**SWARNANDHRA**
**COLLEGE OF ENGINEERING & TECHNOLOGY**
(Autonomous)
Accredited by NBA, AICTE, NEW DELHI • Accredited by NAAC with "A" Grade – 3.32/4.00 CGPA
Recognized by UGC Under Sections 2(f) & 12 (B) of UGC Act 1956
Approved by AICTE, New Delhi, Permanent Affiliated to JNTU K, Kakinada
Seetharampuram, NARSAPUR-534 280, W.G-Dist., Andhra Pradesh

## Department of Electrical and Electronics Engineering

## TEACHING PLAN

| Course Code | Course Title | Semester | Branches | Contact Periods/ Week | Academic Year | Date of Commencement of Semester |
|---|---|---|---|---|---|---|
| **23EE3T02** | ELECTRICAL CIRCUIT ANALYSIS-II | III | EEE | 5 | 2024-2025 | 30/07/2024 |

**Course Outcomes:** *After successful completion of this course, students should be able to:*

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| 1 | Analyze the balanced and unbalanced 3 phase circuits for power calculations. |
| 2 | Analyze the transient behavior of electrical networks in different domains. |
| 3 | Estimate various Network parameters. |
| 4 | Apply the concept of Fourier series to electrical systems. |
| 5 | Analyze the filter circuit for electrical circuits. |

| Unit | Outcome/Bloom's Level | Topics No. | Topics/Activity | TextBook / Reference | Contact Hour | Delivery Method |
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| | | | **1. Analysis Balanced and unbalanced circuits** | | | |
| I | Analyze the balanced and unbalanced 3 phase circuits for power calculations. | 1.1 | Introduction | R1,R3,T4 | 1 | Chalk& Talk,PPT |
| | | 1.2 | Phase sequence | R1,R3,T4 | 1 | Chalk& Talk, PPT |
| | | 1.3 | star and delta connection of sources and loads | R1,R3,T4 | 1 | Chalk& Talk, PPT |
| | | 1.4 | relation between line and phase quantities | R1,R3,T4 | 2 | Chalk& Talk, PPT |
| | | 1.5 | Problems | R1,R3,T4 | 1 | Chalk& Talk |
| | | 1.6 | analysis of balanced three phase circuits | R1,R3,T4 | 1 | Chalk& Talk, PPT |
| | | 1.7 | measurement of activeand reactive power. | R1,R3,T4 | 1 | Chalk& Talk, PPT |
| | | 1.8 | problems | R1,R3,T4 | 2 | Chalk& Talk |
| | | 1.9 | Loop method | R1,R3,T4 | 1 | Chalk& Talk, PPT |
| | | 1.10 | Star-Delta transformation technique | R1,R3,T4 | 1 | Chalk& Talk, PPT |

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| | | 1.11 | two-wattmeter method for measurement of three phase power. | R1,R3,T 4 | 1 | Chalk& Talk, PPT |
| | | 1.12 | problems | R1,R3,T 4 | 2 | Chalk& Talk |
| Content beyond syllabus(if need): BLONDEL'S THEOREM | | | | | 1 | Chalk& Talk, PPT |
| | | | | Total | 16 | |
| | | | **2. Laplace transforms and Transient Analysis** | | | |
| II | Analyze the transient behavior of electrical networks in different domains. | 2.1 | Definition and Laplace transforms of standard functions | T1, R3 | 1 | Chalk& Talk, PPT |
| | | 2.2 | Shifting theorem | T1, R3 | 1 | Chalk& Talk, PPT |
| | | 2.3 | Transforms of derivatives and integrals | T1, R3 | 1 | Chalk& Talk, PPT |
| | | 2.4 | InverseLaplacetransforms and applications. | T1, R3 | 1 | Chalk& Talk, PPT |
| | | 2.5 | Transient response of R-L, circuits (Serics& parallelcombinations) DC excitation | T1, R3 | 1 | Chalk& Talk, PPT |
| | | 2.6 | Transient response of R-C circuits Series& parallel combinations\|DC excitation | T1, R3 | 1 | Chalk& Talk, PPT |
| | | 2.7 | Transient response of R-L-C circuits Series& parallel combinationsDC excitation | T1, R3 | 1 | Chalk& Talk, PPT |
| | | 2.8 | Transient response of R-L-C circuits (Serics&parallel combinations) AC excitation | T1, R3 | 1 | Chalk& Talk, PPT |
| | | 2.9 | Transient response of RL-RC circuits (Series&parallel combinations) AC | T1, R3 | 2 | Chalk& Talk, PPT |

