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| **Course Name:** | **Analogue Digital Systems** | **Semester:** | **IV** |
| **Date of Performance:** | **01 / 04 / 2024** | **Batch No.:** | **A - 2** |
| **Faculty Name:** | **Prof. Amrita Naiksatam** | **Roll no.:** | **16014022050** |
| **Faculty Sign & Date:** |  | **Grade / Marks:** | **\_\_\_ / 25** |

**Experiment No.: 10**

**Title: DIY (BPSK Modulation and Demodulation)**

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| **Aim and Objective of the Experiment:** |
| * **Aim:** To generate and study Digital Modulation techniques Binary Phase Shift Keying (BPSK) using Simulink. * **Objective:**    1. To understand the working of BPSK.   2. To visualize the BPSK output and make appropriate conclusions. |

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| **COs to be achieved:** |
| CO2: To understand Pulse Shaping techniques for optimum transmission of signal and Band-pass digital modulation and demodulation. |

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| **Theory:** |
| **Phase Shift Keying**,PSK, is the digital modulation technique in which the phase of the carrier signal is changed by varying the sine and cosine inputs at a particular time. PSK technique is widely used for wireless LANs, bio-metric, contactless operations, along with RFID and Bluetooth communications.  PSK is of two types, depending upon the phases the signal gets shifted. They are –   1. BPSK 2. QPSK   **Binary Phase Shift Keying**, BPSK, is also called as 2-phase PSK or Phase Reversal Keying. In this technique, the sine wave carrier takes two phase reversals such as 0° and 180°. BPSK is basically a Double Side Band Suppressed Carrier DSBSC modulation scheme, for message being the digital information.  **BPSK Modulator:**  The block diagram of Binary Phase Shift Keying consists of the balance modulator which has the carrier sine wave as one input and the binary sequence as the other input. Following is the diagrammatic representation.    The modulation of BPSK is done using a balance modulator, which multiplies the two signals applied at the input. For a zero binary input, the phase will be 0° and for a high input, the phase reversal is of 180°.  Following is the diagrammatic representation of BPSK Modulated output wave along with its given input.    The output sine wave of the modulator will be the direct input carrier or the inverted 180° phase shifted input carrier, which is a function of the data signal.  **BPSK Demodulator:**  The block diagram of BPSK demodulator consists of a mixer with local oscillator circuit, a bandpass filter, a two-input detector circuit. The diagram is as follows. |

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| **Step-Wise Procedure:** |
| 1. Make the block diagram using Simulink. 2. Observe the Output on Virtual CRO. |

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| **Block Diagram of Simulink / MATLAB code:** |
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| **Output:** |
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| **Conclusion:** |
| In summary, our experiment on BPSK modulation and demodulation using MATLAB Simulink shows how important BPSK is for digital communication. Looking at the graphs from our experiment, we can see that BPSK is really good at handling errors and sending binary data even in noisy conditions. This tells us that BPSK is a reliable and efficient way to communicate digitally, which is essential for many modern technologies. |

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| **Signature of faculty in-charge with date:** |