

### Course Outcomes of ENGINEERING MECHANICS

Sub: ENGINEERING MECHANICS Year/Sem: II-I A.Y. 2022-23 Subject Code : C211	
C211.1	Define the knowledge of Mathematics & Mechanics in composition of Force system in different bodies
C211.2	Summarize different types of friction acting on surfaces.
C211.3	Calculate centre of gravity and area moment of inertia of composite bodies
C211.4	Solve practical problems on motion of bodies
C211.5	Evaluate Work and Energy equation to solve practical problems
C211.6	Apply D'alemberts Principle on rigid bodies in Motion

### CO and PO Mapping Matrix

Sub: ENGINEERING MECHANICS Year/Sem: II-I A.Y. 2022-23 Subject Code : C211												
CO'S	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C211.1	3	2	1		2	2						2
C211.2	2	2	1		2	2						2
C211.3		2	1	1								
C211.4	3	2	2									
C211.5	3	2	1	2								
C211.6	3	2	1	2								
C211 Avg.	2.4	2.4	1.16	1.66	2	2						2

### CO and PSO Mapping Matrix

CO'S	PSO1	PSO2	PSO3
C211.1	3	3	2
C211.2	3		1
C211.3	2		
C211.4	1	2	
C211.5	3	3	
C211.6	1		
C211 Avg.	2.16	2.66	1.5

Correlation Level 1, 2, or 3 as defined below.

1-Slight (Low)

2-Moderate (Medium)

3-Substantial (High)

“-“No Correlation

  
PRINCIPAL

Christu Jyothi Institute of Technology & Science  
Colombo Nagar, Yeshwanthapuram (Vill)  
Jangaon(Mdl), Jangaon (Dist)-606105

### Course Outcomes of Electrical Circuit Analysis

Sub: Electrical Circuit Analysis		Year/Sem: II-I	A.Y. 2022-23	Code: C212
C212.1	Apply network theorems for the analysis of electrical circuits.			
C212.2	Analyze the transient and steady-state response of electrical circuits			
C212.3	Analyze circuits in the sinusoidal steady-state (single-phase and three-phase).			
C212.4	Analyze two port circuit behavior.			
C212.5	Compare the circuit in a.c and d.c circuit			
C212.6	Apply network theorems for the analysis of electrical circuits.			

### CO and PO Mapping Matrix

Sub: Electrical Circuit Analysis		Year/Sem: II-I	A.Y. 2022-23	Code: C212								
CO'S	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C212.1	2	3	2									
C212.2	2	3	2									
C212.3	3	2	1									
C212.4	3	2	3			2						
C212.5	2	3	2	2	2							
C212.6	2	2	3									
C212	2.33	2.5	2.16	2	2	2						

### CO and PSO Mapping Matrix

CO'S	PSO1	PSO2	PSO3
C212.1	2	1	1
C212.2	3	2	2
C212.3	2	2	2
C212.4	2	3	2
C212.5	2	3	3
C212.6	2	2	2
C212 Avg	2.16	2.16	2

Correlation Level 1, 2, or 3 as defined below.

1-Slight (Low)

2-Moderate (Medium)

3-Substantial (High)

“-“No Correlation

  
PRINCIPAL

Christu Jyothi Institute of Technology & Science  
Colombo Nagar, Yeshwanthapuram, Villu  
Jangaon (Mdi), Jangaon (Dist) 506167.

### Course Outcomes of ANALOG ELECTRONICS

Sub: ANALOG ELECTRONICS		Year/Sem: II-I	A.Y. 2022-23	Code: C213
C213.1	Determine the forward and reverse bias of diode			
C213.2	Studying the input and output wave forms for a full wave rectifier and half wave rectifier			
C213.3	Studying the input and output characteristics if CE,CB,CC configuration			
C213.4	Studying the h parameters of CE,CB,CC configuration			
C213.5	Design different modes using 741 IC			
C213.6	Study the operation of oscillators and power amplifiers			

### CO and PO Mapping Matrix

Sub: ANALOG ELECTRONICS		Year/Sem: II-I						A.Y. 2022-23			Code: C213	
CO'S	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C213.1	3	3	2		3	3						1
C213.2	3	3	2			1						
C213.3	3	3	3		2	2						
C213.4	3	2	2									
C213.5		2	3									
C213.6	3	2	3			3						
C213 Avg.	3	2.5	2.5		1.6	2						1

### CO and PSO Mapping Matrix

CO'S	PSO1	PSO2	PSO3
C213.1	3	3	3
C213.2	3		2
C213.3	3	3	
C213.4	3		
C213.5	3		
C213.6	3		
C213 Avg.	3	3	1.6

Correlation Level 1, 2, or 3 as defined below.

1-Slight (Low)

2-Moderate (Medium)

3-Substantial (High)

“-“No Correlation

  
PRINCIPAL

Page | 25



### Course Outcomes of ELECTRICAL MACHINES - I

Sub: ELECTRICAL MACHINES - I      Year/Sem: II-I      A.Y.2022-23      Code: C214	
C214.1	List out the advantages of 4-point starter over 3-point starter?
C214.2	Understand the term armature reaction? Describe the role of compensating windings in dc generators?
C214.3	Explain the procedure of Hopkinson's Test? Mention its advantages and Disadvantages.
C214.4	Illustrate the working principle of single phase Transformer and also explain the constructional details.
C214.5	A DC series motor is running with a speed of 1000 RPM while taking a current of 30 A from the supply. If the load is changed such that the current drawn by the motor is increased to 70 A, estimate the speed of the motor on new load. The armature and series field winding resistances are 0.25 ohms and 0.35 ohms respectively. Assume the flux produced is proportional to the current. Take supply voltage as 260 V.
C214.6	List out the advantages of 4-point starter over 3-point starter?

### CO and PO Mapping Matrix

Sub: ELECTRICAL MACHINES – I Year/Sem: II-I A.Y. 2022-23 Code: C214												
CO'S	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C214.1	3	2	2			1						
C214.2	2	3	1									
C214.3		2	3			1						
C214.4	3	3			3							
C214.5	2	3										
C214.6	2	3				2						
C214 Avg.	2.4	2.67	2		3	1.33						

### CO and PSO Mapping Matrix

CO'S	PSO1	PSO2	PSO3
C214.1	2	2	3
C214.2	3	1	2
C214.3	3	2	2
C214.4	2	3	3
C214.5	2	2	2
C214.6			2
C213 Avg.	2.4	2	2.33

Correlation Level 1, 2, or 3 as defined below.

1-Slight (Low)

2-Moderate (Medium)

3-Substantial (High)

“-No Correlation

### Course Outcome of ELECTRO MAGNETIC FIELDS

Sub: ELECTRO MAGNETIC FIELDS Year/Sem: II-I A.Y. 2022-23 Subject Code : C215	
C215.1	State the basic laws of electric field and magnetic field.
C215.2	Discuss the electric and magnetic fields for simple configurations under static conditions.
C215.3	Solve problems on Lorentz force equation and analyze the torque on a current loop in a magnetic field.
C215.4	Analyze time varying electric and magnetic fields
C215.5	Evaluate the propagation of Electromagnetic Waves.
C215.6	Analyze the scalar and vector magnetic potential, their Limitations.

### CO and PO Mapping Matrix

Sub: ELECTRO MAGNETIC FIELDS Year/Sem: II-I A.Y. 2022-23 Subject Code: C215												
CO'S	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C215.1	3	2	1	2	3	3	3	1	1	1		3
C215.2	3	3	3	3	3	3	3	3	1	1	1	2
C215.3	3	3	2	2	2	3		1	1	1		2
C215.4	3	3	3	3	3	3	2	3	1	1	3	
C215.5	3	3	2	2	2	2		1	1	1	1	2
C215.6	3	2	2	2	3	3	3	2	1	3	3	1
C215 Avg.	3	2.66	2.16	2	2.33	2.83	2.75	1.83	1	1.33	2	2

### CO and PSO Mapping Matrix

CO'S	PSO1	PSO2	PSO3
C215.1	2		2
C215.2	2		2
C215.3	2	2	
C215.4	2	1	
C215.5	1	3	3
C215.6	1		
C215 Avg.	1.5	2.5	2.33

Correlation Level 1, 2, or 3 as defined below.

1-Slight (Low)

2-Moderate (Medium)

3-Substantial (High)

“-“No Correlation

  
PRINCIPAL Page | 27

Christu Jyothi Institute of Technology & Science  
Colombo Nagar, Yeshwanthapuram (Vill)  
Jangaon(Mdl), Jangaon (Dist)-506167.

