concept of value, objectives, components and types of value, V.A. procedure and V.A. Test. DARA SIRI method, value improvement procedures, role of computers in management, introduction to computer system, Personal computer and its uses-introduction to management information system (MIS).



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Course Outcomes	<p>At the end of this course student will be able to:</p> <ul style="list-style-type: none">• Understand the theories and principles of modern management and apply the concepts to the management of organizations in private and public sector.• Understand how managers can effectively plan in today's dynamic environment, be familiar with the design of organisation structure and describe how environmental uncertainty affects organisation design. Describe the implementation of work and time study at a workplace• Identify what strategies organisations might use to become more customer oriented and be more innovative. Identify the characteristics of effective teams and understand why teams have become so popular in organisations• Describe contemporary theories of motivation and discuss the challenges managers face in motivating unique group of workers.
Text Books	<ol style="list-style-type: none">1. Learning package on Industrial Management. T.T.T.I., Bhopal.2. CPM and PERT - Principles and Application. L.S. Srinath.3. Modern Production Management. Buffa.4. Essentials of Management Kuntz , McGraw Hill.5. Industrial Engineering and Management O.P. Khanna.6. Industrial organization and management Ahuja.7. Value Analysis Miles.
Reference Books	<ol style="list-style-type: none">1. . Manpower Management. R.S. Diwedi.2. Personnel Management and Industrial Relations R.S. Davar.3. Production and operations Management Ray Wild.4. 11 Management of operations Jack R. Meredith.5. 12 Production and Operations Management Contemporary policy for managing Operating. Tata McGraw Hill.6. 13. Project Engineering and Management A.K.Sinha & Rama Sinha



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Course Title	DIGITAL ELECTRONICS & EMBEDDED SYSTEM				
Course Code	DENEE405T				
Course Credits	L	T	P	TC	
	3	1	-	4	
Prerequisites	Physics				
Course Objectives	<ul style="list-style-type: none"> • To understand number representation and conversion between different representation in digital electronic circuits. • To understand characteristics of memory and their classification. • To analyze logic processes and implement logical operations using combinational logic circuits. • To understand operation of semiconductor devices, encoder, decoder and flip-flops 				
Course Contents	<p>UNIT-I Introduction to Digital Techniques Numerical representations, comparison of digital and analog systems, merits of operation in the digital mode</p> <p>Digital Codes Number systems: Binary, Decimal, Octal & Hexa-decimal, conversion of one number system to others, binary addition, subtraction, multiplication and division use of 1's and 2's compliments in binary arithmetic, binary codes: BCD numbers, weighted and non-weighted binary codes, 8421 BCD code, Excess-3 codes and Gray code, BCD addition and subtraction use of 9's and 10's complement in decimal arithmetic.</p> <p>UNIT-II Logic Gates Basic logic gates: NOT, AND, OR gates using semiconductor diodes & BJTs symbol, Truth table, logic equation applications, universal logic gates, Basic logic gates using universal logic gates. Ex-OR and Ex-NOR gates, Boolean algebra: Fundamental concepts & their basic laws-AND, OR, complementation, cumulative, Associative and distribution laws, De'Morgan's theorems and numerical examples, standard forms for boolean function, SOP and POS and their conversion to standard forms, Karnaugh (k) map reduction techniques for 2 and 4 variables only.</p> <p>Digital Systems Introduction: types of digital systems and their block diagram, operating principles, combination logic system: R-S flip-flop using BJTs, NOR and NAND gates clocked R-S flip-flop, propagation delay and Racer around condition, Master-Slave (M-S) J.K. flip-flop with preset and clear, T and D type flip-flops, field of application of flip-flop.</p> <p>UNIT-III</p>				



