| LESSION PLAN 4TH SEMESTER(2023-24) | | | | |
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| **SUBJECT-Th1. ENERGY CONVERSION - I** | | | | |
| **NAME OF THE FACULTY- Er. Chinmaya Kumar Patra** | | | | |
| MONTH | MODULE/UNIT | COURSE TO BE COVERED | TOTAL NO. OF CLASS | REMARK |
| **January** | **UNIT-1** | **DC GENERATORS** | **14** | |
| | | 1.1.Operating principle of generator | 01 | |
| | | 1.2.Constructional features of DC machine. | 01 | |
| | | 1.2.1. Yoke, Pole & field winding, Armature, Commutator. | 01 | |
| | | 1.2.2. Armature winding, back pitch, Front pitch, Resultant pitch and commutator- pitch. | 01 | |
| | | 1.2.3. Simple Lap and wave winding, Dummy coils. | 01 | |
| | | 1.3.Different types of D.C. machines (Shunt, Series and Compound) | 01 | |
| | | 1.4. Derivation of EMF equation of DC generators. (Solve problems) | 01 | |
| | | 1.5. Losses and efficiency of DC generator. Condition for maximum efficiency and numerical problems. | 01 | |
| | | 1.6. Armature reaction in D.C. machine. | 01 | |
| | | 1.7. Commutation and methods of improving commutation. | 01 | |
| | | 1.7.1. Role of inter poles and compensating winding in commutation. | 01 | |
| | | 1.8.Characteristics of D.C. Generators | 01 | |
| | | 1.9. Application of different types of D.C. Generators. | 01 | |
| | | 1.10.Concept of critical resistance and critical speed of DC shunt generator | 01 | |
| | | 1.11. Conditions of Build-up of emf of DC generator. | 01 | |
| | | 1.12. Parallel operation of D.C. Generators. | 01 | |
| | | 1.13.Uses of D.C generators | 01 | |
| **February** | **UNIT-2** | **2.D. C. MOTORS** | **15** | |

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|---|---|---|---|---|
| | | 2.1.Basic working principle of DC motor | 01 | |
| | | 2.2. Significance of back emfin D.C. Motor. | 01 | |
| | | 2.3.Voltage equation of D.C. Motor and condition for maximum power output(simple problems) | 02 | |
| | | 2.4.Derive torque equation (solve problems) | 02 | |
| | | 2.5. Characteristics of shunt, series and compound motors and their application. | 01 | |
| | | 2.6. Starting method of shunt, series and compound motors. | 01 | |
| | | 2.7. Speed control of D.C shunt motors by Flux control method. Armature voltage Control method. Solve problems | 01 | |
| | | 2.8.Speed control of D.C. series motors by Field Flux control method, Tapped field method and series-parallel method | 01 | |
| | | 2.9.Determination of efficiency of D.C. Machine by Brake test method(solve numerical problems) | 01 | |
| | | 2.10.Determination of efficiency of D.C. Machine by Swinburne's Test method(solve numerical problems) | 02 | |
| | | 2.11.Losses, efficiency and power stages of D.C. motor(solve numerical problems) | 01 | |
| | | 2.12.Uses of D.C. motors | 01 | |
| **March** | **UNIT-3** | **3.SINGLE PHASE TRANSFORMER** | **20** | |
| | | 3.1 Working principle of transformer. | 01 | |
| | | 3.2 Constructional feature of Transformer. | 01 | |
| | | 3.2.1 Arrangement of core & winding in different types of transformer. | 01 | |

