EE-211 / ELECTRICAL NETWORK ANALYSIS

**Course Code/ Title**

Electrical Engineering

**Program**

**Instructor**

Dr. Wazir Muhammad

**Semester**

3rd

**Course File Index**

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| **Header** | **Description** | **Comments** | **Page No.** |
| 1 | Copy of Academic calendar |  |  |
| 2 | Course time table |  |  |
| 3 | Course Description including course contents, recommended text books, lecture breakdown, office hours for students, CLOs with taxonomy levels and their mapping to PLOs, Assessment tools and their weightage, grading policy etc. |  |  |
| 4 | Teaching notes |  |  |
| 5 | Schedule of mid-term tests and final examination. |  |  |
| 6 | Schedule of tests, assignments and Quizzes. (Sessional) |  |  |
| 7 | Samples of best, worst and average answer sheets, along with the question paper and model solutions of each sessional(s)/ midterm / quizzes/ assignments and final examination. |  |  |
| 8 | Breakdown of laboratory experiments pertaining to the course and record of successful conduct. |  |  |
| 9 | Record of CLOs assessment and attainment |  |  |
| 10 | Teacher course feedback form |  |  |
| 11 | Monthly attendance and proof that it was communicated to Students |  |  |
| 12 | Record of make-up classes for any un-scheduled holiday. |  |  |
| 13 | Recommendation and suggestions related to the course for the next session. |  |  |
| 14 | Course files are required to be checked as per procedure already defined by QEC |  |  |

**Chairman Name of Course Teacher**

**Electrical Engineering Dr.Wazir Muhammad**

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| **Course Outline** | | |
| **Course Code/Title:** | **Semester**: | **Credit Hours:** |
| EE-211/ Electrical Network Analysis | 3rd | 3+1 |
| **Prerequisites:** | **Year:** | **Batch:** |
| Electrical circuit | 2021 | 2019 |
| **Teacher:** | **Location:** | **Contact:** |
| Dr. Wazir Muhammad | BUETK Khuzdar | wazir.laghari@gmail.com |
|  |  |  |
| **COURSE STRUCTURE/ SCHEDULE:** | | |
| 3 Theory Lecture + 1 Lab/week (3+3 Hour) | | |
| **COURSE LEARNING OUTCOMES (CLO’s):** | | |
| After completion of this course a student will be/will have:   |  |  |  |  |  | | --- | --- | --- | --- | --- | | **CLO No.** | **COURSE LEARNING OUTCOME** | **PLO** | **B.T Level** | **WK** | | 1. | Analyze AC circuits in time domain and frequency domain. | 1 | **C4** | 1 | | 2. | Analyze balanced three phase systems | 2 | **C4** | 2 | | | |
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| **COURSE OUTLINES** in HEC for BE Electronics Engineering Curriculum **(Revised 2017):** | | |
| Current and voltage transients RLC circuits with DC and AC excitation, resonant circuit: series and parallel resonance in AC circuit, Q-Factor, bandwidth, selectivity. Poly phase generators, star and delta connections, phase sequence, voltage and current relations, vector diagrams for balance and unbalanced three phase networks, three phase unbalanced star and delta-connected loads, power in three phase circuits and different methods of its Measurements.  Loop and node analysis using matrix approach. Two-port network, characterization of linear time-invariant, two ports by six sets of parameters, relationship among parameter sets, interconnection of two port network. Initial condition determination, Laplace transform and differential equations, Laplace transform of signals involving generalized functions, convolution, introduction to poles & zeros and stability criteria, impedance functions and network theorems, frequency response, magnitude and phase plots, Fourier series and transform. | | |
| **BOOKS** in HEC for BE Electronics Engineering Curriculum **(Revised 2017):** | | |
| 1. Electric Circuits Fundamentals, S. Franco, Oxford University Press, (Latest Edition). 2. The Analysis and Design of Linear Circuits by R E Thomas, A J Rosa and G J Toussaint, John Wiley, 6th Edition, 2009. 3. Fundamentals of Electric Circuits by C Alexander and M Sadiku, McGraw Hill, 4th Edition, 2008. 4. Basic Engineering Circuit Analysis by J D Irwin and R M Nelms, Wiley, 9th Edition, 2008. | | |
| **ASSESSMENT ACTIVITIES:** | | |
| |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | **CLO No.** | **Course Learning Outcome** | **Assignment** | **Quiz** | **Midterm** | **Final Exam** | |  | Analyze AC circuits in time domain and frequency domain. | 2.5 | 2.5 | 20 | 30 | | 2. | Analyze balanced three phase systems. | 2.5 | 2.5 |  | 20 |  |  |  |  |  | | --- | --- | --- | --- | | **Relationship of Course Learning Outcomes, Cognitive levels to Program Learning Outcomes** | | | | | **PLO#** | **Program Outcomes** | **CLO#,C#** | **Comments** | | PLO-1 | Engineering Knowledge | CLO-1,C4,WK1 | The course provides basic concepts and fundamentals of Electrical Engineering to provide knowledge about:  AC Fundamentals ,resonance circuits, quality factor, star delta connections and phase sequence .Assessment **Tool:**  Quiz/Assignments /Midterm | | PLO-2 | Problem Analysis | CLO-2,C4,WK2 | In this course students will learn the knowledge about Two port network theory, laplace transformation, poles and zeros criteria and frequency response.  **Assessment Tool:**  Quiz/Assignments /Midterm/Final Exam | | PLO-3 | Design/Development of  Solutions | - | - | | PLO-4 | Investigation | - | - | | PLO-5 | Modern Tool Usage |  | - | | PLO-6 | The Engineer and Society | - | - | | PLO-7 | Environment and  Sustainability | - | - | | PLO-8 | Ethics | - | - | | PLO-9 | Individual and Team Work | - | - | | PLO-10 | Communication |  |  | | PLO-11 | Project Management | - | - | | PLO-12 | Life Long Learning | - | - | | | |