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	<p>Encoders / Multiplexers Necessity of multiplexers, principles of Multiplexers and their types 2 to 1, 4 to 1, 8 to 1 and 16 to 1 lines, Block diagrams, operating principles and applications, multiplexer tree 32 to 1 and 64 to 1 line multiplexer 16 to 1 line multiplexer.</p> <p>Decoders / Demultiplexers Necessity of demultiplexer, principles of demultiplexer and their types 2 to 1, 4 to 1, 8 to 1 and 16 to 1 lines, Block diagrams, operating principles and applications, UNIT-IV</p> <p>Code Converters BCD to binary converter using IC 74184, Binary to BCD converter using IC 74185.</p> <p>Data Converters Introduction: Necessity of data converters and their types, analog to digital converters: necessity, different methods, staircase ramp, single slope, dual slope and successive approximation method. performance criteria, A/D converter ICs field of applications, digital to analog converters: necessity, different methods, weighted register, ladder & binary ladder methods. Performance criteria, study of D/A converters ICs, field of applications</p> <p>UNIT-V Memories Introduction: Characteristics of memory classification – Random access and sequential access memories, Read-Write and Read-Only memories, Volatile and Non-Volatile memories, Static and dynamic memory, magnetic core and semiconductor memory, magnetic memory, semiconductor memory- requirements and their types ROMs & RAMs, semiconductor RAMs storage cells, bipolar cells, static bipolar RAM and Static CMOS RAMs, MOS dynamic RAMs, Three state RAMs semiconductor RAMs –Mask programmable and erasable RAMs, EPROMs, EEPROM, Dot – matrix ROM, memory system reliability MTBF.</p>
<p>Course Outcomes</p>	<p>At the end of this course student will be able to:</p> <ul style="list-style-type: none"> • Develop a digital logic and apply it to solve real life problems. • Analyze, design and implement combinational logic circuits. • Classify different semiconductor memories. • Analyze, design and implement sequential logic circuits.
<p>Text Books</p>	<ol style="list-style-type: none"> 1. Introductory circuit analysis by Boylested R.L. 2. Schaum online series- Theory & problems of electric circuits by Edminister. 3. Basic Electrical Engineering by V.N.Mittal.



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**Reference
Books**

1. Circuits and Networks by Sudhakar.
2. Electrical Technology Vol-I by B.L.Theraja.
3. A Text Book Of Electrical Technology by V.K.Mehta.



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Course Title	Electrical Measurements and Measuring Instruments				
Course Code	DENEE401P				
Course Credits	L	T	P	TC	
	-	-	2	1	
Prerequisites	Element of electrical engineering, electrical circuit				
Course Objectives	<ul style="list-style-type: none"> • To learn how to visualize and work on laboratory and multidisciplinary tasks like • To demonstrate various Bridges ct, pt, hardware set ups. • To Measure Voltage, Current, Power factor, Power, Energy. 				
Course Contents	LIST OF EXPERIMENTS				
	<ol style="list-style-type: none"> 1. Study of different meters, such as: Ammeter, voltmeter, wattmeter & energy meter. 2. Measurement of electrical quantities by low range meter along with i.Shunt & multiplier ii.C.T. & P.T. 3. Measurement of active & reactive power in 3-phase balance load circuit by one wattmeter method. 4. Measurement of active & reactive power in 3-phase unbalance load circuit by two-wattmeter method. Effect of load PF. 5. Calibration of energy meter at various P.F. by (1) Standard energy meter (2) Meter test bench 6. Performance of iii.Phase sequence meter iv.P.F. & frequency meter Maximum demand indicator KVA, KWH & KVAR meter. 7. Measurement of low & medium resistance by Wheastone bridge. 8. Measurement of low resistance by Kelvin double bridge. 9. Measurement of earth resistance by Earth Tester. 10. Measurement of insulation resistance by Megger. 11. Use of potentiometer for the measurement of Resistance and emf 12. Calibration of DC voltmeter and ammeter by potentiometer 13. Use of Multi-meter 				
Course Outcomes	<p>At the end of this course student will be able to:</p> <ul style="list-style-type: none"> • Calibrate - voltmeters, ammeters, single phase energy meter. • Analysis based on comparing true and actual value of potentio meter & Power factor meter • Examine the output of turns ratio and ratio error of CT. • Analyze the measuring parameters of Wheatstone bridge & Kelvin double bridge. 				
Text Books	<ol style="list-style-type: none"> 1. Electrical measurement & measuring instrument by A.K.Sawhney. 2. Electrical measurement & measuring instrument by J.B.Gupta 				