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| | | 3.2.2 Brief ideas about transformer accessories such as conservator, tank, breather, and explosion vent etc. | 01 | |
| | | 3.2.3 Explain types of cooling methods | 01 | |
| | | 3.3 State the procedures for Care and maintenance. | 01 | |
| | | 3.4 EMF equation of transformer. | 01 | |
| | | 3.5 Ideal transformer voltage transformation ratio | 01 | |
| | | 3.6 Operation of Transformer at no load, on load with phasor diagrams. | 01 | |
| | | 3.7 Equivalent Resistance, Leakage Reactance and Impedance of transformer. | 01 | |
| | | 3.8 To draw phasor diagram of transformer on load, with winding Resistance and Magnetic leakage with using pf, leading pf and lagging pf load. | 01 | |
| | | 3.9 To explain Equivalent circuit and solve numerical problems. | 01 | |
| | | 3.10 Approximate & exact voltage drop calculation of a Transformer. | 01 | |
| **April** | | 3.11 Regulation of transformer. | 01 | |
| | | 3.12 Different types of losses in a Transformer. Explain Open circuit and Short Circuit test.(Solve numerical problems) | 01 | |
| | | 3.13 Explain Efficiency, efficiency at different loads and power factors, condition for maximum efficiency (solve problems) | 01 | |
| | | 3.14 Explain All Day Efficiency (solve problems) | 02 | |
| | | 3.15 Determination of load corresponding to Maximum efficiency. | 01 | |
| | | 3.16 Parallel operation of single phase transformer. | 01 | |
| **April** | **UNIT-4** | **4. AUTOTRANSFORMER** | **03** | |

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|---|---|---|---|---|
| | | 4.1. Constructional features of Auto transformer. | 01 | |
| | | 4.2. Working principle of single phase Auto Transformer.<br>4.3. Comparison of Auto transformer with an two winding transformer (saving of Copper). | 01 | |
| | | 4.4. Uses of Auto transformer.<br>4.5. Explain Tap changer with transformer (on load and off load condition) | 01 | |
| **April** | **UNIT-5** | **5.INSTRUMENT TRANSFORMERS** | 05 | |
| \ | | 1.1Explain Current Transformer and Potential Transformer | 02 | |
| | | 1.2Define Ratio error, Phase angle error, Burden. | 02 | |
| | | 1.3Uses of C.T. and P.T. | 01 | |

| SUBJECT-Th4. ANALOG ELECTRONICS AND OP-AMP | | | | |
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| **NAME OF THE FACULTY- Siba Prasad Panda** | | | | |
| MONTH | MODULE/UNIT | COURSE TO BE COVERED | TOTAL NO. OF CLASS | REMARK |
| **January** | **UNIT-1** | **1 P-N JUNCTION DIODE** | **06** | |
| | | 1. 1 P-N Junction Diode<br>1. 2 Working of Diode | 01 | |
| | | 1. 3V-1 characteristic of PN junction Diode. V-1 characteristic of PN junction Diode | 01 | |
| | | 1. 4 DC load line<br>1. 5 Important terms such as Ideal Diode, Knee voltage | 01 | |
| | | 1. 6Junctions break down.<br>1.6.1 Zener breakdown<br>1.6.2 Avalanche breakdown | 01 | |
| | | 1. 7 P-N Diode clipping Circuit. | 01 | |
| | | 1.8 P-N Diode clamping Circuit | 01 | |
| **January** | **UNIT-2** | **2.SPECIALSEMICONDUCTOR DEVICES** | **05** | |
| | | 2.1Thermistors, Sensors & barretters | 02 | |
| | | 2. 2 Zener Diode | 01 | |
| | | 2. 3 Tunnel Diode | 01 | |
| | | 2. 4 PIN Diode | 01 | |
| | **UNIT-3** | **3.RECTIFIERCIRCUITS&FILTERS** | **07** | |
| | | 3.1Classification of rectifiers | 01 | |
| | | 3.2 Analysis of half wave, full wave centre tapped and Bridge rectifiers | 01 | |
| | | 3.2.1DC output current and voltage | 01 | |
| | | 3.2.2 RMS output current and voltage<br>3.2.3 Rectifier efficiency | 01 | |