**Course Outcomes of ELECTRICAL MACHINES LAB - I**

Sub: ELECTRICAL MACHINES LAB - I		Year/Sem: II-I	A.Y. 2022-23	Code: C216
C216.1	List the concepts Start and control the Different DC Machines.			
C216.2	Describe the concepts and performance of different machines using different testing methods			
C216.3	Demonstrate different conditions required to be satisfied for self - excitation of DC Generators.			
C216.4	Analyze the Performance curves of DC machines			
C216.5	Evaluate the efficiency of different DC machines.			
C216.6	Develop the ability to work effectively in groups to troubleshoot and analyze electrical machines.			

**CO and PO Mapping Matrix**

Sub: ELECTRICAL MACHINES LAB - I		Year/Sem: II-I		A.Y. 2022-23		Code: C216						
CO'S	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C216.1	3	2	3		1							
C216.2	3	3		2							2	
C216.3	3	2									2	
C216.4	3	3	2									
C216.5	3	3	2		2							
C216.6	3	3	2								2	
C216 Avg.	3	2.66	2.25	2	1.5						2	

**CO and PSO Mapping Matrix**

CO'S	PSO1	PSO2	PSO3
C216.1	1	3	
C216.2	3	3	
C216.3	2	3	
C216.4	2	2	
C216.5	1	2	
C216.6	2	3	
C216 Avg.	1.83	2.66	

Correlation Level 1, 2, or 3 as defined below.

1-Slight (Low)

2-Moderate (Medium)

3-Substantial (High)

“-“No Correlation

  
PRINCIPAL



### Course Outcome of ANALOG ELECTRONICS LAB

Sub: ANALOG ELECTRONICS LAB Year/Sem: II-I A.Y. 2022-23		Subject Code: C217
C217.1	Determine the forward and reverse bias of diode	
C217.2	Studying the input and output wave forms for a full wave rectifier and half wave rectifier	
C217.3	Studying the input and output characteristics if CE,CB,CC configuration	
C217.4	Studying the h parameters of CE,CB,CC configuration	
C217.5	Design different modes using 741 IC	
C217.6	Study the operation of oscillators and power amplifiers	

### CO and PO Mapping Matrix

Sub: ANALOG ELECTRONICS LAB Year/Sem: II-I		A.Y. 2022-23								Subject Code: C217		
CO'S	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C217.1	3	3	3	3	3	3			3			3
C217.2	3	3	3	3	3	3			3			3
C217.3	3	3	3	3	3	3			3			3
C217.4	3	3	3	3	3	3			3			3
C217.5	3	3	3	3	3	3			3			3
C217.6	3	3	3	3	3	3			3			3
C217 Avg.	3	3	3	3	3	3			3			3

### CO and PSO Mapping Matrix

CO'S	PSO1	PSO2	PSO3
C217.1	3	3	3
C217.2	3	3	3
C217.3	3	3	3
C217.4	3	3	3
C217.5	3	3	3
C217.6	3	3	3
C217 Avg.	3	3	3

Correlation Level 1, 2, or 3 as defined below.

1-Slight (Low)

2-Moderate (Medium)

3-Substantial (High)

“-“No Correlation

  
**PRINCIPAL**  
Christu Jyothi Institute of Technology & Science | 29  
Colombo Nagar, Yeshwanthapuram (Vill)  
Jangaon (Md), Jangaon (Dist)-506167.

### Course Outcomes of ELECTRICAL CIRCUITS LAB

Sub: Basic Electrical and Electronics Engineering		Year/Sem: II-I	A.Y. 2022-23	Code: C218
C218.1	Analyze complex DC and AC linear circuits			
C218.2	Apply concepts of electrical circuits across engineering			
C218.3	Evaluate response in a given network by using theorems			
C218.4	Design electrical systems by applying various Network Theorems			
C218.5	Calculate three phase Active and Reactive power.			
C218.6	Analyze complex DC and AC linear circuits			

### CO and PO Mapping Matrix

Sub: ELECTRICAL CIRCUITS LAB		Year/Sem: II-I								A.Y. 2022-23		Code: C218	
CO'S	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	
C218.1	3	3	3	1	1						2		
C218.2	3	3											
C218.3	3	2	2								2		
C218.4	3	3	3								2		
C218.5	2	3											
C218.6	2	3	1										
C218 Avg.	2.6	2.83	2.25	1	1						2		

### CO and PSO Mapping Matrix

CO'S	PSO1	PSO2	PSO3
C218.1	3	1	
C218.2	2		
C218.3	2		
C218.4	2	1	
C218.5	2		
C218.6	2	2	
C218 Avg.	2.16	1.33	

Correlation Level 1, 2, or 3 as defined below.

1-Slight (Low)

2-Moderate (Medium)

3-Substantial (High)

“-“No Correlation

  
PRINCIPAL

Christu Jyothi Institute of Technology & Science  
Colombo Nagar, Yeshwanthapuram (Vill)  
Jangaon(Mdl), Jangaon (Dist)-506167.



## ASSESSMENT OF COURSE OUTCOMES

### Introduction

Assessment is a mechanism for providing instructors with data for improving their teaching methods and for guiding and motivating students to be actively involved in their own learning. As such, assessment provides important feedback to both instructors and students. The techniques of outcomes assessment as a means of measuring student learning and the use of that information to improve teaching are considered first.

Assessment gives us essential information about what our students are learning and about the extent to which we are meeting our teaching goals. The following three tools are used to assess the Course outcomes

1. Internal Tests
2. University Results
3. Course Outcome Feedback

### COs Assessment Process-Theory Courses:

The attainment process of COs is taken from three assessment Tools-Internal Tests, University Results, and Course Outcome Feedback. Internal Tests, University Results comes under direct attainment and Course Outcome Feedback comes under indirect attainment.

### Assessment Tool -Internal Tests:

As per the Curriculum of JNTU Kakinada, The student has to write two internal examinations per the Course. Each exam conducted for 30 Marks. First three Units in MID –I and last three units syllabus covered in MID-II. Faculty will set the Question paper accordingly. The marks obtained for each question and corresponding CO are collected from each student and then CO attainment is calculated.

The course outcomes are written by the respective faculty member using action verbs of learning levels . Then, a correlation is established between COs and POs in the scale of 1 to 3, 1 being the slight (low), 2 being moderate (medium) and 3 being substantial (high). A mapping matrix is prepared in this regard for every course in the program

In a university affiliated college, the CO attainment levels can be measured based on the results of the internal assessment and external examination conducted by the university. This is a form of direct measurement of attainment. As per university regulations two internal assessment tests are conducted for each course in a semester. In each test, the percentage of students who achieve a set target (usually, 50% of the maximum marks,) in each question calculated and that value decides the level of attainment of COs which correlated to that question. The model MID exam CO attainment form is given in Annexure-I (Form 1)

**Attainment Level 1:** below 60% of students score more than 60% marks out of the maximum relevant marks.

**Attainment Level 2:** 60% to 80 % of students score more than 60% marks out of the maximum relevant marks.

**Attainment Level 3:** more than 80% of students score more than 60% marks out of the maximum relevant marks.

Thus, the average of percentage of students attaining all the COs decides the CO attainment level.

**Sample Internal Tests analysis:**

**Course Name: C413 (P.E. - High Voltage DC Transmission) Year of Study: 2022-23**

CO Code	Course Outcome	CO Attainment
C413.1	Explain necessity of DC transmission over AC and modern trends in DC transmission	2.66
C413.2	Analyze Graetz circuit for rectifier and inverter modes	2.33
C413.3	Interpret HVDC system control and describe various sources of reactive power	1.75
C413.4	Assess modeling of AC-DC system under steady state	3
C413.5	Describe various converter faults and protection methods	2.5
C413.6	Illustrate design objectives of filter and state different types of harmonics	1.45

**Assessment Tool - University Results:**

At the end of the Semester University conducts examination for 70 marks. The marks obtained for each student is calculated to measure the attainment. After the declaration of the university results, the percentage of students who attained the COs is computed. Here, it is assumed that the questions answered by a student cover all the course outcomes defined for that course. The percentage of students who achieve a set target (usually, 50% of the maximum marks,) calculated and that value decides the level of attainment of COs which correlated to that question.