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Course Title	Electrical Machines -I				
Course Code	DENEE402P				
Course Credits	L	T	P	TC	
	-		1	2	
Prerequisites	Element of electrical engineering, electrical circuit				
Course Objectives	<ul style="list-style-type: none"> • To prepare the students to have a basic knowledge of transformers. • Able to conduct open circuit/ short circuit test on transformer • Able to calculate torque and speed of DC Machine. • To enable, train and evaluate the ability of the students to perform the analysis of any electromechanical system. • To empower students to determine the parameters of DC machines and transformers by performing experiments on these machines. • The ability to select a suitable measuring instrument for a given application. 				
Course Contents	LIST OF EXPERIMENTS <ol style="list-style-type: none"> 1. Voltage & current ratio of 1-phase & 3-phase transformer 2. Performance of a single phase transformer by direct loading 3. Performance of a single phase transformer by OC & SC test and its regulation 4. Performance of an auto transformer 5. Performance of D.C. generator 6. Performance of D.C. shunt Motor 7. Performance of D.C. series Motor 8. Performance of D.C. shunt/series/compound generator 9. Load test on separately excited generator. 10. Speed torque characteristics of D.C. shunt & series motors 11. Starting of shunt & series D.C. motors 				
Course Outcomes	<p>At the end of this course student will be able to:</p> <ul style="list-style-type: none"> • Apply and Deduce the principles of Electrical Machines through laboratory experimental work • Connect the circuit to perform experiments, measure, analyze the observed data & come to a conclusion • Organize reports based on performed experiments with effective demonstration of diagrams and characteristics /graph • Demonstrate the starting & speed control of various AC & DC motors • Perform various tests, find efficiency & voltage regulation of electrical machines 				
Text Books	Laboratory courses in electrical engineering by S.G. Tarnekar& P.K. Kharbanda				



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Course Title	Electrical Power Generation Transmission & Distribution				
Course Code	DENEE403P				
Course Credits	L	T	P	TC	
	-	-	2	1	
Prerequisites	Generation transmission and distribution				
Course Objectives	<ul style="list-style-type: none"> • To under the concepts of various method Electrical Energy Generation • To learn the usage of passive elements in various Power Transmission Systems. • To understand the factors affecting Insulators and also in Under Ground cables. • To calculate the various parameters in Distribution System. • To learn critical mathematical calculations that are common to any overhead line design. Calculations such as transverse loading, conductor clearances, pole buckling and guying will be discussed in detail. • Suggest methods for power factor improvement. 				
Course Contents	LIST OF EXPERIMENTS				
	<ol style="list-style-type: none"> 1. Field visits to explain various electrical and mechanical details of transmission & distribution system 2. Reports of field visits 3. Market survey to find out the availability of the various transmission and distribution components (like different types of pin insulators, shackle insulators, etc.) and comparison of their specification and prices. 				
Course Outcomes	<p>At the end of this course student will be able to:</p> <ul style="list-style-type: none"> • Analyze the performance of various Units involved in the power plants. • Apply power system fundamentals to the design of a system that meet specific needs. • Design a power system solution based on the problem requirements and realistic Constraints. • Develop a major design experience in power a system that prepares them for engineering practice. 				
Text Books	<ol style="list-style-type: none"> 1. Power system engineering 1 st , 1994 Nagrath; Tata McGraw-Hill, New Delhi 2. High Voltage Engineering 2 nd Naidu; Tata McGraw-Hill, New Delhi 3. Transmission and Distribution 1994 Raina, K.B. et al; Tata McGraw Hill, New Delhi 				