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| **Lecture & Assessment Plan** | | | | |
| **WEEK** | **LECTURE** | **TOPICS** | **PLO,CLO,C,WK** | **ASSESMENT** |
| 1 | 1-3 | Current and voltage transients RLC circuits with DC and AC excitation. | PLO-1,CLO-1,C-4,WK1 |  |
| 2 | 4-6 | Resonant circuit: series and parallel resonance in AC circuit, Q-Factor, bandwidth and selectivity. | PLO-1,CLO-1,C-4,WK1 | Quiz#1 |
| 3 | 7-9 | Poly phase generators, star and delta connections, phase sequence, voltage and current relations, vector diagrams for balance and unbalanced three phase networks. | PLO-1,CLO-1,C-4,WK1 | Assignment#1 |
| 4 | 10-12 | Three phase unbalanced star and delta-connected loads, power in three phase circuits and different methods of its measurements. | PLO-1,CLO-1,C-4,WK1 |  |
| 5 | 13-15 | Loop and node analysis using matrix approach. | PLO-1,CLO-1,C-4,WK1 |  |
| 6 | 16-18 | Two-port network, characterization of linear time-invariant. | PLO-2,CLO-2,C-4,WK2 |  |
| 7 | 19-21 | Two ports by six sets of parameters. | PLO-2,CLO-2,C-4,WK2 |  |
| 8 | 22-24 | Relationship among parameter sets, interconnection of two-port network. | PLO-2,CLO-2,C-4,WK2 |  |
| **MID TERM EXAM** | | | |  |
| 9 | 25-27 | Initial condition determination. | PLO-2,CLO-2,C-4,WK2 |  |
| 10 | 28-30 | Practice Problems of Initial condition determination. | PLO-2,CLO-2,C-4,WK2 |  |
| 11 | 31-33 | Laplace transform and differential equations. | PLO-2,CLO-2,C-4, WK2 | Quiz#2 |
| 12 | 34-36 | Laplace transform and differential equations Practice Problems. | PLO-2,CLO-2,C-4,WK2 |  |
| 13 | 37-39 | Laplace transform of signals involving generalized functions. | PLO-2,CLO-2,C-4,WK2 | Assignment#2 |
| 14 | 40-42 | Convolution, introduction to poles & zeros and stability criteria. | PLO-2,CLO-2,C-4,WK2 |  |
| 15 | 43-45 | Impedance functions and network theorems. | PLO-2,CLO-2,C-4,WK2 |  |
| 16 | 46-48 | Frequency response, magnitude and phase plots, Fourier series and transform. | PLO-2,CLO-2,C-4,WK2 |  |
| **FINAL EXAM** | | | |  |

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| **COURSE PROGRESS REPORT** | | | | | | | | |
| **WEEK** | | **LECTURE** | | **TOPICS** | **Time** | | **Signature**  **Date** | **Comments** |
| **In** | **Out** |
| 1 | | 1-3 | | Current and voltage transients RLC circuits with DC and AC excitation. |  |  |  |  |
| 2 | | 4-6 | | Resonant circuit: series and parallel resonance in AC circuit, Q-Factor, bandwidth and selectivity. |  |  |  |  |
| 3 | | 7-9 | | Poly phase generators, star and delta connections, phase sequence, voltage and current relations, vector diagrams for balance and unbalanced three phase networks. |  |  |  |  |
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| **MID TERM EXAM** | | | | | | | | |
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