

**Meerut Institute of Engineering and Technology, Meerut**

**DEPARTMENT OF ………………………**

**PROGRAM # B. TECH. ……………………..**

**Course – Handout**

**Name of Faculty**

**Designation**

**Subject Name (Code)**

**Odd / Even Semester : 2022 - 2023**

**Vision of the Institute**

Please copy-paste / insert Vision of the MIET.

**Mission of the Institute**

Please copy-paste / insert Mission of the MIET.

**Vision of the Department**

Please copy-paste / insert Vision of the department concerned.

**Mission of the Department**

Please copy-paste / insert Mission of the department concerned.

**Program Educational Objectives (PEOs)**

|  |  |
| --- | --- |
| **PEO 1** | Please copy-paste / insert PEO-1 of the department concerned. |
| **PEO 2** | Please copy-paste / insert PEO-2 of the department concerned. |
| **PEO 3** | Please copy-paste / insert PEO-3 of the department concerned. |

**Program Specific Outcomes (PSOs)**

**By the completion of …………. Engineering program the student will be able to:**

|  |  |
| --- | --- |
| **PSO 1** | Please copy-paste / insert PSO-1 of the department concerned. |
| **PSO 2** | Please copy-paste / insert PSO-2 of the department concerned. |

**Program Outcomes (POs)**

**PO1 Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

**PO2 Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

**PO3 Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

**PO4 Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

**PO5 Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

**PO6 The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

**PO7 Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

**PO8 Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

**PO9 Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

**PO10 Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

**PO11 Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one’s own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

**PO12 Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

**Course Details**

|  |  |
| --- | --- |
| Name of the Course / Subject  |  |
| Subject / Course Code |  | Theory / Lab |  |
| Academic Session |  | Semester |  |
| L T P |  | Credits  |  |
| Core // Dept. / Open Elective |  | Internal Marks |  |
| Total Marks of the Subject  |  | External Marks |  |
| Name of the Faculty |  |  |  |
| Class-room |  |  |  |
| Time-table (mention lecture timings in appropriate cell) |
| Mon | Tues | Wed | Thurs | Fri |
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**Course Description**

This course provides a comprehensive coverage of the important topics in electrical circuit analysis. The full spectrum of electrical circuit topics such as Kirchoff's Laws Mesh Analysis Nodal Analysis RLC Circuits and Resonance to Network Theorems and Applications Laplace Transforms. Transient behavior and two port network connections.

**Course Outcomes**

|  |  |
| --- | --- |
| **Course Outcome** | Statement (On completion of this course, the student will be able to) |
| CO1 | Understand basics electrical circuits with nodal and mesh analysis. |
| CO2 | Appreciate electrical network theorems. |
| CO3 | Apply Laplace transform for steady state and transient analysis |
| CO4 | Determine different network functions. |
| CO5 | Appreciate the frequency domain techniques. |

**Mapping of CO with PO**

|  |  |
| --- | --- |
| **Course outcome** | **Program Outcomes** |
| **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| CO1 | 3 | 3 | 2 | - | - | - | - | - | - | - | - | 2 |
| CO2 | 3 | 3 | 2 | - | - | - | - | - | - | - | - | 2 |
| CO3 | 3 | 3 | 2 | - | - | - | - | - | - | - | - | 2 |
| CO4 | 3 | 3 | 2 | - | - | - | - | - | - | - | - | 2 |
| CO5 | 3 | 2 | 2 | - | - | - | - | - | - | - | - | 3 |
| Average | 3 | 2.8 | 2 | - | - | - | - | - | - | - | - | 2.2 |

**Mapping of CO with PSO**

|  |  |
| --- | --- |
| **Course Outcome** | **Program Specific Outcomes** |
| **PSO1** | **PSO2** |
| CO1 | 2 | - |
| CO2 | 3 | - |
| CO3 | 3 | - |
| CO4 | 2 | - |
| CO5 | 3 | - |
| Average | 2.8 |  |

**Course Topics (Syllabus – as prescribed by AKTU; CO-wise)**

**CO-1 (Kx)**

Node and mesh analysis, matrix approach of network containing voltage & Current sources and reactances, source transformation and duality

**CO-2 (Kx)**

Network theorems: Superposition, reciprocity, Thevenin’s, Norton’s, Maximum power transfer, compensation and Tallegen's theorem as applied

to A.C. circuits.

