**Solid State Devices Laboratory**

**Code: EC392**

**Contacts: 3P**

**Credits: 2**

**Syllabus:**

**Module 1:**

**Perform any four experiments:**

Ex 1: Study input characteristics of BJT in common-emitter configuration.

Ex 2: Study output characteristics of BJT in common-emitter configuration for different base currents and hence determine hybrid parameters.

Ex 3: Study output characteristics of BJT in common-emitter configuration and find performance parameters (Voltage Gain, Current Gain, Input

Impedance, Output Impedance).

Ex 4: Study the variation of small-signal voltage gain with frequency of a common-emitter RC coupled amplifier.

Ex 5: Study of drain characteristics and transfer characteristics of a JFET and hence determine the FET parameters (drain resistance, transconductance

& amplification factor).

Ex 6: Study the variation of small-signal voltage gain with frequency of a JFET.

**Module 2:**

**Perform any two experiments**

Ex 1: Study of C-V characteristics of a Varactor diode by appropriate software.

Ex 2: Study of C-V characteristics of a MOS structure by appropriate software.

Ex3: Study of drain characteristics and transfer characteristics of a MOSFET and hence determine the FET parameters (drain resistance,

transconductance & amplification factor).

Course outcome:

|  |  |
| --- | --- |
| **CO** | **Statement** |
| CO1 | Able to estimate Voltage Gain, Current Gain, Input  Impedance, Output Impedance, drain resistance, transconductance  & amplification factor from Input and Output characteristics of BJT and FET. |
| CO2 | Able to design Transistor based single stage R-C coupled voltage amplifier circuit with given specification. |
| CO3 | Able to simulate C-V characteristics of a Varactor diode and drain and transfer characteristics MOS-FET. |

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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, Q2, Q3 | Q1 |
| CO2 | Q3 | Q2, Q3 | Q4 | Q2, Q3 |
| CO3 | Q4,Q5 | Q4,Q5 | Q5 | Q4,Q5 |

Accordingly prepare the above table for CO1, CO2, CO3. Here average grading for CO1=3, CO2=3 and CO3=3.

**CO attainment for a course EC 392:**

Target: 60% students must achieve 60% and above

Total number of student for the batch 2012-2016 in 2nd year=141

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Course outcome** | **Avg. grading on scale of 3** | **Distribution %** | | |
| 3 | 2 | 1 |
| CO1 | 3 | 141/141=100% | 0/141=0% | 0/141=0% |
| CO2 | 3 | 141/141=100% | 0/141=0% | 0/141=0% |
| CO3 | 3 | 141/141=100% | 0/141=0% | 0/141=0% |

|  |  |  |
| --- | --- | --- |
| 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

|  |  |  |
| --- | --- | --- |
| **Course outcomes** | **% of students achieved CO** | **CO result (achieved) (Y/N)** |
| CO1 | 100% | Y |
| CO2 | 100% | Y |
| CO3 | 100% | Y |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| **CO** | **Statement** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** |
| EC 392.1 | Able to construct half wave, full wave, bridge rectifier and regulator circuits. | 3 | 3 | 3 | 3 | 2 | - | 2 | - | 3 | - | - | 3 |
| EC 392.2 | Able to create clipper and clamper circuit using diode. | 3 | 3 | 3 | 3 | 2 | - | 2 | - | 3 | - | - | 3 |
| EC 392.3 | Able to design Transistor based single stage R-C coupled voltage amplifier and different classes of power amplifier circuit with given specification. | 3 | 3 | 3 | 3 | 3 | - | 2 | - | 3 | - | - | 3 |
| EC 392 | | 3 | 3 | 3 | 3 | 2 | - | 2 | - | 3 | - | - | 3 |
| Course | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
| EC 392 | | 3 | 3 | 3 | 3 | 2 | - | 2 | - | 3 | - | - | 3 |

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

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course** | **COs** | **CO Attainment** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** |
| EC 392 | CO1 | 100% | 100% | 100% | 100% | 100% | 66.66% | - | 66.66% | - | 100% | - | - | 100% |
| CO2 | 100% | 100% | 100% | 100% | 100% | 66.66% | - | 66.66% | - | 100% | - | - | 100% |
| CO3 | 100% | 100% | 100% | 100% | 100% | 100% | - | 66.66% | - | 100% |  |  | 100% |
| AVG |  | 100% | 100% | 100% | 100% | 100% | 77.77% | - | 66.66% | - | 100% | - | - | 100% |

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

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SL No** | **Course** | **% of students achieved >=60%** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** |
| 1 | EC 392 | 100% | 100% | 100% | 100% | 100% | 77.77% | - | 66.66% | - | 100% | - | - | 100% |

**Mapping with CO with PSO**

|  |  |  |  |
| --- | --- | --- | --- |
| **CO** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | 3 | 3 | 2 |
| CO2 | 3 | 3 | 2 |
| CO3 | 3 | 3 | 2 |
| AVG OF EC 392 | 3 | 3 | 2 |

**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 392 | CO1 | 100% | 100% | 100% | 66.66% |
| CO2 | 100% | 100% | 100% | 66.66% |
| CO3 | 100% | 100% | 100% | 66.66% |
| AVG of EC 392 |  | 100% | 100% | 100% | 66.66% |

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

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| --- | --- | --- | --- | --- | --- |
| **SL No.** | **Course** | **% of students achieved >=60%** | **PSO1** | **PSO2** | **PSO3** |
| 1 | EC 392 | 100% | 100% | 100% | 66.66% |