**Digital Communication lab**

**EC 691**

**Contact: 0L+0T+3P = 3**

**Credit: 2**

**Syllabus**

1. Design and implementation of all the properties 7- length and 15- length. PN sequence using Shift Register.

2. Study of PAM and demodulation.

3 Study of PCM and demodulation.

4. Study of Line coders: Polar/Unipolar/Bipolar NRZ, RZ and Manchester.

5. Study of Adaptive Delta modulator and demodulator.

7. Study of BPSK modulator and demodulator.

8. Study of BFSK modulator and demodulator.

9. Study of ASK modulator and demodulator.

10. Study of QPSK modulator and demodulator

11. Study of simulation probability of symbol error for BPSK modulation.

**Course outcome**:

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| CO | Statement |
| C01 | Able to analyze the PN sequence with its properties. |
| C02 | Verify the Polar, Unipoler, Bipolar NRZ, RZ and Manchester line coding techniques. |
| C03 | Understand the Modulation and De-modulation of PAM, PCM techniques. |
| C04 | Able to discriminate the Delta Modulation and Adaptive Delta Modulation techniques. |
| C05 | Verify the ASK, BFSK, BPSK, QPSK Modulator and Demodulator techniques. |

**Mapping with CO with PSO**

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| --- | --- | --- | --- |
|  | PSO1 | PSO2 | PSO3 |
| CO1 | 3 | 3 | 1 |
| CO2 | 3 | 2 | 1 |
| CO3 | 3 | 2 | 1 |
| CO4 | 3 | 2 | 1 |
| CO5 | 3 | 2 | 1 |
| AVG OF EC691 | 3 | 2.2 | 1 |

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| --- | --- | --- | --- | --- |
| COs | Test-1 (T1)  (10) | Test-2 (T2) (10) | Test-3 (T3) (10) | Test-4 (T4) (10) |
| CO1 | Q1,Q2 | Q1 | Q1 | - |
| CO2 | Q3 | Q2,Q3 | - | Q1 |
| CO3 |  | -Q4 | Q2 | Q3 |
| CO4 | Q4,Q5 | - | Q3 | Q4 |
| CO5 | - | Q5 | Q4,Q5 | - |

Test-1: Configuration of circuit/writing of code

Test-2: Demonstration

Test-3: Report

Test-4: Viva

Accordingly prepare the above table for CO1, CO2, CO3, CO4 and CO5. Here average grading for CO1=2.9, CO2=2.9, CO3=2.9 and CO4=2.9, CO5=2.9

**CO attainment for a course EC 591:**

Target level 1: 60% students must score 60% and above

Target level 2: 70% students must score 60% and above

Target level 3: 80% students must score 60% and above

**Total number of student for the batch 2012-2016 in third year=144**

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| Course outcome | Avg. grading on scale of 3 | Distribution % | | |
| 3 | 2 | 1 |
| CO1 | 2.9 | 142/144=98.61% | 2/144=1.3% | 0/144=0% |
| CO2 | 2.9 | 141/144=97.91% | 3/144=2.08% | 0/144=0% |
| CO3 | 2.9 | 134/144=93.05% | 10/144=6.94% | 0/144=0% |
| CO4 | 2.9 | 140/144=97.22% | 4/144=2.77% | 0/144=0% |
| CO5 | 2.9 | 139/144=96.52% | 5/144=3.47% | 0/144=0% |

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| CO and PO Scale | 3 | Strongly Related |
| 2 | Moderately Related |
| 1 | Low |

**CO achieved if percentage (%) of students is greater than or equal to 60**

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| Course outcomes | % of students achieved CO | CO result (achieved) (Y/N) |
| CO1 | 98.61% | Y |
| CO2 | 97.91% | Y |
| CO3 | 93.05% | Y |
| CO4 | 97.22% | Y |
| CO5 | 96.52% | Y |