**Attainment Level 1:** below 60% of students score more than 40% marks out of the maximum relevant marks.

**Attainment Level 2:** 60% to 80 % of students score more than 40% marks out of the maximum relevant marks.

**Attainment Level 3:** more than 80% of students score more than 40% marks out of the maximum relevant marks.

The model University exam CO attainment form is given in Annexure-I (Form 2)

**Sample University Result analysis:**

**Course Name: C413 (P.E. - High Voltage DC Transmission) Year of Study: 2022-23**

CO Code	Course Outcome	CO Att.
C413.1	Explain necessity of DC transmission over AC and modern trends in DC transmission	3
C413.2	Analyze Graetz circuit for rectifier and inverter modes	3
C413.3	Interpret HVDC system control and describe various sources of reactive power	3
C413.4	Assess modeling of AC-DC system under steady state	3
C413.5	Describe various converter faults and protection methods	3
C413.6	Illustrate design objectives of filter and state different types of harmonics	3



## CO Feedback methodology

The true power of assessment comes in also using it to give feedback to our students. Improving the quality of learning in our courses involves not just determining to what extent students have mastered course content at the end of the course; improving the quality of learning also involves determining to what extent students are mastering content throughout the course.

At the end of the course, on line feed backs(The model CO feedback form is given in Annexure-I (Form 3))are collected based on COs. Each CO is asked as question and that questionnaire has been send to Student. For example, if a course has six COs then six questions asked. The Student may grade Excellent, Very Good, Good, Satisfactory and Poor. Their weightage are as follows.

Feedback parameter	CO Attainment criteria	Level of attainment
Given feedback "Satisfactory" or above	Percentage Students >80%	Level 3
	60% to 80 % of students	Level 2
	below 60% of students	Level 1

The model feedback analysis of CO attainment form is given in Annexure-I (form 4)

### Sample Course outcome feedback analysis:

**Course Name: C413 (P.E. - High Voltage DC Transmission) Year of Study: 2022-23**

CO Code	Course Outcome	CO Attainment
C413.1	Explain necessity of DC transmission over AC and modern trends in DC transmission	2.4
C413.2	Analyze Graetz circuit for rectifier and inverter modes	2.5
C413.3	Interpret HVDC system control and describe various sources of reactive power	2
C413.4	Assess modeling of AC-DC system under steady state	2.5
C413.5	Describe various converter faults and protection methods	2.8
C413.6	Illustrate design objectives of filter and state different types of harmonics	3



### COs Assessment Process- Laboratory Course

Out of 100 marks for each lab, 25 marks are internal and 75 marks are for External Examination. In internal 25 marks, 10 marks for Day to day evaluation, 5 marks for attendance and 10 marks for Internal examination. By recording all these marks for each student, the Co attainment is calculated. 80% of the maximum marks is considered as target marks for Laboratory attainments. The Overall CO attainment is calculated. The calculation process as follows, day to day evaluation (20%), Experiments (15%), Attendance (5%), Internal Exam (10%), External Exam (50%) and Total is 100%. (form 5)

The overall CO attainment level in the laboratories considered is then computed as

Overall CO attainment level = 80% of Direct Attainment+20% of Indirect Attainment

**Attainment Level 1:** below 60% of students score more than 60% marks out of the maximum relevant marks.

**Attainment Level 2:** 60% to 80 % of students score more than 60% marks out of the maximum relevant marks.

**Attainment Level 3:** more than 80% of students score more than 60% marks out of the maximum relevant marks.

### COs Assessment Process-Projects

Commonly six COs are given to each project and first three COs are evaluated in Review I and Last Three are evaluated in Review 2 by PRC for 25 marks each and from both reviews total 25marks. University will conduct external viva voce for 100marks. The average of Review-1, Review-2 and University Viva voce is calculated. By considering 25% weightage to internal reviews and 75% weightage to University Viva voce marks total percentage of attainment is calculated. The model Project CO attainment form is given in Annexure-I (form 6)

**Attainment Level 1:** Attainment is less than 80%

**Attainment Level 2:** Attainment is in between 80% to 90%

**Attainment Level 3:** Attainment is more than 90%

## ASSESSMENT OF PROGRAM OUTCOMES

### Introduction

In quality teaching and learning process, mapping and attainment is becoming an important process. The compliance of continuous improvement can be done by deciding action plan for weak attainment and is a key factor leading to continuous student learning.

Program Outcomes (POs) are one step broader statements than COs that describe what students are expected to know and be able to do upon the graduation. These relate to the skills, knowledge, and behavior that students acquire in their matriculation through the program.

The program outcomes are assessed with the help of course outcomes of the relevant Courses through direct and indirect methods.

### Direct Assessment Method:

Direct measures are provided through direct examinations or observations of student knowledge or skills against measurable course outcomes. The knowledge and skills described by the course outcomes are mapped to specific problems on internal exams/University exams/online feed backs. Throughout the semester the faculty records the performance of each student on each course outcome. At the end of the semester students receive grades from external exams.

### Indirect Assessment Method:

Indirect assessment strategies are implemented by embedding them in the Graduate survey , Alumni Survey and events survey. Finally, program outcomes are assessed with above mentioned data and Program Assessment Committee concludes the PO attainment level.

### CO-PO Mapping

- POs are attained through the COs. So determine the POs corresponding set COs.
- Every Course Leads to Some Outcomes. All the courses together must cover all the POs (and PSOs).
- A PO can have contributors from many Cos While mapping COs with POs the following points to be observed
- Is CO reflects the intended measurement from PO?
- Does the assessment correlates well with the CO?

### Sample CO-PO mapping:

Step 1: Form a Table between COs and POs with correlation by verifying the reasons



**PRINCIPAL**

**Sample Course outcomes with Blooms Taxonomy:**

**Course Name: C413 (P.E. - High Voltage DC Transmission) Year of Study: 2022-23**

Code	Course Outcome	Taxonomy Level
C413.1	Explain necessity of DC transmission over AC and modern trends in DC transmission	Understand
C413.2	Analyze Graetz circuit for rectifier and inverter modes	Analyze
C413.3	Interpret HVDC system control and describe various sources of reactive power	Understand
C413.4	Assess modeling of AC-DC system under steady state	Evaluate
C413.5	Describe various converter faults and protection methods	Understand
C413.6	Illustrate design objectives of filter and state different types of harmonics	Apply

**Sample CO-PO mapping:**

**Step 2:** Depending on correlation level, PO mapping at corresponding COs.

Course Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C413.1	3				2	2	2				2	
C413.2	3	3			2					2		
C413.3	3	2	2		2	2				2		
C413.4	3	2	3			1						
C413.5	2	2	3									
C413.6	3	2	3									2
C413	2.83	2.2	2.75		2	1.66	2			2	2	2

Level of mapping - 1: Slight (Low)    2: Moderate (Medium)    3: Substantial (High)

**Step 3:** Justification for the mapping of CO with the PO will be recorded.

A sample Justification Guidelines is shown below:

Course :Electrical Circuits Analysis(ECA)

ECA-CO1: Apply circuit concept as an approximation to a physical system.

Mapping to Program Outcomes:

  
**PRINCIPAL**  
 Christu Jyothi Institute of Technology & Science  
 Colombo Nagar, Yeshwanthapuram (VIII)  
 Jangaon(Mdl), Jangaon (Dist)-505007, 36



**{Apply knowledge of mathematics (PO1)}** Kirchoff's Laws, Voltage and Current sources, Network equations, use of source transformations, Loop and Nodal analysis, Matrix representation of circuit equations and their solutions.

**{PO2}** Transient response, solution of differential equations with constant coefficients, initial and final conditions, time constant, its physical significance, and use in solving engineering problems.

**{PO 5}** Two-port networks, two-port parameter, sinusoidal steady state analysis and frequency response; Use of computers for solving large problems.

**Course Outcomes: PO1, PO2, PO5**

**Program Level Course –PO/PSO Matrix of all Courses Including First Year Courses**

**For the A.Y. 2022-23**

S No	Course Code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO			PSO1	PSO2	PSO3
												10	11	12			
1	C111	Maths-I	2.2	2.2				2.2							2.2		
2	C112	Chemistry	2.8	2.8	2.8		2.9	2.7	2.9						2.8	2.8	
3	C113	BEE	2.5	2.5	2.5		2.5						2.6		2.5	2.5	2.5
4	C114	Engineering workshop	3		3		3	3	2.9		3				3	3	3
5	C115	English	2.1	2.1	2		2.1	2.1	2	2.1	2.1	2.1	2	2	2	2.1	2.1
6	C116	Engineering Chemistry Lab	2.9	2.9	3.0				2.9						2.9		2.9
7	C117	ELCS Lab									3.0		3.0	3.0		3	3
8	C118	BEE Lab	2.9	2.9	2.9		3								2.9	2.9	3
9	C121	Maths – II	2.8	2.8				2.7							2.8	2.7	
10	C122	Applied Physics	2.4				2.3		2.6					2.5	2.3	2.4	2.4
11	C123	PPS	2.6				2.6		2.6	2.9	1.0			2.7	2.6	2.7	2.7
12	C124	Engineering Graphics	2.9				2.9					1.0		2.9	2.9	2.9	2.8
13	C125	Applied Physics Lab	1.8	2.2	1.9	2.2	2.2	2.0					1.0	1.8	2	2	2
14	C126	PPS Lab	2.5	2.5	2.5			2.5							1.4		
15	C127	ES	2.5			2.5		2.5	2.5	2.5				2.5	2.5	2.5	2.5
16	C211	Engineering Mechanics	2.8	2	1.16	1.66	2	2						2	2.16	2.66	1.5
17	C212	Electrical Circuit Analysis	1.6	2.6	2.5			2	1						2.25	2.5	3
18	C213	Analog Electronics	3	2.16	2.5		1.6	2						1	3	2	1.6
19	C214	Electrical Machines-I	2.6	2.6	2		1	1.33							2.33	1	2
20	C215	Electromagnetic Fields	2.16	2.66	2.75	2.4									2	2	2
21	C216	Electrical Machines Lab-I	3	2.66	2.25	2	1.5						2		1.83	2.66	
22	C217	Analog Electronics Lab	3	3	3	3	3	2.16					2	2.5	3	3	3
23	C218	Electrical Circuit Lab	2.6	2.83	2.25	1	1						2		2.16	1.33	

