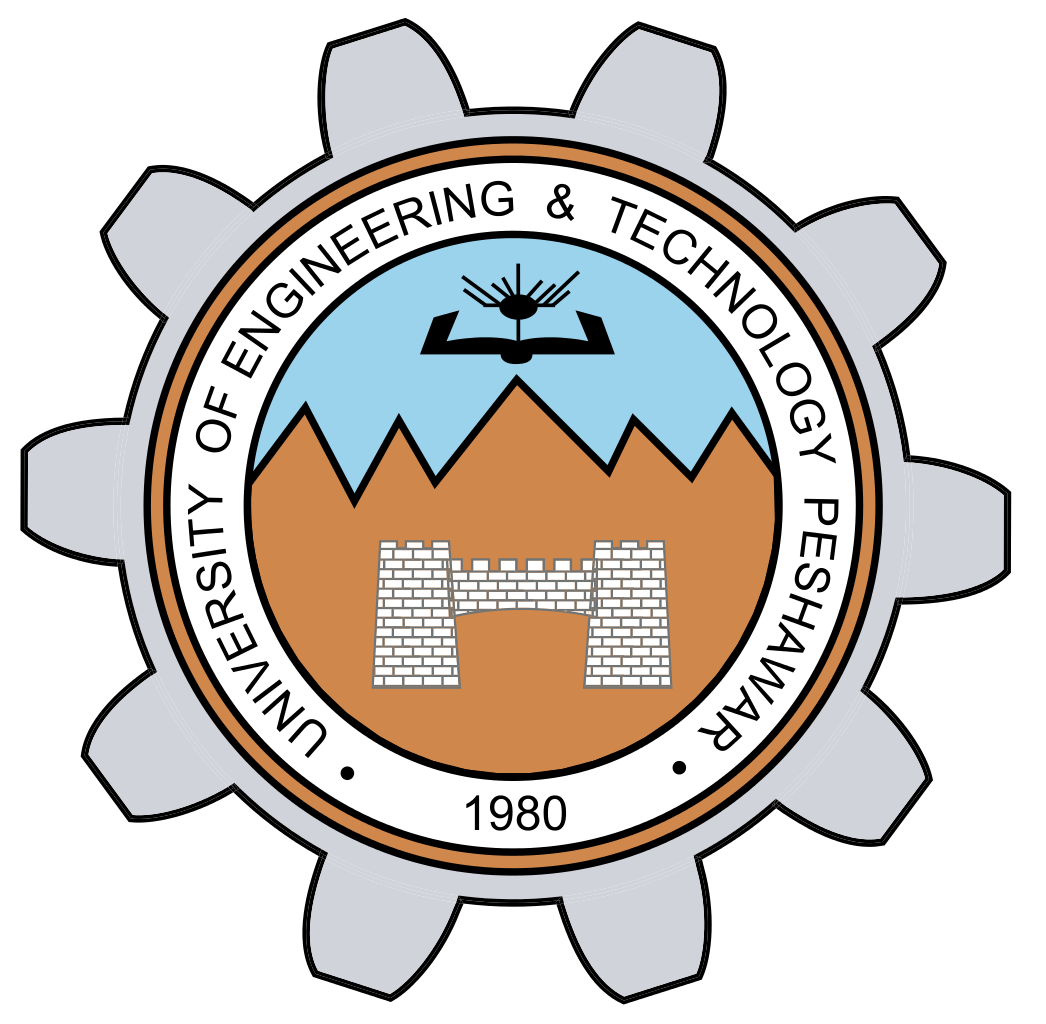
**DEPARTMENT OF COMPUTER SYSTEM ENGINEERING**



**UNIVERSITY OF ENGINEERING & TECHNOLOGY PESHAWAR**

Fall 2022

**CSE 402L: DIGITAL SIGNALS PROCESSING LAB**

**Course Learning Objectives**

**Credit Hours: 1**

**Contact Hours: 3**

**Grading:**

* Final Term
* Mid Term
* Lab Performance
* Project
* Viva

1. **COURSE OUTLINE:**

DSP is a field that involves the analysis, processing, and synthesis of digital signals. It has a wide range of applications and is used in various fields such as telecommunications, audio and video processing, medical imaging, and more.

In this Lab, students are introduced to the fundamentals of discrete-time signals and systems like Modulators, Demodulators, Multiplexers and Demultiplexers. They learn about techniques for signal analysis and processing using Modern Tools like Matlab and Simulink. This Lab uses <https://www.mathworks.com/support/learn-with-matlab-tutorials.html> where state of the art knowledge and Skills are available.

1. **Weekly Course Outline:**

|  |  |  |
| --- | --- | --- |
| **Weeks** | **Lab No** | **Experiments** |
| Week 1 | Lab 1 | Matlab Training by MathWork (Matlab Academy) |
| Week 2 | Lab 1 | Matlab Training by MathWork (Matlab Academy) |
| Week 3 | Lab 2 | Signal Analysis in both time and frequency domain using Matlab |
| Week 4 | Lab 3 | Spectral Analysis of a random Signal using Matlab |
| Week 5 | Lab 4 | Analysis of Amplitude Modulated Signal using Matlab |
| Week 6 | Lab 5 | Analysis of Amplitude Demodulated Signal using Matlab |
| Week 7 | Lab 6 | Compare Double-Sideband and Single-Sideband Amplitude Modulated Signal using Matlab |
| Week 8 |  | **MIDTERM EXAM** |
| Week 9 | Lab 7 | Simulink Training to demonstrate the use of Simulink products using MathWork (Matlab Academy) |
| Week 10 | Lab 8 | Modeling Frequency Division Multiplexing using Matlab |
| Week 11 | Lab 9 | Modeling Frequency Division De- Multiplexing using Matlab |
| Week 12 | Lab 10 | Signal Processing Training from MathWork (Matlab Academy) |
| Week 13 |  | **Open Ended Lab (project)** |
| Week 14 |  | **Open Ended Lab (project)** |
| Week 15 |  | **Presentation** |
| Week 16 |  | **Final Lab Exam** |

1. **CLASS LEARNING OUTCOMES:**

At the end of the course, the students will be able to:

|  |  |  |  |
| --- | --- | --- | --- |
| **CLO #** | **CLO** | **Cognitive Domain** | **PLOs** |
| CLO-1 | Have a thorough understanding of working of the modern signal processing tools i.e. MATLAB and Simulink. | C2 | PLO1 (Engineering Knowledge) |
| CLO-2 | Implement DSP algorithms in MATLAB. | C5 | PLO3 (Design) |
| CLO-3 | Analyze signals and systems using simulations and graphical tools. | C4 | PLO4(Investigation) |

1. **RESOURCES:**

* https://www.mathworks.com/support/learn-with-matlab-tutorials.html
* Digital Signal Processing: A Practical Approach by Emanual C.Ifeachor 2nd edition. Prentice Hall.
* DSP Lab Manual

1. **MAPPING OF CLOs WITH COURSE ASSESSMENT TOOLS:**

|  |
| --- |
| Assessment Tools |
|  | **CLOs** |  |
| **CLO 1** | **CLO 2** | **CLO 3** |
| Lab Reports |  |  |  |
| Lab Performance | ✔ | ✔ | ✔ |
| Midterm Exam | ✔ | ✔ | ✔ |
| Final Exam |  |  | ✔ |
| DSP Project |  |  |  |
| Viva | ✔ |  |  |