



**GOVERNMENT POLYTECHNIC,
PURID DEPARTMENT OF ELECTRICAL ENGINEERING**

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| Discipline: ELECTRICAL ENGINEERING | Semester: 3RD | Name of the Teaching Faculty: MR NILAKANTHA NAIK, LECTURER IN ELECTRICAL ENGINEERING | |
| Subject: ELECTRICAL ENGINEERING MATERIAL | No. of days/per week class allotted: 4 | Semester From date: 01.10.2021 | To Date: 08.01.2022 |
| PRE-REQUISITE | Basic knowledge about atomic configuration of an atom, conductor, semiconductor, insulator, dielectric etc. | | |
| COURSE OUT COMES | CO1: To clarify the students on insulating, conducting & magnetic materials. CO2: To impart knowledge on the Physical, Electrical & Mechanical properties CO3: To impart knowledge on practical uses of various materials in different areas | | |
| Week | Class Day | Practical Topics | DELIVERY METHOD |
| 1 ST | 1 st | Conducting Materials: 1 . 1 Introduction 1 . 2 Resistivity, | whiteboard |
| | 2 nd | factors affecting resistivity 1 . 3 Classification of conducting materials into low-resistivity and high resistivity materials | whiteboard |
| | 3 RD | 1 . 4 Low Resistivity Materials and their Applications. (Copper, Silver, Gold, Aluminum, Steel) | whiteboard |
| | 4 TH | 13 1 . 5 Stranded conductors 1 . 6 Bundled conductors | whiteboard |
| 2 ND | 1 st | 1 . 7 Low resistivity copper alloys 1 . 8 High Resistivity Materials and their Applications (Tungsten, Carbon, Platinum, Mercury) | whiteboard |
| | 2 nd | 1 . 9 Superconductivity 1 . 10 Superconducting materials 1 . 11 Application of superconductor materials | Lecture notes |
| | 3 RD | QUIZ/ASSIGNMENT-1 | |
| | 4 TH | Semiconducting Materials: 2 . 1 Introduction 2 . 2 Semiconductors | whiteboard |
| 3 RD | 1 st | 2 . 3 Electron Energy and Energy Band Theory | whiteboard |
| | 2 nd | 2 . 4 Excitation of Atoms 2 . 5 Insulators, Semiconductors and Conductors | whiteboard |
| | 3 RD | 2 . 6 Semiconductor Materials | whiteboard |
| | 4 TH | 2 . 7 Covalent Bonds 2 . 8 Intrinsic Semiconductors | whiteboard |
| 4 TH | 1 st | 2 . 9 Extrinsic Semiconductors | whiteboard |
| | 2 nd | 2 . 10 N-Type Materials 2 . 11 P-Type Materials | whiteboard |
| | 3 RD | 2 . 12 Minority and Majority Carriers | whiteboard |
| | 4 TH | 2 . 13 Semi-Conductor Materials 2 . 14 Applications of Semiconductor materials | whiteboard |
| 5 TH | 1 st | 2.14.1 Rectifiers 2.14.2 Temperature-sensitive resistors or thermistors 2.14.3 Photoconductive cells | whiteboard |
| | 2 nd | 2.14.4 Photovoltaic cells | whiteboard |
| | 3 RD | 2.14.5 Varistors 2.14.6 Transistors 2.14.7 Hall effect generators 2.14.8 Solar power | Lecture notes |
| | 4 TH | QUIZ/ASSIGNMENT-2 | |

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| 6 TH | 1 st | Insulating Materials: 3 . 1 Introduction 3 . 2 General properties of Insulating Materials | whiteboard |
| | 2 nd | 3.2.1 Electrical properties | whiteboard |
| | 3 RD | 3.2.2 Visual properties 3.2.3 Mechanical properties | whiteboard |
| | 4 TH | 3.2.4 Thermal properties 3.2.5 Chemical properties 3.2.6 Ageing | whiteboard |
| 7 TH | 1 st | 3.2.4 Thermal properties 3.2.5 Chemical properties 3.2.6 Ageing | whiteboard |
| | 2 nd | 3.3.1 Introduction 3.3.2 Classification of insulating materials on the basis physical and chemical structure | whiteboard |
| | 3 RD | 3.4 Insulating Gases 3.4.1 Introduction. 3.4.2 Commonly used insulating gases chemical structure | whiteboard |
| | 4 TH | QUIZ/ASSIGNMENT-3 | |
| 8 TH | 1 st | Dielectric Materials: 4.1 Introduction 4.2 Dielectric Constant of Permittivity 4.3 Polarization , | whiteboard |
| | 2 nd | 4.4 Dielectric Loss | whiteboard |
| | 3 RD | 4.5 Electric Conductivity of Dielectrics and their Break Down | whiteboard |
| | 4 TH | 4.6 Properties of Dielectrics. 4.7 Applications of Dielectrics. | Lecture notes |
| 9 TH | 1 ST | QUIZ/ASSIGNMENT-4 | |
| | 2 ND | Magnetic Materials: 5.1 Introduction 5.2 Classification | whiteboard |
| | 3 RD | 5.2.1 Diamagnetism | whiteboard |
| | 4 TH | 5.2.2 Para magnetism | whiteboard |
| 10 TH | 1 ST | 5.2.3 Ferromagnetism | whiteboard |
| | 2 ND | 5.3 Magnetization Curve | whiteboard |
| | 3 RD | 5.4 Hysteresis | whiteboard |
| | 4 TH | 5.5 Eddy Currents | whiteboard |
| 11 TH | 1 ST | 5.6 Curie Point | whiteboard |
| | 2 ND | 5.7 Magneto-striction | whiteboard |
| | 3 RD | 5.8 Soft and Hard magnetic Materials | whiteboard |
| | 4 TH | 5.8.1 Soft magnetic materials 5.8.2 Hard magnetic materials | Lecture notes |
| 12 TH | 1 ST | QUIZ/ASSIGNMENT-5 | |
| | 2 ND | Materials for Special Purposes 6.1 Introduction | whiteboard |
| | 3 RD | 6.2 Structural Materials | whiteboard |
| | 4 TH | 6.3 Protective Materials | whiteboard |
| 13 TH | 1 ST | 6.3.1 Lead | whiteboard |
| | 2 ND | 6.3.2 Steel tapes, wires and strips | whiteboard |
| | 3 RD | 6.4 Other Materials | whiteboard |
| | 4 TH | 6.4.1 Thermocouple materials | whiteboard |
| 14 TH | 1 ST | 6.4.2 Bimetals | Lecture notes |
| | 2 ND | 6.4.3 Soldering Materials | whiteboard |
| | 3 RD | 6.4.4 Fuse and Fuse materials. | whiteboard |
| | 4 TH | 6.4.5 Dehydrating material. | whiteboard |
| 15 TH | 1 ST | QUIZ/ASSIGNMENT-6 | |
| | 2 ND | REVISION | whiteboard |
| | 3 RD | REVISION | whiteboard |
| | 4 TH | REVISION | whiteboard |

LEARNINGRESOURCES:

- 1 Electrical Engineering Material & Electronic components K.B.Raina, S.K.Bhattacharya, T. Joneja S. K. Kataria & Sons
- 2 An Introduction to Electrical Engineering Materials C.S.Indulkar, S.Thiruvengadam S. Chand
3. Electrical Engineering Materials R.K.Shukla, Archana Singh Mc Graw Hill

WEBSITERESOURCES:

<https://www.sciencedirect.com>

11/10/21

Sign. of Faculty concerned

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Principal
G.Pauni

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Sign. of HOD/c
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