**Project Overview**

Diffraction grating relations are obtained by two different methods for “Tunable Liquid Crystal Diffraction Grating”. By changing the applied voltage on the LCD, tuning diffraction pattern can be obtained.

Amplitude Grating: It can act as an optical gate to turn “on/off” the diffraction pattern.

Phase Grating: It can change the diffraction pattern versus different supplied voltage.

**Aims and Objectives**

- To analyze the diffraction grating pattern under different supplied voltage.
- To record the change of diffraction grating pattern versus supplied voltage.
- To investigate the application of tunable diffraction gratings in related area.

**Methodology**

**Design Phase**

- Design the structure of the amplitude grating LCDs.
- Design the structure of phase grating LCDs.

**Implementation**

- Using the TN mode of LCD characteristic to implement into the amplitude grating LCDs.
- Using difference of reflective index to implement into the phase grating LCDs.

**Testing**

- Varying the supply voltage to each types of LCDs.

**Data Collection & Analysis**

- Capture the changes of the pattern under different voltage.
- Using the Imaged to analyze the captured photo.

**Result**

- **1D Amplitude Grating**
  - Figure 7: 1D Amplitude Grating at 0V
  - Figure 8: 1D Amplitude Grating at 6V

- **2D Amplitude Grating**
  - Figure 9: 2D Amplitude Grating at 0V
  - Figure 10: 2D Amplitude Grating at 6V

- **1D Phase Grating**
  - Figure 11: 1D Phase Grating at 0V
  - Figure 12: 1D Phase Grating at 6V

- **2D Phase Grating**
  - Figure 13: 2D Phase Grating at 0V
  - Figure 14: 2D Phase Grating at 6V