24	C219	Gender Sensitization Lab	2.6	2.66	2		1	1.33		2.9		2.75		2.33	1	2	
25	C221	Laplace Transforms, Numerical methods & Complex Variables	2.66	2	1.6	1.75		1.85					1	2	1	1.66	
26	C222	Electrical Machines-II	2.6	2.5	2.66		1	1.33						2.5	1	2	
27	C223	Digital Electronics	3	2.6	3	2.33	2	2				2		3	2	1.6	
28	C224	Control Systems	2.33	2.4	3	1								2	2	3	
29	C225	Power Systems-I	1.66	2.16	2.16	2.16	2	2	2	1.5		1		2	1.33	1.16	1.33
30	C226	Digital Electronics Lab-I	3	2.66	2.25	2	1.5						2	1.83	2.66	2.83	
31	C227	Electrical Machines Lab-II	3	2.66	2.25	2	1.5						2	1.83	2.66		
32	C228	Control Systems Lab	2.5	2.33	2.2	2	2.5	2			1.5			2.16	1.5	2.5	
33	C229	Constitution of India						1.33		2.9		2.8		1			
34	C311	Power Electronics	1.5	2.833	2.66			2				1	2	2	2	2.33	2.5
35	C312	Power Systems-II	2.833	2.83	2.2			1.5	2				1.67	1.75	2.8	2.5	2
36	C313	Measurements and Instrumentation	2.3	2.5	2	1.9	1.66							2.16	2.4		
37	C314	High Voltage Engineering-PE-I	3	2	3	1		3				1		1.8	2.5	2	2
38	C315	Business Economics and Financial Analysis	3	2		1		2	2.5	2.9			2	2.25	2.5	2	2
39	C316	Power System Simulation Lab-I	2.33	1.66	1.16	1.66	2					2		2	2	2	
40	C317	Power Electronics Lab	2.83	2.83	3	2.5	3						2	1.83	2.66	2.66	
41	C318	Measurements and Instrumentation Lab	2.66	2.5	1.75	1.33	2							2.167	1.33		
42	C319	Advanced Communication Skills Lab						2		2.9	3	3		3		2.26	
43	C3110	Intellectual Property Rights	1.5	2.83	2.66	2.33	2.6	2		2		1	2	2	2.5	2	2



44	C321	Fundamentals of Internet of Things-OE-I	2.83	2.25	2.5	2.25	2	1	2.45				2.92		2.16	1.33	2.75
45	C322	Power Semiconductor Drives- PE-II	2.5	2.75	2.33	1.75	2	1.85					2.74	2.25	2	2.5	
46	C323	Signals and Systems	3	2		2	2	1.75					1.66		2.92		
47	C324	Microprocessor and Microcontrollers	2.83	2.25	2.5	2.25	2	1				2		3		3	
48	C325	Power System Protection	3	2	3	1		3			1		1.8	2.16	1.33		
49	C326	Power System Operation and Control	2.83	2.5	2.16	2	2.33	2				2	2	2	2.5	2.16	2.166
50	C327	Power System Lab	2.8	2.4	2.5	2.2	1.75	1			2.4		2.33	2.16	2.16	1.33	1
51	C328	Microprocessor and Microcontrollers Lab		2.48	2.52	1.9	1.8				2.9		2.8		3	3	
52	C329	Signals and Systems Lab	2.5	2.5	2.5		2.5	2.5	2.5				2.8	2.5	2.5	2.5	
53	C3210	Environmental Science	1			1.5		1	3	3	2.9		2.98	3	1	1.33	1.166
54	C411	Principles of Entrepreneurship-OE-II	1.66	1	2		1	2.5		1.5	1.5	1.75	3	2.8	2	2	
55	C412	Electrical and Hybrid Vehicles-PE-III	3	2	1.8		2	2	3			2	3	3	2	2.5	2.8
56	C413	HVDC Transmission-PE-IV	2.8	2.2	2.75		2	1.66	2			2	2	2	2.33	2.33	2.4
57	C414	Fundamentals of Management for Engineers	2.5	2.44			2	1.75	2		2.6		2.65	2.33		1.6	2.25
58	C415	Electrical and Electronics Design Lab	2.5	1.66	2.66		1.5	1				1	2.92	2.16	1.33	2.6	
59	C416	Industrial Oriented Mini Project / Summer Internship	2.1	2.2	2.62	1.88	2.28	2.14	1.77	1.7	2.5	2.26	2	2	2.7	2.1	1.57
60	C417	Seminar	2.5	2.35	2.7	1.8	1.86	2.6	1.9	1.75	2.6	2.5	2.38	2.29	2.6	2.15	1.3
61	C418	Project Stage -I	2.1	2.2	2.62	1.88	2.28	2.14	1.77	1.7	2.5	2.26	2	2	2.7	2.1	1.57

62	C421	Environmental Impact Assessment-OE-III	2.16		2.36			2.33	2				3	2.5	2		2.25
63	C422	Power Quality and FACTS-PE-V	2.5	2.67			2	2.5					2.5	2.3	2.8	2.5	2.64
64	C423	Electrical Distribution Systems-PE-VI	2.33	2.75	2		2	2.6				2		2	2.67	1.33	2.16
65	C424	Project Stage-II	2.1	2.2	2.62	1.88	2.28	2.14	1.77	1.7	2.5	2.26	2	2	2.7	2.1	1.57
<b>Number of Courses Mapped(2022-23)</b>			<b>61</b>	<b>55</b>	<b>52</b>	<b>39</b>	<b>48</b>	<b>45</b>	<b>21</b>	<b>17</b>	<b>23</b>	<b>18</b>	<b>32</b>	<b>38</b>	<b>61</b>	<b>58</b>	<b>52</b>
<b>Average</b>			<b>2.50</b>	<b>2.40</b>	<b>2.40</b>	<b>2.02</b>	<b>2.05</b>	<b>1.99</b>	<b>2.26</b>	<b>2.26</b>	<b>2.21</b>	<b>2.24</b>	<b>2.26</b>	<b>2.32</b>	<b>2.34</b>	<b>2.13</b>	<b>2.29</b>

### CO ATTAINMENT ASSESSMENT

The process of attainment of POs starts from writing appropriate COs for each course of the program. The course outcomes are written by the respective faculty member using action verbs of learning levels. Then, a correlation is established between COs and POs in the scale of 1 to 3, 1 being the slight (low), 2 being moderate (medium) and 3 being substantial (high). A mapping matrix is prepared in this regard for every course in the program.

**The following two methods are used to assess the Course outcomes for Theory Courses, Lab Courses & Projects. They are as follows:**

- 1) Direct Assessment Method and
- 2) Indirect Assessment Method

#### **Direct Assessment Method:**

The following tools are used to assess the Course outcomes of Theory Courses, Lab Courses and Projects.

The tools used for Theory Courses are:


4. Slip Test
5. Internal Tests (consisting of Subjective, Objective Examinations & Assignments)
6. University Results

The tools used for Lab Courses are:

1. Day to day Evaluation.
2. Viva Voce
3. Internal Exam
4. External Exam

The tools used for Projects are:

1. Review 1
2. Review 2
3. Day to Day Evaluation.

  
**PRINCIPAL**  
 Christu Jyothi Institute of Technology & Science  
 Colomto Nagar, Yeshwanthapuram (Vill) Page | 41  
 Jangaon (Mdl), Jangaon (Dist)-506167.



#### 4. University Examination.

##### COs Assessment Process-Theory Courses:

The attainment process of COs is taken from three assessment Tools-Slip Tests, Internal Tests, and University Results, University Results comes under direct attainment.

