**COURSE PLAN**

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| **S.No.** | **TOPIC** | **No. of Lect. Req.** | **Total No. Lect.** |
| 1. | Introduction of Subject | 1 | **8** |
| 2. | **Unit 1** **Introduction to Breakdown in Gases** | 1 |
| 3. | Townsend’s breakdown mechanism | 1 |
| 4. | Application of gases in power system | 1 |
| 5. | Introduction to mechanism of **breakdown in liquids** | 1 |
| 6. | Suspended solid particle mechanism and cavity breakdown | 1 |
| 7. | Application of oil in power apparatus | 1 |
| 8. | **Unit Test 1** | 1 |
| 9. | **Unit 2 High DC Voltage Generation** | 1 | **8** |
| 10. | Generation of high dc voltage, Basic voltage multiplier circuit | 2 |
| 11. | High **AC Voltage Generation**, Cascaded Transformers | 2 |
| 12. | Impulse voltage, Basic impulse circuit, Mark’s multistage impulse generator. | 1 |
| 13. | Potential dividers - resistive, capacitive and mixed potential dividers | 1 |
| 14. | Sphere gap- Construction and operation. Klydonorgraph | 1 |
| 15. | **Unit 3 Nondestructive Insulation Tests** | 1 | **8** |
| 16. | Measurement of resistively, dielectric constant and loss factor. | 1 |
| 17. | High Voltage Schering Bridge- measurement of capacitance and dielectric loss. | 1 |
| 18. | Introduction to **partial discharge** | 1 |
| 19. | Partial discharge equivalent circuit | 1 |
| 20. | Basic wide-band and narrow band PD detection circuits | 2 |
| 21. | **Unit test 2** | 1 |
| 22. | **Unit 4 Over voltages** | 1 | **8** |
| 23. | Introduction To Lightning Phenomena, Over Voltages Due To Lighting | 1 |
| 24. | **Travelling waves** on transmission lines-open end line, short circuited line | 1 |
| 25. | line terminated through a resistance | 1 |
| 26. | line connected to a cable, reflection and refraction at a T-junction | 2 |
| 27. | line terminated through a capacitance. Attenuation of traveling waves | 2 |
| 28. | **Unit 5 Over Voltage Protection** | 1 | **8** |
| 29. | Basic construction and operation of ground wires- protection angle | 1 |
| 30. | Protective zone, ground rods, counterpoise, surge absorber, rod gap, arcing horn | 1 |
| 31. | lighting arresters expulsion type, non -linear gap type, metal oxide gapless type | 1 |
| 32. | **Insulation Coordination** | 1 |
| 33. | Volt-time curves, basic impulse insulation levels | 1 |
| 34. | Coordination of insulation levels | 1 |
| 35. | **Unit test 3** | 1 |
|  | Total Lectures Required |  | **40** |