# Course Outline

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| **Course title**  | **Course code**  |
| Signals & Systems | EEE231 |

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| **Course Catalog Description**  |
| This course is aimed at building a comprehensive foundation for discrete-time and continuous-time signals, systems, their applications and transforms. The concepts developed are of primary importance in later higher - level courses of electronics, communications & control systems.  |

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| **Course detail**  |
| Credit Hours | 03 + 01 (Theory + Lab) |
| Core  | BE(EE) |
| Elective  |  - |
| Pre Requisite  | Complex and Multivariable Calculus |

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| **Course offering Detail**  |
| Lecture Hall | No of lectures per week | Duration of lecture  | Lecture day | Semester  |
| - | 02 | 90 minutes |  |  |

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| **Instructor Detail**  |
| Name | Engr. M. Mujtaba Ihsan |
| Office  |  |
| Email  | mujtaba.ihsan@inu.edu.pk |
| Counseling hours  |  |
| Course assistant  |  |

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| **Recommended Books** |  |
| **Text Book** |  |
| Title  | Edition  | Web link  | Others/tutorial  |  |
| Signals and Systems by Alan V. Oppenheim | 2nd , 2015 | - | - |  |
| **Reference Books** |  |
| Signals and Systems: Continuous and Discrete by Rodger E. Ziemer, William H Tranter and D. R. Fannin | 5th, 2014 | - | - |  |
| CLO | Statement  | Weightage | Breakdown |
| 1 | **State** fundamentals of the course and distinguish between different types of signals, their representation and transformation **[C1, PLO 1]** | **30%** | A1,Q1 |
| 2 | Discuss LTI systems and **extend** concepts such as convolution to both continuous and discrete time systems.**[C2, PLO 2]** | **30%** | A2,Q2 |
| 3 | **Solve** engineering problems using transformation methods **[C3, PLO 3]** | **40%** | A3,Q3,A4,Q4 |

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| **Course Plan** |
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| Week No: | Contents | Exam  | Quiz  | Assign. |
| Mid  |  Final  |
| 1 | Introduction to signals, overview of continuous and discrete time signals [**CLO 1**] |  |  |  |  |
| 2 | Analog and Digital Signals, Even and Odd Signals, Periodic and Non-Periodic Signals, Unit Step and Unit Impulse Functions [**CLO 1**] |  |  |  |  |
| 3 | Signal Representation [**CLO 1**] |  |  |  |  |
| 4 | Signal Transformation [**CLO 1**] |  |  |  |  |
| 5 | Introduction to Systems, Different type of systems [**CLO 1**] |  |  |  |  |
| 6 | Analog to Digital Conversion, S ampling theorem[**CLO 2**] |  |  |  |  |
| 7 | LTI systems, Block diagram representation of LTI systems [**CLO 2**] |  |  |  |  |
| 8 | Convolution (Continuous Time) Convolution (Discrete Time) [**CLO 2**]  |  |  |  |  |
|  **Midterm Examination** |
| 9 | Laplace transform , Inverse Laplace transform [**CLO 3**] |  |  |  |  |
| 10 | State Space Analysis[**CLO 3**] |  |  |  |  |
| 11 | Z – transform, Block diagram representation [**CLO 3**] |  |  |  |  |
| 12 | Inverse Z – transform [**CLO 3**] |  |  |  |  |
| 13 | Fourier Series [**CLO 3**] |  |  |  |  |
| 14 | Fourier Transform [**CLO 3**] |  |  |  |  |
| 15 | Properties of Fourier Transform [**CLO 3**] |  |  |  |  |
| 16 | Fourier Transform of integration and differentiation of continuous time signals [**CLO 3**] |  |  |  |  |
|  | **Final Examination** |

**Mapping CLOs to Standard PLOs**

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|  PLOsCLOs | PLO 1 | PLO 2 | PLO 3 | PLO 4 | PLO 5 | PLO 6 | PLO 7 | PLO 8 | PLO 9 | PLO 10 | PLO 11 | PLO 12 |
| CLO1 |  |  |  |  |  |  |  |  |  |  |  |  |
| CLO 2 |  |  |  |  |  |  |  |  |  |  |  |  |
| CLO 3 |  |  |  |  |  |  |  |  |  |  |  |  |

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| **Prepared by Course Review Committee Communication (CRC Comm.)** |
| Dr. Shahryar Shafique |  |
| Engr. Pir Meher Ali Shah |  |
| **Engr. M. Mujtaba Ihsan** |  |
| Engr. Perniya Akram |  |
| Engr. Mehr e Munir |  |

General Remarks:

Approved By

Chairman Electrical Engineering