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| | | 3.2.4Ripple factor<br>3.2.5Regulation | 01 | |
| | | 3.2.6 Transformer utilization factor<br>3.2.7 Peak inverse voltage | 01 | |
| | | 3.3 Filters:<br>3.3.1 Shunt capacitor filter<br>3.3.2 Choke input filter<br>3.3.3 π filter | 01 | |
| **February** | **UNIT-4** | **4.TRANSISTORS** | **07** | |
| | | 4.1 Principle of Bipolar junction transistor | 01 | |
| | | 4.2 Different modes of operation of transistor | 01 | |
| | | 4.3 Current components in a transistor | 01 | |
| | | 4.4 Transistor as an amplifier | 01 | |
| | | 4.5 Transistor circuit configuration & its characteristics<br>4.5.1 CB Configuration<br>4.5.2 CE Configuration<br>4.5.3 CC Configuration | 03 | |
| **February** | **UNIT-5** | **5. TRANSISTOR CIRCUITS** | **07** | |
| | | 5.1 Transistor biasing | 01 | |
| | | 5.2 Stabilization | 01 | |
| | | 5.3 Stability factor | 01 | |
| | | 5.4 Different method of Transistors Biasing<br>5.4.1 Base resistor method<br>5.4.2 Collector to base bias<br>5.4.3 Self bias or voltage divider method | 04 | |
| **February** | **UNIT-6** | **6.TRANSISTOR AMPLIFIERS & OSCILLATORS** | **07** | |
| | | 6.1Practical circuit of transistor amplifier<br>6.2DC load line and DC equivalent circuit | 01 | |
| | | 6.3AC load line and AC equivalent circuit<br>6.4Calculation of gain | 01 | |

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|---|---|---|---|---|
| | | 6.5Phase reversal<br>6.6H-parameters of transistors | 01 | |
| | | 6.7Simplified H-parameters of transistors | 01 | |
| | | 6.8Generalised approximate model<br>6.9Analysis of CB, CE, CC amplifier using generalised approximate model | 01 | |
| | | 6.9 Analysis of CB, CE, CC amplifier using generalised approximate model | 01 | |
| | | 6.10Multi stage transistor amplifier<br>6.10.1R.C. coupled amplifier<br>6.10.2Transformer coupled amplifier | 02 | |
| **March** | | 6.11Feed back in amplifier<br>6.11.1General theory of feed back<br>6.11.2Negative feedback circuit<br>6.11.3Advantage of negative feed back | 01 | |
| | | 6.12Power amplifier and its classification<br>6.12.1Difference between voltage amplifier and power amplifier | 01 | |
| | | 6.12.2Transformer coupled class A power amplifier<br>6.12.3Class A push - pull amplifier<br>6.12.4Class B push - pull amplifier | 01 | |
| | | 6.13Oscillators<br>6.13.1Types of oscillators<br>6.13.2Essentials of transistor oscillator<br>6.13.3Principle of operation of tuned collector, Hartley, colpitt, phase shift, wein- bridge oscillator (no mathematical derivations) | 02 | |
| **March** | **UNIT-7** | **7.FIELDEFFECT TRANSISTOR** | **06** | |
| | | 7.1 Classification of FET | 01 | |
| | | 7.2 Advantages of FET over BJT<br>7.3 Principle of operation of BJT | 02 | |
| | | 7.4 FET parameters (no mathematical derivation)<br>7.4.1DC drain resistance<br>7.4.2AC drain resistance<br>7.4.3Trans-conductance | 02 | |
| | | 7.5 Biasing of FET | 01 | |
| **April** | **UNIT-8** | **8.PERATIONAL AMPLIFIERS** | **09Z** | |
| | | 8.1 General circuit simple of OP-AMP and IC - CA - 741 OP AMP | 01 | |

