**University of Management and Technology**

**School of Engineering**

**Department of Electrical Engineering**

**Course Outline**

Course code……EE 212………………… Course title……Electrical Network Analysis……………………

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| Program | BSEE |
| Credit Hours | 3 |
| Duration | One semester |
| Prerequisites | EE111 |
| Resource Person | Khan M. Nazir |
| Counseling Timing  (Room# ) | 1:30 pm to 4pm , Monday & Wednesday  11am to 1 pm, Tuesday & Thursday  Project Lab |
| Contact | 03454030919  Khan.nazir@umt.edu.pk |

**Chairman/Director signature………………………………….**

**Dean’s signature…………………………… Date………………………………………….**

**Learning Objective:**

Upon Completion of the course, the students will be able to:-

a. Converts Sinusoids into Phasors, and Solve Circuits by applying Phasors .

b. Carry out Sinusoidal Steady State Analysis

c. Carry out AC Power Analysis

d. Analyze balanced three phase systems

e. Apply Concept of Magnetically Coupled Circuits.

f. Solve circuits by applying Laplace and Fourier transforms

g. Analyze Two-Port Networks

**Learning Methodology:**

Lecture, interactive, participative

**Grade Evaluation Criteria**

Following is the criteria for the distribution of marks to evaluate final grade in a semester.

**Marks Evaluation Marks in percentage**

Quizzes 10

Assignments 6

Mid Term 25

Attendance & Class Participation 5

Term Project 4

Presentations

Final exam 50

Total 100

**Recommended Text Books:**

Recommended Books:

**Text book:** Fundamentals of Electric Circuits, 5th Ed., By Alexander and Sadiku

**Reference Books:**

1) The Analysis and Design of Linear Circuits, by Ronald Thomas, and Albert Rosa

2) Electric Circuits, Eighth Edition, by Nilsson & Riedel

3) Basic Engineering Circuit Analysis, 8t h Ed., By J. David Irwin

**Calendar of Course contents to be covered during semester**

**Course code………EE212 Course title…Electrical Network Analysis……………**

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| --- | --- | --- |
| **Week** | **Course Contents** | **Reference Chapter(s)** |
| 1 | 9.1 Introduction  9.2 Sinusoids  9.3 Phasors  9.4 Phasor Relationships for Circuit Elements | Ch-9 |
| 2 | 9.5 Impedance and Admittance  9.6 Kirchhoff’s Laws in the Frequency Domain  9.7 Impedance Combinations 390 | Ch-9 |
| 3 | 10.1 Introduction to Sinusoidal Steady State Analysis  10.2 Nodal Analysis  10.3 Mesh Analysis  10.4 Superposition Theorem  10.5 Source Transformation | Ch-10 |
| 4 | 10.6 Thevenin and Norton Equivalent Circuits  10.7 Op Amp AC Circuits  11.1 Introduction to AC Power Analysis  11.2 Instantaneous and Average Power | Ch-10  Ch-11 |
| 5 | 11.3 Maximum Average Power Transfer  11.4 Effective or RMS Value  11.5 Apparent Power and Power Factor  11.8 Power Factor Correction | Ch-11 |
| 6 | 12.1 Introduction to Three-Phase Circuits  12.2 Balanced Three-Phase Voltages  12.3 Balanced Wye-Wye Connection  12.4 Balanced Wye-Delta Connection | Ch-12 |
| 7 | 12.5 Balanced Delta-Delta Connection  12.6 Balanced Delta-Wye Connection  12.7 Power in a Balanced System | Ch-12 |
| 8 | **Mid Term Examination** |  |
| 9 | 13.1 Introduction to Magnetically Coupled Circuits  13.2 Mutual Inductance  13.3 Energy in a Coupled Circuit  13.4 Linear Transformers  13.5 Ideal Transformers  13.6 Ideal Autotransformers | Ch-13 |

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| 10 | 14.1 Introduction to Frequency Response  14.2 Transfer Function  14.3 †The Decibel Scale  14.4 Bode Plots  14.5 Series Resonance  14.6 Parallel Resonance | Ch-14 |
| 11 | 14.7 Passive Filters  14.7.1 Lowpass Filter  14.7.2 Highpass Filter  14.7.3 Bandpass Filter  14.7.4 Bandstop Filter | Ch-14 |
| 12 | 15.1 Introduction to Laplace Transform  15.2 Definition of the Laplace Transform  15.3 Properties of the Laplace Transform  15.4 The Inverse Laplace Transform  15.4.1 Simple Poles  15.4.2 Repeated Poles  15.4.3 Complex Poles | Ch-15 |
| 13 | 16.1 Introduction to the Application of Laplace Transform  16.2 Circuit Element Models  16.3 Circuit Analysis  16.4 Transfer Functions | Ch-16 |
| 14 | 17.1 Introduction to Fourier Series  17.2 Trigonometric Fourier Series  17.3 Symmetry Considerations  17.3.1 Even Symmetry  17.3.2 Odd Symmetry  17.3.3 Half-Wave Symmetry  17.4 Circuit Applications | Ch-17 |
| 15 | 19.1 Introduction to Two-Port Networks  19.2 Impedance Parameters  19.3 Admittance Parameters  19.4 Hybrid Parameters  19.5 Transmission Parameters  19.7 Interconnection of Networks | Ch-19 |
| 16 | **Final Examination** |  |