**Analog Electronic Circuits Laboratory**

**Code:EC394.**

**Contacts: 3P**

**Credits: 2**

**Syllabus:**

1. Study of Diode as clipper & clamper

2. Study of Zener diode as a voltage regulator

3. Study of ripple and regulation characteristics of full wave rectifier without and with capacitor filter

4. Study of characteristics curves of B.J.T & F.E.T .

5. Design a two-stage R-C coupled amplifier & study of it’s gain & Bandwidth.

6. Study of class A & class B power amplifiers.

7. Study of class C & Push-Pull amplifiers.

8. Realization of current mirror & level shifter circuit using Operational Amplifiers.

9. Study of timer circuit using NE555 & configuration for monostable & astable multivibrator.

10. Design a Bistable multivibrator using NE 555.

11. Study of Switched Mode Power Supply & construction of a linear voltage regulator using regulator IC

chip.

12. Design a simple function generator using IC.

13. Realization of a V-to-I & I-to-V converter using Op-Amps.

14. Realization of a Phase Locked Loop using Voltage Controlled Oscillator (VCO).

15. Study of D.A.C & A.D.C.

**PSO:**

**PSO1:**Ability to Identify, Formulate & Solve problems of basics of Electronics & Communication Engineering and to apply them to various areas like Analog & digital Circuits, Signal & systems, Communication, VLSI, Embedded System etc.

**PSO2:**Ability to design the systems of Electronics & Communication Engineering using advanced hardware and software tools with analytical skills to achieve the Soceital needs.

**PSO3:** Knowledge of social & environmental awareness along with ethical responsibility to achieve a successful career addresses the real world applications using optimal resources as an entrepreneur.

**Course outcome:**

|  |  |
| --- | --- |
| **CO** | **Statement** |
| CO1 | Able to construct half wave, full wave and bridge rectifier circuits, regulator. |
| CO2 | Able to create clipper and clamper circuit using diode. |
| CO3 | Able to design Transistor based single stage R-C coupled voltage amplifier and different classes of power amplifier circuit with given specification. |
| CO4 | Able to construct astable, bi-stable and mono-stable mode timer circuit using IC 555. |
| CO5 | Able to design Inverting and Non-inverting amplifier, Integrator, differentiator, Wean bridge and RC phase shift oscillator using Op-Amp. |

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

**CO attainment for a course EC 394:**

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 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% |
| CO4 | 3 | 141/141=100% | 0/141=0% | 0/141=0% |
| CO5 | 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 |
| CO4 | 100% | Y |
| CO5 | 100% | Y |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **CO** | **Statement** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** |
| EC 394.1 | Able to construct half wave, full wave, bridge rectifier and regulator circuits. | 3 | 3 | 3 | 3 | 2 | - | 2 | - | 3 | - | - | 3 |
| EC 394.2 | Able to create clipper and clamper circuit using diode. | 3 | 3 | 3 | 3 | 2 | - | 2 | - | 3 | - | - | 3 |
| EC 394.3 | 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 | 2 | - | 2 | - | 3 | - | - | 3 |
| EC 394.4 | Able to construct astable, bi-stable and mono-stable mode timer circuit using IC 555. | 3 | 3 | 3 | 3 | 2 | - | 2 | - | 3 | - | - | 3 |
| EC 394.5 | Able to design Inverting and Non-inverting amplifier, Integrator, differentiator, Wean bridge and RC phase shift oscillator using Op-Amp. | 3 | 3 | 3 | 3 | 2 | - | 2 | - | 3 | - | - | 3 |
| EC 394 | | 3 | 3 | 3 | 3 | 2 | - | 2 | - | 3 | - | - | 3 |
| Course | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
| EC 394 | | 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 394 | 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% | 66.66% | - | 66.66% | - | 100% |  |  | 100% |
| CO4 | 100% | 100% | 100% | 100% | 100% | 66.66% | - | 66.66% | - | 100% | - | - | 100% |
| CO5 | 100% | 100% | 100% | 100% | 100% | 66.66% | - | 66.66% | - | 100% | - | - | 100% |
| AVG |  | 100% | 100% | 100% | 100% | 100% | 66.66% | - | 66.66% | - | 100% | - | - | 100% |

**Result of attainment of POs (SEE: Semester End Examination) ( 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 394 | 100% | 100% | 100% | 100% | 100% | 66.66% | - | 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 |
| CO4 | 3 | 3 | 2 |
| CO5 | 3 | 3 | 2 |
| AVG OF EC 394 | 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 394 | CO1 | 100% | 100% | 100% | 66.66% |
| CO2 | 100% | 100% | 100% | 66.66% |
| CO3 | 100% | 100% | 100% | 66.66% |
| CO4 | 100% | 100% | 100% | 66.66% |
| CO5 | 100% | 100% | 100% | 66.66% |
| AVG of EC 394 |  | 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)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **SL No.** | **Course** | **% of students achieved >=60%** | **PSO1** | **PSO2** | **PSO3** |
| 1 | EC 394 | 100% | 100% | 100% | 66.66% |