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| | | | excitation | | | |
| | | 2.10 | Problems | T1, R3 | 1 | Chalk& Talk, PPT |
| | | 2.11 | Problems | T1, R3 | 1 | Chalk& Talk, PPT |
| Content beyond syllabus: | | | | | | |
| | | | | Total | 12 | |
| | | | **3. Network Parameters** | | | |
| III | Estimate various Network parameters | 3.1 | Impedance parameters | T2,T3,R 5 | 1 | Chalk& Talk, PPT |
| | | 3.2 | Admittance parameters | T2,T3,R 5 | 1 | Chalk& Talk, PPT |
| | | 3.3 | Hybrid parameters | T2,T3,R 5 | 1 | Chalk& Talk, PPT |
| | | 3.4 | Transmission (ABCD) parameters | T2,T3,R 5 | 1 | Chalk& Talk, PPT |
| | | 3.5 | conversion of Parameters from one form to other | T2,T3,R 5 | 2 | Chalk& Talk, PPT |
| | | 3.6 | **PROBLEMS** | T1,T4,R 3 | 1 | Chalk& Talk, PPT |
| | | 3.7 | Conditions for Reciprocity and Symmetry | T1,T4,R 3 | 1 | Chalk& Talk, PPT |
| | | 3.8 | Interconnection of Two Port networks in Series | T1,T4,R 3 | 1 | Chalk& Talk, PPT |
| | | 3.9 | Interconnection of Two Port networks in parallel | T1,T4,R 3 | 1 | Chalk& Talk, PPT |
| | | 3.10 | Interconnection of Two Port networks in cascade configuration | T1,T4,R 3 | 1 | Chalk& Talk, PPT |
| | | 3.11 | problems | T1,T4,R 3 | 2 | Chalk& Talk, PPT |
| Content beyond syllabus(if need): | | | | | | |
| | | | | Total | 13 | |
| | | | **4. Analysis of Electric Circuits with Periodic Excitation** | | | |
| IV | | 4.1 | Fourier series and evaluation of Fourier | T1,T4,R 3 | 1 | Chalk& Talk, PPT |

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| | | | coefficients | | | |
| | Apply the concept of Fourier series to electrical systems. | 4.2 | Trigonometric and complex Fourier series for periodic waveforms | T1,T4,R 3 | 2 | Chalk& Talk, PPT |
| | | 4.3 | Application to Electrical Systems | T1,T4,R 3 | 1 | Chalk& Talk, PPT |
| | | 4.4 | Effective value and average value of non-sinusoidal periodic waveforms | T1,T4,R 3 | 1 | Chalk& Talk, PPT |
| | | 4.5 | Problems | T1,T4,R 3 | 2 | Chalk& Talk, PPT |
| | | 4.6 | power factor | T1,T4,R 3 | 1 | Chalk& Talk, PPT |
| | | 4.7 | effect of harmonics | T1,T4,R 3 | 1 | Chalk& Talk, PPT |
| | | 4.8 | Problems | T1,T4,R 3 | 2 | Chalk& Talk, PPT |
| Content beyond syllabus(if need): | | | | | | |
| | | | | Total | 11 | |
| | | | 5. Filters | | | |
| V | Analyze the filter circuit for electrical circuits. | 5.1 | Classification of filters- | T1,R2,R 3 | 1 | Chalk& Talk, PPT |
| | | 5.2 | Low passfilters | T1,R2,R 3 | 1 | Chalk& Talk, PPT |
| | | 5.3 | High passfilters | T1,R2,R 3 | 1 | Chalk& Talk, PPT |
| | | 5.4 | Band passfilters | T1,R2,R 3 | 1 | Chalk& Talk, PPT |
| | | 5.5 | Band Elimination filters | T1,R2,R 3 | 1 | Chalk& Talk, PPT |
| | | 5.6 | Constant-k filters - Low pass and High Pass | T1,R2,R 3 | 2 | Chalk& Talk, PPT |
| | | 5.7 | Design of Filters | T1,R2,R 3 | 1 | Chalk& Talk, PPT |
| | | 5.8 | Problems | T1,R2,R 3 | 2 | Chalk& Talk, PPT |
| | | | | Total | 10 | |
| | | | | Cumulative proposed periods | 62 | |

| Text Books: | |
|---|---|
| S. No. | Authors, Book Title, Edition, Publisher, Year of Publication |
| 1 | William Hayt and Jack E. Kemmerly,Engineering Circuit Analysis 8th Edition McGraw-Hill, 2013 |
| 2 | Charles K. Alexander, Mathew N. O. Sadiku, Fundamentals of Electric Circuits, 3rd Edition, Tata McGraw-Hill, 2019 |
| Reference Books: | |
| S. No | Authors, Book Title, Edition, Publisher, Year of Publication |
| 1 | A. Chakrabarti, Dhanpat Rai & Co.,Circuit Theory: Analysis and Synthesis, 7th Revised Edition,2018. |
| 2 | M. E. Van Valkenburg,Network Analysis, 3rd Edition, PHI, 2019. |
| 3 | N. C. Jagan and C. Lakshminarayana,Network Theory, 1st Edition, B. S. Publications, 2012. |
| 4 | A. Sudhakar, Shyam Mohan S. Palli,Circuits and Networks Analysis and Synthesis, 5th Edition, Tata McGraw-Hill, 2017. |
| 5 | Durgesh C. Kulshreshtha Gopal G. Bhise, Prem R. Chadha ,Engineering Network Analysis and Filter Design (Including Synthesis of One Port Networks),Umesh Publications 2012. |
| Web Details: | |
| 1 | https://archive.nptel.ac.in/courses/117/106/117106108/ |
| 2 | https://archive.nptel.ac.in/courses/108/105/108105159/ |

| | | Name | Signature |
|---|---|---|---|
| i. | Course Coordinator | Mr. P.R.C.MURTHY | P.R.C.Murthy |
| ii. | Module Coordinator | Mrs. N.LAVANYA | N.Lavanya |
| iii. | Programme Coordinator | MR. A. SATYANARAYANA | A. Satyanarayana |

Principal