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| **CO** | **Statement** | | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** |
| EC 691.1 | Able to analyze the PN sequence with its properties. | | 3 | 3 | - | - | - | - | 2 | 2 | 1 | - | - | 2 |
| EC 691.2 | Verify the Polar, Unipolar, Bipolar NRZ, RZ and Manchester line coding techniques. | | 3 | 3 | 3 | 3 | - | - | 2 | 2 | 1 | - | - | 2 |
| EC 691.3 | Understand the Modulation and De-modulation of PAM, PCM techniques. | | 3 | 3 | - | - | 2 | - | - | 2 | 1 | - | - | 2 |
| EC 691.4 | Analyze the Time Division Multiplexing and De-multiplexing techniques | | 3 | 3 | - | - | 2 | - | 1 | 2 | 2 | 1 | - | 2 |
| EC 691.5 | | Verify the ASK, BFSK, BPSK, QPSK Modulator and Demodulator techniques | 3 | 3 | 3 | 3 | - | - | 2 | 2 | 1 | 1 | - | 2 |
| EC 691 | | | 3 | 3 | 3 | 3 | - | - | 2 | 2 | 1 | - | - | 2 |

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| Course | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
| 691 | 3 | 3 | 3 | 3 | - | - | 2 | 2 | 1 | - | - | 2 |

**Result of attainment of POs (CIE)**

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| Course | COs | CO Attainment | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
| EC 691 | CO1 | 98.61% | 98.61% | 98.61% |  |  | - | - | 65.74% | 65.74% | 32.87% | - | - | 65.764% |
| CO2 | 97.91% | 97.91% | 97.91% | 97.91% | 97.91% | - | - | 65.27% | 65.27% | 32.63% | - | - | 65.27% |
| CO3 | 93.05% | 93.05% | 93.05% | - | - | - | - | 62.03% | 62.03% | 31.01% |  |  | 62.03% |
| CO4 | 97.22% | 97.22% | 97.22% | - | - | - | - | 32.40% | 64.81% | 64.81% | 32.40% |  | 64.81% |
|  | CO5 | 96.52% | 96.52% | 96.52% | 96.52% | - | - | - | 64.34% | 64.34% | 32.17% | 32.17% | - | 64.32% |
| AVG of EC 691 |  | 96.66% | 96.66% | 96.66% | 97.21% | 97.91% |  |  | 57.95% | 64.43% | 38.69% | 32.28% |  | 64.34% |

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| **PO attainment through (SEE)** | | | | | | | |  |  |  |  |  |  | |  |  | | |  | |  | |
| SL No | Course | | % of students achieved >=60% | | PO1 | | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | | PO8 | PO9 | | PO10 | PO11 | | PO12 | |
| 1 | EC691 | | 100% | | 100% | | 100% | 100% | 100% | 100% |  |  | | 66.66% | 66.66% | | 33.33% |  | | 66.66% | |

**Mapping with CO with PSO**

|  |  |  |  |
| --- | --- | --- | --- |
| **CO** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | 3 | 2 | 1 |
| CO2 | 3 | 2 | 1 |
| CO3 | 3 | 2 | 1 |
| CO4 | 3 | 2 | 1 |
| CO5 | 3 | 2 | 1 |
| AVG OF EC 691 | 3 | 2 | 1 |

**Result of attainment of PSOs (CIE) ( NB : The following table to be generated considering mapping of COs with PSOs)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Course** | **COs** | **CO Attainment** | **PSO1** | **PSO2** | **PSO3** |
| EC 691 | CO1 | 100% | 100% | 66.66% | 33.33% |
| CO2 | 100% | 100% | 66.66% | 33.33% |
| CO3 | 100% | 100% | 66.66% | 33.33% |
| CO4 | 100% | 100% | 66.66% | 33.33% |
| CO5 | 100% | 100% | 66.66% | 33.33% |
| AVG of EC 691 |  | 100% | 100% | 66.66% | 33.33% |

**Result of attainment of PSOs (SEE: Semester End Examination) ( NB : The following table to be generated considering mapping of COs with PSOs)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **SL No.** | **Course** | **% of students achieved >=60%** | **PSO1** | **PSO2** | **PSO3** |
| 1 | EC691 | 100% | 100% | 66.66% | 33.33% |