**Papua New Guinea University of Technology**

**Department Electrical and Communication Engineering**

**Lesson PlanEE237**

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| **Subject** | Applicable Mathematics for Electrical Engineers | | | **Subject Code** | | EE 237 | | |
| **Semester/year** | 1/2016 | | | **Date Prepared** | | 02/02/2016 | | |
| **Lecturer** | Dr. K. B. Singh | | | **Credit Hours**  **(PNG standard)** | |  | | |
| **Period** | 15 Weeks | | | **Credit Hours**  **(Engineering Accreditation**  **Standard)** | | 6 | | |
| **Subject Synopsis** | This subject deals with various important mathematical concepts which are useful and applicable in many electrical engineering problems. | | | | | | | |
| **Contact hours** | Lecture: 2 hours/week  Tutorial: 1 hours/week | | | | | | | |
| **Evaluation** | 50% Continuous assessment, 50% Final Examination | | | | | | | |
| **Learning Outcomes** | LO1: Understand the composition and mathematical background of Fourier Series  LO2: Understand the usage of Fourier Transform and its inverse  LO3: Be familiar with calculating with complex numbers on the complex plane. | | | | | | | |
|  | Distribution | (%) | LO1 | | LO2 | | LO3 | LO4 |
| Assignment 1 | 10 | X | |  | |  |  |
| Assignment 2 | 10 | X | | X | |  |  |
| Assignment 3 | 10 | X | | X | | X | X |
| Test 1 | 10 | X | | X | |  |  |
| Test 2 | 10 |  | |  | | X | X |
| Final exam | 50 | X | | X | | X | X |
| **References**  **Used in Class** | 1. E. Kreyszig Advanced Engineering Mathematics, Wiley, 9th Edition, 2006. 2. J. Bak, Donald J. Newman, Complex Analysis, Springer, 3rd Edition, 2010. | | | | | | | |
| **Additional References** | Electronic Notes | | | | | | | |

**Program Outcomes (Electrical Engineering)**

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| PO1 | An ability to apply the knowledge of mathematics, science and Engineering in all aspects of Electrical Engineering and other fields. |
| PO2 | An ability to design and conduct experiments, as well as to analyse and interpret data. |
| PO3 | An ability to design a system, component, or process to meet desired need within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability. |
| PO4 | An ability to apply the techniques of using appropriate tools to investigate, analyse, design, simulate and/or fabricate/commission complete systems. |
| PO5 | An ability to identify, analyse, formulate, design, simulate and/or fabricate/commission complete systems for engineering problems. |
| PO6 | An ability to communicate effectively and to prepare formal technical plans leading to solutions and detailed reports for Electrical Engineering. |
| PO7 | An ability to work on multidisciplinary teams and comprehend his/her scope of work, deliverables and issues in which able to lead the team towards goal. |
| PO8 | Possess an understanding of professional, safety and ethical responsibility. |
| PO9 | Broad understanding of the impact of engineering solutions in a global, economic, environmental, and societal context. |
| PO10 | Recognition of the need for, and an ability to engage in life-long learning to upgrade to higher learning and research activities. |
| PO11 | Comprehensive knowledge of contemporary issues due to changing technical scenario. |
| PO12 | An ability to manage projects in multidisciplinary environments and apply management techniques. |

| Chapter | Topic | Week | Topic Outcomes (TO) | LO | PO | Delivery Methods |
| --- | --- | --- | --- | --- | --- | --- |
| 1 | Fourier Series | 1-4 | * Exponential series * Sine/cosine series | LO1 | PO1  PO2  PO3  PO4 | Lecture, Tutorial |
| 2 | Half Range Series | 5-6 | * Coefficient characteristic with   + Even function   + Odd function | LO1 | PO1  PO2  PO3 | Lecture, Tutorial |
| Mid-Term Break | | | | |
| Fourier Transform | 7-9 | * Fourier Sine and Cosine Transform * Inverse Fourier Transform | LO2 | PO1  PO2  PO3  PO4  PO5  PO6 |
| 3 | Convolution | 10-11 | * Properties of Fourier Transform * Fourier Transform of Derivatives * Applications of Fourier Transforms | LO3 | PO1  PO2  PO3  PO4 | Lecture, Tutorial |
| 4 | Complex Analysis | 12-13 | * From Algebra to Geometry and Back | LO4 | PO1  PO2  PO3  PO4  PO5  PO6 | Lecture, Tutorial |
| 5 | Maximum flow problems | 14-15 | * Geometric Properties | LO4 | PO1  PO2  PO3  PO4  PO5  PO6  PO12 |  |

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| Assessment Details | | | |
| Type | Group/ Individual | Learning Domain | Mark |
| 3 Assignments | Individual | Cognitive | 30 |
| Test 1 | Individual | Cognitive | 10 |
| Test 2 | Individual | Cognitive | 10 |
| Final Exam | Individual | Cognitive | 50 |

**Assessment schedule:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Week No. | | | | | | | | | | | | | | |
|  |  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| Assessment Methods | Assignments |  |  | X | X | X | X | X | X | X | X | X |  |  |  |  |
| Test 1 |  |  |  |  |  | X |  |  |  |  |  |  |  |  |  |
| Test 2 |  |  |  |  |  |  |  |  |  |  |  | X |  |  |  |

**LO-PO mapping:**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Programme Outcomes (POs) | | | | | | | | | | | |
|  |  | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | PO 10 | PO 11 | PO 12 |
| Learning Outcomes LOs | LO 1 | X | X |  | X |  |  |  |  |  |  |  |  |
| LO 2 | X | X |  | X |  |  |  |  |  |  |  |  |
| LO 3 | X |  |  | X |  |  |  |  |  |  |  |  |
| LO 4 | X |  |  | X |  |  |  |  |  |  |  |  |

Prepared By:Dr. K. B. Singh Checked&Approved By:

(Head of the department EE)

Date:2-02-2016 Date:

**Remarks:**

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