##### Assessment Tool -Slip Tests:

As per the Norms of College, The student has to write five slip test examinations per the Course. Average marks are taken by considering five slip tests. Faculty will set the Question paper accordingly. The marks obtained for each question and corresponding CO are collected from each student and then CO attainment is calculated.

The course outcomes are written by the respective faculty member using action verbs of learning levels. Then, a correlation is established between COs and POs in the scale of 1 to 3, 1 being the slight (low), 2 being moderate (medium) and 3 being substantial (high).

In each test, the percentage of students who achieve a set target (usually, 60% of the maximum marks) in each question calculated and that value decides the level of attainment of COs which correlated to that question.

**Attainment Level 1:** Below 60% of students score more than or equal to 60% marks out of the maximum relevant marks.

**Attainment Level 2:** 60% to 80 % of students score more than or equal to 60% marks out of the maximum relevant marks.

**Attainment Level 3:** More than 80% of students score more than or equal to 60% marks out of the maximum relevant marks.

##### Sample Slip Test Analysis:

**Course Name: C413 (P.E. - High Voltage DC Transmission) Year of Study: 2022-23**

CO Number	CO Statement	CO Attainment
C413.1	Explain necessity of DC transmission over AC and modern trends in DC transmission	3
C413.2	Analyze Graetz circuit for rectifier and inverter modes	3
C413.3	Interpret HVDC system control and describe various sources of reactive power	3
C413.4	Assess modeling of AC-DC system under steady state	3
C413.5	Describe various converter faults and protection methods	3
C413.6	Illustrate design objectives of filter and state different types of harmonics	3

##### Assessment Tool -Internal Tests:



As per the Curriculum of JNTU Hyderabad, The student has to write two internal examinations per the Course. Each exam conducted for 25 Marks. First Two and Half Units syllabus covered before MID-I Term Exam and last Two and Half unit's syllabus covered before MID-II Term Examination.

Faculty will set the Question paper accordingly. The marks obtained for each question and corresponding CO are collected from each student and then CO attainment is calculated.

The course outcomes are written by the respective faculty member using action verbs of learning levels. Then, a correlation is established between COs and POs in the scale of 1 to 3, 1 being the slight (low), 2 being moderate (medium) and 3 being substantial (high).

A mapping matrix is prepared in this regard for every course in the program, the CO attainment levels can be measured based on the results of the internal assessment and external examination conducted by the university. This is a form of direct measurement of attainment. As per university regulations two internal assessment tests are conducted for each course in a semester. In each test, the percentage of students who achieve a set target (usually, 60% of the maximum marks) in each question calculated and that value decides the level of attainment of COs which correlated to that question. The model MID exam CO attainment form is given in Annexure-I

**Attainment Level 1:** Below 60% of students score more than or equal to 60% marks out of the maximum relevant marks.

**Attainment Level 2:** 60% to 80 % of students score more than or equal to 60% marks out of the maximum relevant marks

**Attainment Level 3:** More than 80% of students score more than or equal to 60% marks out of the maximum relevant marks.

#### Sample Internal Test Analysis:

Course Name: C413 (P.E. - High Voltage DC Transmission) Year of Study: 2022-23

CO Number	CO Statement	CO Attainment
C413.1	Explain necessity of DC transmission over AC and modern trends in DC transmission	2.66
C413.2	Analyze Graetz circuit for rectifier and inverter modes	2.33
C413.3	Interpret HVDC system control and describe various sources of reactive power	1.75
C413.4	Assess modeling of AC-DC system under steady state	3
C413.5	Describe various converter faults and protection methods	2.5
C413.6	Illustrate design objectives of filter and state different types of harmonics	1.45

#### Assessment Tool - University Results:

At the end of the Semester University conducts examination for 75 marks. The marks obtained for each student is calculated to measure the attainment. After the declaration of the university results, the percentage of students who attained the COs is computed. Here, it is assumed that the questions answered by a student cover all the course outcomes defined for that course. The percentage of students who achieve a set target (usually, 40% of the maximum marks) calculated and that value decides the level of attainment of COs which correlated to that question.

**Attainment Level 1:** Below 60% of students score more than or equal to 40% marks out of the maximum relevant marks.

**Attainment Level 2:** 60% to 80 % of students score more than or equal to 40% marks out of the maximum relevant marks.

**Attainment Level 3:** More than 80% of students score more than or equal to 40% marks out of the maximum relevant marks.

**Sample Semester End Examination Analysis:**

**Course Name: C413 (P.E. - High Voltage DC Transmission) Year of Study: 2022-23**

CO Number	CO Statement	CO Attainment
C413.1	Explain necessity of DC transmission over AC and modern trends in DC transmission	3
C413.2	Analyze Graetz circuit for rectifier and inverter modes	3
C413.3	Interpret HVDC system control and describe various sources of reactive power	3
C413.4	Assess modeling of AC-DC system under steady state	3
C413.5	Describe various converter faults and protection methods	3
C413.6	Illustrate design objectives of filter and state different types of harmonics	3

**Direct attainment calculation:**

To calculate direct attainment, 30% Weightage to Slip Tests, 30% Weightage to Internal Tests, 40% Weightage to University Results.

Direct attainment= 30% Weightage to Slip Tests+30% Weightage to Internal Tests+40% Weightage to University Results.

**Sample Direct Attainment Analysis:**

**Course Name: C413 (P.E. - High Voltage DC Transmission) Year of Study: 2022-23**

Course	Internal examination A	Slip test B	SEE C	Direct Attainment (A*0.3+B*0.3+C*0.4)=D	Rubrics level
C413.1	2.66	3	3	2.89	Level 3
C413.2	2.33	3	3	2.799	Level 3
C413.3	1.75	3	3	2.6259	Level 3
C413.4	3	3	3	3	Level 3
C413.5	2.5	3	3	2.85	Level 3



C413.6	1.45	3	3	2.535	Level 3
--------	------	---	---	-------	---------

**Indirect Assessment Method:**

Indirect assessment strategies are implemented by embedding them in the course end survey, Graduate survey and Alumni Survey. Finally, program outcomes are assessed with above mentioned data and Program Assessment Committee concludes the PO attainment level.

20% Weightage is considered for Assessment of Indirect Attainment.

TOOLS	
Student Feedback on Course Outcome- COFA	

**Annexure I:**

**Sample Course Outcomes Feedback (Form-I)**

**Feedback Rating:** Excellent: 3 Moderate: 2 Low: 1

**Academic Year:** 2022-23

**Year/Semester/Section:**

**Student Name (Optional):**

**Roll Number (Optional):**

The following is the Sample of Student Feedback on Theory Course Outcomes Feedback Form:

HVDC TRANSMISSION	Course Outcomes	Taxonomy	Feedback Rating
C413.1	Explain necessity of DC transmission over AC and modern trends in DC transmission	Understand	
C413.2	Analyze Graetz circuit for rectifier and inverter modes	Analyze	
C413.3	Interpret HVDC system control and describe various sources of reactive power	Understand	
C413.4	Assess modeling of AC-DC system under steady state	Evaluate	
C413.5	Describe various converter faults and protection methods	Understand	
C413.6	Illustrate design objectives of filter and state different types of harmonics	Apply	

**Overall Course Outcome Attainment:**

The overall CO attainment level in the course considered is then computed as

Overall CO attainment level = 80% of Direct Attainment+20% of Indirect Attainment

**Rubrics Table:**



Overall Attainment Level	Percentage students attained course attainment
Level 1	<60%
Level 2	60-80%
Level 3	>80%

### Course Outcome Marks Assessment

- ❖ The following is the Course Outcome assessment process followed by the entire faculty for Theory Courses, Laboratory Courses and Project work.

#### Theory Course (100 Marks):

- ❖ **Internal assessment** consist of 2 descriptive (10 Marks each), 2 Objective (10 marks each) & 2 Assignments (5 Marks each) and 2 Slip Test (10 marks). Total for 25 marks is calculated.
  - ❖ All questions used to evaluate the students and framed for considering the COs and Taxonomy Level of learning
  - ❖ Cut-off mark is considered as **60% for Slip Test & 60% for Mid Exam and 40% for Semester End Examination** mark.
  - ❖ Number of students securing marks the cut-off is computed.
  - ❖ Percentage of students securing marks the cut-off is computed.
  - ❖ Level is assigned based on the below percentage (Rubrics Table)
- ❖ **Rubrics Table: Rubrics followed by all faculty for all the Courses**

RUBRICS (Theory & Lab.)	
% Students attained Course Outcomes	Attainment Level
$\geq 80\%$	3
$>60 \& <80 \%$	2
$\leq 60\%$	1

- ❖ **University assessment** –Consist of 75 marks and Exam marks are not announced Question-wise, hence CO-Level computed from external exam marks is assigned to all Course Outcomes.
  - ❖ **Direct Assessment**- 30% Slip test+30% internal Test+40% Semester Examination.
- Overall Theory CO-Attainment = 80% Direct Assessment + 20% Indirect assessment**

Following is the sample Overall CO attainment sheet followed by all faculties for Theory Course.