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|---|---|---|---|---|
| | | 8.2 Operational amplifier stages<br>8.3Equivalent circuit of operational amplifier | 01 | |
| | | 8.4 Open loop OP-AMP configuration | 01 | |
| | | 8.5 OPAMP with fed back<br>8.6 Inverting OP-AMP | 01 | |
| | | 8.7 Non inverting OP-AMP | 01 | |
| | | 8.8 Voltage follower & buffer | 01 | |
| | | 8.9 Differential amplifier<br>8.9.1 Adder or summing amplifier<br>8.9.2 Sub tractor<br>8.9.3 Integrator<br>8.9.4 Differentiator<br>8.9.5 Comparator | 03 | |

| TH-2 DATA COMMUNICATION & COMPUTER NETWORK | | | | |
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| **NAME OF THE FACULTY-** | | | | |
| MONTH | MODULE/UNIT | COURSE TO BE COVERED | TOTAL NO. OF CLASS | REMARK |
| **January** | **UNIT-1** | **Network& Protocol** | 08 | |
| | | 1.1 Data Communication | 03 | |
| | | 1.2 Networks | 02 | |
| | | 1.3 Protocol & Architecture, Standards, OSI, TCP/IP | 03 | |
| **February** | **UNIT-2** | **Data Transmission & Media** | **08** | |
| | | 2.1 Data transmission Concepts and Terminology | 03 | |
| | | 2.2 Analog and Digital Data transmission | 02 | |
| | | 2.3 Transmission impairments, Channel capacity | 03 | |
| **February** | **UNIT-3** | **Data Encoding** | **08** | |
| | | 3.1 Data encoding, | 02 | |
| | | 3.2 Digital data digital signals, | 02 | |
| | | 3.3 Digital data analog signals | 02 | |
| | | 3.4 Analog data digital signals | 01 | |
| | | 3.5 Analog data analog signals | 01 | |
| **March** | **UNIT-4** | **Data Communication & Data link control** | **08** | |
| | | 4.1 Asynchronous and Synchronous Transmission | 01 | |
| | | 4.1 Error Detection | **01** | |
| | | 4.3 Line configuration | 01 | |
| | | 4.4 Flow Control, | 01 | |
| | | 4.5 Error Control | 01 | |
| | | 4.6 Multiplexing | **01** | |
| | | 4.7 FDM synchronous TDM | 01 | |
| | | 4.8 Statistical TDM | 01 | |
| **MARCH** | **UNIT-5** | **Switching & Routing** | **10** | |

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|---|---|---|---|---|
| | | 5.1 Circuit Switching networks | **02** | |
| | | 5.2 Packet Switching principles | 01 | |
| | | 5.3 X.25 | **01** | |
| | | 5.4 Routing in Packet switching | 01 | |
| | | 5.5 Congestion | 01 | |
| | | 5.6 Effects of congestion, congestion control | 01 | |
| | | 5.7 Traffic Management | 01 | |
| | | 5.8 Congestion Control in Packet Switching Network. | 02 | |
| **APRIL** | **UNIT-6** | **LAN Technology** | 10 | |
| | | 6.1. Topology and Transmission Media | **02** | |
| | | 6.2 LAN protocol architecture | 02 | |
| | | 6.3. Medium Access control | 02 | |
| | | 6.4 Bridges, Hub, Switch | 01 | |
| | | 6.5 Ethernet (CSMA/CD), Fiber Channel | 01 | |
| | | 6.6 Wireless LAN Technology.. | 02 | |
| **APRIL** | **UNIT-7** | **TCP/IP** | 08 | |
| | | 7.1 TCP/IP Protocol Suite | 02 | |
| | | 7.2 Basic Protocol functions | 02 | |
| | | 7.3 Principles of Internetworking | 02 | |
| | | 7.3 Internet Protocol operations | 01 | |
| | | 7.4 Internet Protocol | 01 | |

| Th.3 MICROPROCESSOR & MICROCONTROLLER | | | | |
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| **NAME OF THE FACULTY-** | | | | |
| MONTH | MODULE/UNIT | COURSE TO BE COVERED | TOTAL NO. OF CLASS | TOTAL NO. OF CLASS |
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