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Course Title	Digital Electronics & Embedded System				
Course Code	DENEE405P				
Course Credits	L	T	P	TC	
	-		2	1	
Prerequisites	Digital electronics				
Course Objectives	<ul style="list-style-type: none"> • To know the concepts of Combinational circuits, basic Boolean algebra • To understand the concepts of flip-flops, registers and counters, encoder, decoder, A/D and D/A converter. 				
Course Contents	<p align="center">LIST OF EXPERIMENTS</p> <ol style="list-style-type: none"> 1. Assemble Basic logic gates using Diodes and BJT's and verify truth table. 2. Assemble universal logic gates using BJTs and verify truth table. 3. Performance of NOR and NAND gates as universal. 4. Verify De'Morgan's theorems. 5. Performance of IC logic gates – pin. 6. Use Data books for diagram specification & ratings. 7. Performance of R-S flip-flop. 8. Performance of IC J-K M-S flip-flop. 9. Performance J-K M-S flip-flop using NAND gates. 10. Performance of 4-bit ripple counter using IC 7476. 11. Performance of IC 7490. 12. Performance of Ring counter. 13. Performance of multiplexer Ics. 14. Performance of demultiplexer Ics. 15. Performance of BCD to seven segment drivers Ics 				
Course Outcomes	<p>At the end of this course student will be able to:</p> <ul style="list-style-type: none"> • Learn the basics of gates. • Construct basic combinational circuits and verify their functionalities • Apply the design procedures to design basic sequential circuits • To understand the basic digital circuits and to verify their operation 				
Reference Books	<ol style="list-style-type: none"> 1. Times New Roman font size 12 spacing before after 6-6 line spacing 1 justified. 2. Krishna Mohan N. P. Singh – “Speaking English Effectively”; MacMillan India, New Delhi; 2001. 				



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Course Title	Mini Project				
Course Code	DENEE406P				
Course Credits	L	T	P	TC	
	-		2	1	
Prerequisites	To know all relevant subjects from electrical engineering				
Course Objectives	<p>The curriculum has been design to develop the following objective :-</p> <ul style="list-style-type: none"> • To promote a spirit of free and objective enquiry in different fields of knowledge. • Develop habit of enquiry • Collect information from various sources • Create awareness of recent developments. • Create curiosity in new problems. • Arrange information in logical order. • Develop and demonstrate confidence and ability to tackle new problems • Integrate and reinforce the knowledge and skill. • Understand the follow standard test procedures • Observe safety precautions 10. Interpreter events and results 				
Course Contents	<ol style="list-style-type: none"> 1. Power Project or Electronics / Electrical Project 2. Electrification of Village / Colony 3. Modification of sub station 4. Solving live problems 5. Report on small scale industries 6. Collection of information and writing report on small scale industry 				
Course Outcomes	<p>At the end of this course student will be able to:</p> <ul style="list-style-type: none"> • To study research papers for understanding of a new field, in the absence of a textbook , to summarise and review them. • To impart skills in preparing detailed report describing the project and results • To effectively communicate by making an oral presentation before an evaluation committee • To enable the students to develop comprehensive solution to issues identified in previous semester work and to meet the requirements as stated in project brief. • To inculcate the ability to synthesize the results of the detailed analytical studies conducted, lay down validity and design criteria, interpret the result for application to the problem, develop the concept and detailed 				



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	design solution and to effectively communicate the thesis rationale.
Text Books	Design Suitable Learning Experiences for Laboratory Work and Direct Laboratory Experiences to Achieve Specified Aims - Competency-based Selflearning Module.No.4; REC British Council India Project 1999 Earnest, Joshua; Mathew, Susan S.; Shrivastava, M.K.; Banthiya, N.K.; TTTI, Bhopal