**CO-3 (Kx)**

Trigonometric and exponential Fourier series: Discrete spectra and symmetry of waveform, steady state response of a network to non sinusoidal periodic inputs, power factor, effective values, Fourier transform and continuous spectra, three phase unbalanced circuit and power calculation.

**CO-4 (Kx)**

Laplace transforms and properties: Partial fractions, singularity functions, waveform synthesis, analysis of RC, RL, and RLC networks with and without initial conditions with Laplace transforms evaluation of initial conditions.

**CO-5 (Kx)**

Transient behavior, concept of complex frequency, driving points and transfer functions poles and zeros of immittance function, their properties, sinusoidal response from pole-zero locations, convolution theorem and two four port network and interconnections, behavior of series and parallel resonant circuits, introduction to band pass, low pass, high pass and band

reject filters.

**TOTAL: 40 Lecture Hours**

**Text Books / Reference Books**

1. Franklin F. Kuo, “Network Analysis and Synthesis,” Wiley India Education
2. Van, Valkenburg, “Network analysis,” Pearson, 2019.
3. T Sudhakar, A., Shyammohan, S. P., “Circuits and Network,” Tata McGraw-Hill New Delhi, 1994.
4. A William Hayt, “Engineering Circuit Analysis,” 8th Edition, McGraw-Hill Education
5. A. Anand Kumar, “Network Analysis and Synthesis,” PHI publication, 2019.

**Course Plan**

**(Add lectures related to Pre-requisite and Content Beyond Syllabus / Topics to cover Gap etc.)**

| **Lecture No.** | **COx** | **Lecture Topic** | **Date Planned** | **Reference Material** |
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**Questions Bank (CO-wise)**

**(15-20 Questions per CO, varying from K1 to Highest BKL)**

| Ques. No. | COx | Question | Kx | Answer Type (Short / Medium / Long) |
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**Evaluation Scheme**

The marks are based on the performance of the students in the following activities:

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| --- | --- | --- |
| **Components**  | **Marks Distribution (150)** | **Marks Distribution (%)** |
| Class Tests (Sessional-I, Sessional-II and PUTs) | 30 | 20% |
| Assignment / Quiz  | 10 | 6.67% |
| Attendance | 10 | 6.67% |
| End Semester Examination | 100 | 66.7% |

**Assessment Tool for B Tech – I Year : 2022-23**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Subject Type | Assessment components | Assessment Method | Assessment Tool | Frequency per Semester |
| Theory(all COs) | Direct Assessment(80% weightage) | Internal Assessment(30% ) weightage | Sessional-I; Sessional-II ; PUTs ; Assignment / Quiz | OneOneOneOne for each CO |
| External Assessment(70% weightage) | University Examination | Once |
| Indirect Assessment(20% weightage) | - | Course End Survey | Once |

**Attainment Levels : 2022-23 (Theory Course)**

| Assessment Methods | Level | Range of Students in a class / branch with target marks |
| --- | --- | --- |
| Direct Assessment(Internal Evaluation) | 1 | <50% student secure 60% marks |
| 2 | >=50 <60% student secure 60% marks |
| 3 | >=60% student secure 60% marks |
| Direct Assessment(External Evaluation) | 1 | <50% student secure 50% marks |
| 2 | >=50 <60% student secure 50% marks |
| 3 | >=60% student secure 50% marks |
| Indirect Assessment(Course End Survey) | To be conducted at 3-point scale and weighted method is to be considered for Attainment Value of Indirect Assessment |

**Sign of => Faculty Module Coordinator HOD-Dept**