**Overall Course Attainment (Form-5)**

<b>Program Name:</b>	B.Tech in EEE	<b>AY</b>	2022-23
<b>Course Name:</b>	High Voltage DC Transmission	<b>Class / Sem</b>	IV/I
<b>Faculty Name:</b>	G Saritha	<b>Regulation</b>	R-18

COs	Internal Examination A	Slip test B	SEE C	Direct Attainment (A*0.3+B*0.3+C*0.4)=D	Indirect Attainment E	Overall D*0.8 + E*0.2
C413.1	2.66	3	3	2.89	2.4	2.79
C413.2	2.33	3	3	2.799	2.5	2.73
C413.3	1.75	3	3	2.6259	2	2.49
C413.4	3	3	3	3	2.5	2.9
C413.5	2.5	3	3	2.85	2.8	2.84
C413.6	1.45	3	3	2.535	3	2.62
<b>Overall Course Attainment</b>						<b>2.73</b>
<b>Set Target For The Course</b>						<b>2.07</b>
<b>Attainment Status ( Attained / Not Attained )</b>						<b>Attained</b>

Faculty Signature

  
**PRINCIPAL**  
 Christu Jyothi Institute of Technology & Engineering  
 Coleenra Nagar, Yeshwanthapuram (V),  
 Jangaon (Md), Jangaon (Dist)-506167  
 Coleenra Nagar, Yeshwanthapuram (VIII)  
 Jangaon (Md), Jangaon (Dist)-506167.

**Laboratory (75 Marks):**

- ❖ Internal assessment consist of 1 internal(25 Marks) and 1 External(75 Marks)
- ❖ University appointed examiner awards 75 marks
- ❖ Direct assessment- 50% Internal test+50% University test
- ❖ Indirect assessment- Feedback from Exit Student , Alumni , Employer

Overall Theory CO- Attainment = 80% Direct Assessment + 20% Indirect assessment

Following is the sample Overall CO attainment sheet followed by all faculties for Laboratories:

**Overall Course Attainment (Form-6)**

<b>Program Name:</b>	B.Tech in Electrical and Electronics Engineering	<b>AY</b>	2022-23
<b>Course Name:</b>	Power system lab	<b>Class / Sem</b>	III/II
<b>Faculty Name:</b>	B Suresh Reddy	<b>Regulation</b>	R18

COs	Internal Examination a	SEE b	Direct Attainment $c=(0.5*a+0.5*b)$	Indirect Attainment d=	Overall Att. $=(0.8*c+0.2*d)$
C327.1	3	3	3	3	3
C327.2	3	3	3	2.5	2.9
C327.3	3	3	3	2.2	2.84
C327.4	3	3	3	2.8	2.96
C327.5	3	3	3	3	3
C327.6	3	3	3	2.8	2.96
<b>Overall Course Attainment</b>					<b>2.94</b>
<b>Set Target For The Course</b>					<b>2.05</b>
<b>Attainment Status ( Attained / Not Attained )</b>					<b>Attained</b>



## Faculty Signature

### Project Work (100 Marks):

- ❖ Cut-off mark is considered as **60% for Internal Assessment and 40% for University Examination** mark.
- ❖ Number of students securing marks the cut-off is computed.
- ❖ Percentage of students securing marks the cut-off is computed.
- ❖ Level is assigned based on the above percentage (Rubrics Table)
- ❖ **Rubrics followed by all Guides for all the Projects:**
- ❖

RUBRICS (Project Work)		
% Students attained Cut-off mark	Attainment Level	Out Comes Bench Mark
$\geq 90\%$	3	Nil
$>80 \& <90 \%$	2	1 Outcome
$\leq 80\%$	1	>1 Outcome

- ❖ **Internal Assessment** consist of 2 Reviews (25 Marks), day to day Evaluation (25 Marks)
- ❖ **University** appointed examiner awards 75 marks.
- ❖ **Project Outcomes** namely Prize, Proto type, Publications and best project by Examiner.
- ❖ **Direct project Attainment (weightage)**= 60% Academic Results+40% Project Outcome

  
**PRINCIPAL**  
Christu Jyothi Institute of Technology & Science  
Colombo Nagar, Yeshwanthapuram (VII)  
Jangaon(Md), Jangaon (Dist)-506167.

Following is the sample Project Overall CO attainment sheet followed by Guides:

**PROJECT ATTAINMENT (Form-7)**

Academic Year:	2022-23	Batch No:	01
Name of the Guide:	G. Saritha		
Project Title:	Use of integrated photovoltaic electric spring power balancer in power Distribution network.		

S. No	Roll No.	Internal Review-1	Internal Revie-2	Day-to Day Evaluation	Avg. of Internal marks	SEE	Overall marks
<b>Max. Marks</b>		<b>25</b>	<b>25</b>	<b>25</b>	<b>25</b>	<b>75</b>	<b>100</b>
1.	17681A0215	21	23	22	22	74	96
2.	18685A0225	25	23	24	24	70	94
3.	18685A0209	23	24	25	24	70	94
4.	18685A0208	25	25	25	25	70	95
5.	18685A0207	22	23	24	23	67	90
<b>Average Marks</b>		<b>23.2</b>	<b>23.6</b>	<b>24</b>	<b>23.6</b>	<b>70.1</b>	<b>93.8</b>
<b>%Marks</b>		<b>92.8</b>	<b>94.4</b>	<b>96</b>	<b>94.4</b>	<b>93.4</b>	<b>93.8</b>
<b>Attainment:</b>		<b>3</b>	<b>3</b>	<b>3</b>		<b>3</b>	<b>3</b>
<b>C424.1</b>		<b>3</b>	<b>3</b>	<b>3</b>		<b>3</b>	<b>3</b>
<b>C424.2</b>		<b>3</b>	<b>3</b>	<b>3</b>		<b>3</b>	<b>3</b>
<b>C424.3</b>		<b>3</b>	<b>3</b>	<b>3</b>		<b>3</b>	<b>3</b>
<b>C424.4</b>			<b>3</b>	<b>3</b>		<b>3</b>	<b>3</b>
<b>C424.5</b>			<b>3</b>	<b>3</b>		<b>3</b>	<b>3</b>
<b>C424.6</b>			<b>3</b>	<b>3</b>		<b>3</b>	<b>3</b>
<b>Attainment Based on Academic Performance:</b>							<b>3</b>

**Project Outcomes:**

Project Outcomes	Status(Yes/No)	Count
Prize	No	
Prototype	No	
Publications	Yes	1
Best Project by Examiner	No	

<b>Academic Performance (60% Weightage) -A</b>	<b>1.8</b>
<b>Project Outcomes (Prizes/Prototypes/Publications/Best Project – 40%) - B</b>	<b>0.8</b>
<b>Overall Attainment (0.6*A+0.4*B)</b>	<b>2.6</b>

## Faculty Signature

CO	Assessment Tool	Assessment Criteria	Weightage	Data Collection	Faculty Responsible
Course Name	Internal Tests	% of students scored set Target Marks (60%) in Internal Exams	30%	Once in a Semester	Course Incharge
	University Results	% of students scored set Target Marks (40%) in University Exams	50%	Once in a Semester	Course Incharge
	Course Outcome Feedback Analysis	% of students gave feedback greater than Target value (60%)	20%	Once in a Semester	Faculty Incharge

The above procedure of computing overall CO attainment is to be repeated for each course from first year to final year in an academic year (including opted electives, project work and technical seminars in final year) in order to enable computation of Program Outcome (PO) and Program Specific Outcomes (PSO) attainment levels.

Program Outcomes are one step broader statements than COs that describe what students are expected to know and be able to do upon the graduation. These relate to the skills, knowledge, and behavior that students acquire in their matriculation through the program.

Program outcomes and 'program specific outcomes' are attained through the attainment of COs. This is called direct attainment of POs and PSOs. The overall CO attainment value as computed in chapter 4 and the CO-PO mapping values as computed in chapter 3 are used to compute the attainment of POs. Model attainment calculation Shown in Page no.



**Course level CO-Overall attainment with respect to set target attainment & Status: AY-2022-23**

SUBJECT CODE	SUBJECT NAME	Direct Attainment	Indirect Attainment	Overall Attainment	Target	Status
C211	Engineering Mechanics	2.01	3	2.21	1.94	ATTAINED
C212	Electrical Circuit Analysis	2.7	2.98	2.75	1.76	ATTAINED
C213	Analog Electronics	2	2.37	2.07	2.37	ATTAINED
C214	Electrical Machines-I	1.99	2.37	2.06	2.04	ATTAINED
C215	Electromagnetic Fields	2.47	2.45	2.46	2.57	ATTAINED
C216	Electrical Machines Lab - I	3	2.33	2.86	2.6	ATTAINED
C217	Analog Electronics Lab	3	2.5	2.9	2.5	ATTAINED
C218	Electrical Circuits Lab	3	2.5	2.9	2.05	ATTAINED
C219	Gender Sensitization Lab	3	2.5	2.9	2.05	ATTAINED
C221	Laplace Transforms, Numerical Methods & Complex variables	1.83	2.28	1.92	1.81	NOT ATTAINED
C222	Electrical Machines – II	1.99	2.61	2.11	2.02	ATTAINED
C223	Digital Electronics	2.58	2.43	2.55	2.45	ATTAINED
C224	Control Systems	1.99	2.925	2.177	2.175	ATTAINED
C225	Power System - I	2.58	2.43	2.55	2.09	ATTAINED

C226	Digital Electronics Lab	3	2.73	2.94	2.5	ATTAINED
C227	Electrical Machines Lab - II	3	2.73	2.94	2.02	ATTAINED
C228	Control Systems Lab	3	2.5	2.9	2.05	ATTAINED
C229	Constitution of India	3	2.78	2.95	2.85	ATTAINED
C311	Power Electronics	2.58	2.36	2.54	2.09	ATTAINED
C312	Power System-II	2.82	2.36	2.73	1.98	ATTAINED
C313	Measurements and Instrumentation	2.05	3	2.24	2.12	ATTAINED
C314	High Voltage Engineering	2.18	2.5	2.24	1.8	ATTAINED
C315	Business Economics and Financial Analysis	1.88	3	2.10	1.8	ATTAINED
C316	Power System Simulation Lab	3	2.5	2.9	1.84	ATTAINED
C317	Power Electronics Lab	3	2.5	2.9	2.05	ATTAINED
C318	Measurements and Instrumentation Lab	3	2.5	2.9	2.05	ATTAINED
C319	Advanced Communication Skills Lab	3	2.716	2.94	2.74	ATTAINED
C3110	Intellectual Property Rights	2.76	2.51	2.71	2.18	ATTAINED
C321	Fundamentals of IOT-OE-I	1.99	2.925	2.177	2.175	ATTAINED
C322	Power Semiconductor Drives	2.69	2.36	2.62	2.26	ATTAINED
C323	Signals and Systems	1.90	2.66	2.06	2.14	NOT ATTAINED
C324	Microprocessors & Microcontrollers	1.97	2.66	2.11	1.92	ATTAINED
C325	Power System Protection	2.2	2.5	2.26	1.8	ATTAINED

C326	Power System Operation and Control	2.768	2.51	2.71	2.18	ATTAINED
C327	Power System Lab	3	2.71667	2.94	2.05	ATTAINED
C328	Microprocessors & Microcontrollers Lab	2.7	2.5	2.66	1.96	ATTAINED
C329	Signals and Systems Lab	3	3	3	3	ATTAINED
C3210	Environmental Science	2.5	2.16	2.43	2	ATTAINED
C411	Electric and Hybrid Vehicles	2.18	2.5	2.24	1.69	ATTAINED
C412	Principles of Entrepreneurship	2.05	3	2.24	2.54	NOT ATTAINED
C413	HVDC Transmission	2.78	2.53	2.737	2.07	ATTAINED
C414	Fundamentals of Management for Engineers	2.03	3	2.231	2.04	ATTAINED
C415	Electrical & Electronics Design Lab	3	2.71	2.94	2.05	ATTAINED
C416	Industrial Oriented Mini Project/ Summer Internship	3	2.71	2.6	2.2	ATTAINED
C417	Seminar	3	2.7	2.6	2.2	ATTAINED
C418	Project Stage - I	3	2.71	2.6	2.2	ATTAINED
C421	Environmental Impact Assessment	2.4	2.66	2.45	2.062	ATTAINED
C422	Power Quality & FACTS	2.825	2.3	2.72	1.98	ATTAINED
C423	Electrical Distribution Systems	2.90	2.68	2.86	2.31	ATTAINED
C424	Project Stage - II	3	2.71	2.94	2.2	ATTAINED



Course level-Direct Attainment Table: AY-2022-23

SUBJECT CODE	SUBJECT NAME	Slip Test Attainment (A)	Internal Attainment (B)	Sem End Exam Attainment (C)	Direct Attainment (D)= (0.3*A+0.3*B+0.4*C)
C211	Engineering Mechanics	2.33	2.76	2	2.01
C212	Electrical Circuit Analysis	3	2.11	3	2.7
C213	Analog Electronics	3	2.33	1	2
C214	Electrical Machines-I	3	2.3	1	1.99
C215	Electromagnetic Fields	3	2.55	3	2.47
C216	Electrical Machines Lab - I		3	3	3
C217	Analog Electronics Lab		3	3	3
C218	Electrical Circuits Lab		3	3	3
C219	Gender Sensitization Lab		3	3	3
C221	Laplace Transforms, Numerical Methods & Complex variables	2.33	2.49	1	1.83
C222	Electrical Machines – II	3	2.3	1	1.99
C223	Digital Electronics	3	2.95	3	2.58
C224	Control Systems	3	2.16	1	1.99
C225	Power System - I	3	2.95	3	2.58

PRINCIPAL

Page | 55

Christu Jyothi Institute of Technology & Science  
Coimbatore Nagar, Yeshwanthapuram  
Jangaon(Md), Jangaon (Dist)-506166

C226	Digital Electronics Lab		3	3	3
C227	Electrical Machines Lab - II		3	3	3
C228	Control Systems Lab		3	3	3
C229	Constitution of India	3	3	3	3
C311	Power Electronics	3	2.95	2	2.58
C312	Power System-II	3	2.36	3	2.82
C313	Measurements and Instrumentation	3	2.51	1	2.05
C314	High Voltage Engineering	3	2.95	1	2.18
C315	Business Economics and Financial Analysis	3	1.95	1	1.88
C316	Power System Simulation Lab		3	3	3
C317	Power Electronics Lab		3	3	3
C318	Measurements and Instrumentation Lab		3	3	3
C319	Advanced Communication Skills Lab		3	3	3
C3110	Intellectual Property Rights	3	2.20	3	2.76
C321	Fundamentals of IOT-OE-I	3	2.3	1	1.99
C322	Power Semiconductor Drives	3	2.41	2	2.69
C323	Signals and Systems	3	2.02	1	1.90
C324	Microprocessors & Microcontrollers	3	2.26	1	1.97
C325	Power System Protection	3	2.95	1	2.2
C326	Power System Operation and Control	3	2.24	3	2.768

C327	Power System Lab		3	3	3
C328	Microprocessors & Microcontrollers Lab		3	2.39	2.7
C329	Signals and Systems Lab		3	3	3
C3210	Environmental Science	2		3	2.5
C411	Principles of Entrepreneurship-OE-II	3	2.95	1.33	2.18
C412	Electrical and Hybrid Vehicles-PE-III	3	2.5	1	2.05
C413	HVDC Transmission PE-IV	3	2.28	3	2.78
C414	Fundamentals of Management for Engineers	3	2.46	1	2.03
C415	Electrical & Electronics Design Lab		3	3	3
C416	Industrial Oriented Mini Project/ Summer Internship		3	3	3
C417	seminar		3	3	3
C418	Project Stage - I		3	3	3
C421	Environmental Impact Assessment	2.33	3	2	2.4
C422	Power Quality & FACTS	3	2.41	3	2.825
C423	Electrical Distribution Systems	3	2.69	3	2.90
C424	Project Stage - II		3	3	3



**Course Level- Indirect Attainment Table: A.Y-2022-23**

SUBJECT CODE	SUBJECT NAME	CO1	CO2	CO3	CO4	CO5	CO6	Overall Indirect (Average of COs)
C211	Engineering Mechanics	3	2.98	3	2.99	3	2.99	3
C212	Electrical Circuit Analysis	2.9	3	3	3	3	3	2.98
C213	Analog Electronics	2.25	2.4	2.35	2.5	2.45	2.3	2.37
C214	Electrical Machines-I	2.25	2.4	2.35	2.5	2.45	2.3	2.37
C215	Electromagnetic Fields	2.5	2.8	2.2	3	2.2	2	2.45
C216	Electrical Machines Lab - I	2	2.4	2.1	2.4	2.5	2.6	2.33
C217	Analog Electronics Lab	2.25	2.5	2.6	2.2	3	2.45	2.5
C218	Electrical Circuits Lab	2.3	2.4	2.5	2.3	3	2.5	2.5
C219	Gender Sensitization Lab	2.25	2.5	2.6	2.2	3	2.45	2.5
C221	Laplace Transforms, Numerical Methods & Complex variables	2	2.5	1.8	2.2	2.7	2.5	2.28
C222	Electrical Machines – II	2.35	2.45	2.65	2.7	2.75	2.8	2.61
C223	Digital Electronics	2.5	2.8	2	3	2.2	2.1	2.43
C224	Control Systems	2.95	2.85	2.95	2.9	2.95	2.95	2.925
C225	Power System - I	2.5	2.8	2	3	2.2	2.1	2.43
C226	Digital Electronics Lab	3	2.5	2.3	2.8	3	2.8	2.73
C227	Electrical Machines Lab - II	3	2.5	2.3	2.8	3	2.8	2.73
C228	Control Systems Lab	2.25	2.5	2.6	2.2	3	2.45	2.5

C229	Constitution of India	2.8	2.9	2.9	2.8	2.7	2.6	2.78
C311	Power Electronics	2.5	2.2	2	2.2	2.3	3	2.36
C312	Power System-II	2.5	2.2	2	2.2	2.3	3	2.36
C313	Measurements and Instrumentation	2.98	3	2.98	3	2.99	2.99	3
C314	High Voltage Engineering	2.3	2.4	2.5	2.3	3	2.5	2.5
C315	Business Economics and Financial Analysis	2.98	2.97	2.99	2.98	2.99	2.97	3
C316	Power System Simulation Lab	2.25	2.5	2.6	2.2	3	2.45	2.5
C317	Power Electronics Lab	2.25	2.5	2.6	2.2	3	2.45	2.5
C318	Measurements and Instrumentation Lab	2.25	2.5	2.6	2.2	3	2.45	2.5
C319	Advanced Communication Skills Lab	3	2.5	2.2	2.8	3	2.8	2.716
C3110	Intellectual Property Rights	2.5	2.6	2.4	2.6	2.7	2.3	2.51
C321	Fundamentals of IOT-OE-I	2.95	2.85	2.95	2.9	2.95	2.95	2.925
C322	Power Semiconductor Drives	2.5	2.2	2	2.2	2.3	3	2.36
C323	Signals and Systems	3	2	2	3	3	3	2.66
C324	Microprocessors & Microcontrollers	2	3	3	2	3	3	2.66
C325	Power System Protection	2.3	2.4	2.5	2.3	3	2.5	2.5
C326	Power System Operation and Control	2.5	2.6	2.4	2.6	2.7	2.3	2.51
C327	Power System Lab	3	2.5	2.2	2.8	3	2.8	2.71
C328	Microprocessors & Microcontrollers Lab	2.25	3	2.15	2.1	2.5	3	2.5
C329	Signals and Systems Lab	2.98	2.97	2.99	2.97	2.99	2.98	3
C3210	Environmental Science	2	2	2.5	2	2.5	2	2.16
C411	Principles of Entrepreneurship	2.3	2.4	2.5	2.3	3	2.5	2.5

C412	Electrical and Hybrid Vehicles	2.98	2.99	2.98	2.97	2.99	2.98	3
C413	HVDC Transmission	2.4	2.5	2	2.5	2.8	3	2.53
C414	Fundamentals of Management for Engineers	2.98	2.99	2.98	2.97	2.99	2.97	3
C415	Electrical & Electronics Design Lab	3	2.5	2.2	2.8	3	2.8	2.71
C416	Industrial Oriented Mini Project/ Summer Internship	3	2.5	2.2	2.8	3	2.8	2.71
C417	Seminar	3	2.5	2.2	2.8	3	2.8	2.7
C418	Project Stage - I	3	2.5	2.2	2.8	3	2.8	2.71
C421	Environmental Impact Assessment	3	3	3	2.5	2.5	2	2.66
C422	Power Quality & FACTS	2.5	2.2	2	2.2	2	3	2.3
C423	Electrical Distribution Systems	3	2.6	2.4	2.8	2.7	2.6	2.68
C424	Project Stage - II	3	2.5	2.2	2.8	3	2.8	2.71

**Coordinator**

**HoD**



**PRINCIPAL**

Christu Jyothi Institute of Technology & Science  
 Colomco Nagar, Yeshwanthapuram (Vill)  
 Jangaon(Mdl), Jangaon (Dist)-506107.



**PO ATTAINMENT ASSESSMENT**

i) **Direct assessment Method** and ii) **Indirect assessment Method**

<b>Direct Assessment Methods</b>		
<b>S No.</b>	<b>Direct Assessment</b>	<b>Method Description</b>
1.	<b>Theory Course : Internal Tests</b>	As per the Curriculum of JNTU Kakinada, The student has to write two internal examinations per the Course. Each exam conducted for 30 Marks. First three Units in MID –I and last three units syllabus covered in MID-II. Faculty will set the Question paper accordingly. The marks obtained for each question and corresponding CO are collected from each student and then attainment is calculated. <b>R18 curriculum:</b> The best marks obtained from the two tests shall be the Internal Assessment Marks for the relevant subject. <b>R18 curriculum:</b> 20% weightage to least marks obtained from the two tests and 80% weightage to best marks obtained from the two tests shall be the Internal Assessment Marks for the relevant subject.
	<b>Theory Course : (SEE) University Results</b>	At the end of the Semester University conducts Semester end examination (SEE) for 70 marks. The marks obtained for each student is calculated to measure the attainment. Here, it is assumed that the questions answered by a student cover all the course outcomes defined for that course.
	<b>Theory Course : CO Feedback methodology</b>	At the end of the course, on line feed backs are collected based on COs. Each CO is asked as question and that questionnaire has been send to Student. For example, if a course has six COs then six questions asked. The Student may grade Excellent, Very Good, Good, Satisfactory and Poor.
2.	<b>Laboratory Course:</b>	Out of 75 marks for each lab, 25 marks are internal and 50 marks are for External Examination. In internal 25 marks, 10 marks for Day to day evaluation ,5 marks for attendance and 10 marks for Internal examination. By recording all there marks for each student, the Co attainment is calculated.
3.	<b>Projects:</b>	The Internal marks in the case of projects in the final year shall be based on the evaluation by a committee consisting of the Head of the concerned Department and two senior faculty members of the Department, one of whom shall be the project / seminar guide. Two reviews are conducted by Committee for 30 marks and summation of both review marks becomes internal marks of the Student. University will conduct external viva voce for 140marks.

**Indirect Assessment Method**

**PO attainment from co-curricular and extra-curricular activities**

  
**PRINCIPAL**  
 Christ's Health Institute of Technology & Science  
 Colomco Nagar, Keshwanthapuram (Vill)  
 Jangaon (Dist)-506187.

The PO attainment is calculated from co-curricular and extra-curricular activities organized during Current assessment Year. Number of events organized verses level of attainment is mapped first and then event vs PO attainment is calculated. The model PO attainment from co-curricular and extra-curricular activities form is given in Annexure-II (form 4)

#### **PO attainment from stakeholder feedbacks**

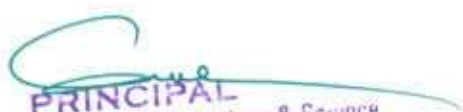
Indirect methods such as surveys and feedbacks taken from the stake holders to identify the Student learning. They assess opinions or thoughts about the graduate's knowledge or skills and their values by different stakeholders. For determining indirect attainment of POs and PSOs, student exit feedback, employer feedback, and Alumni feedback was considered (which includes attainments from both curricular &co/ extracurricular activities).The model Alumni feedback, employer feedback, and exit feedback is given in Annexure-II (form 5), Annexure-II (form 6) and Annexure-II (form 7) respectively.

#### **INDIRECT ASSESSMENT METHODS**

<b>S No.</b>	<b>Indirect Assessment Method</b>	<b>Method Description</b>
1.	Co-curricular and extra-curricular activities	The PO attainment is calculated from co-curricular and extra-curricular activities organized during Current assessment Year. Number of events organized verses level of attainment is mapped first and then event Vs PO attainment is calculated.
2.	Alumni Feedback	Collect variety of information about program Satisfaction and college from the Alumni students.
3.	Exit Student Feedback	Collected when the student complete his/her degree and leaving the institution
4.	Employer feedback	Collect variety of information about the graduates' skills, capabilities and opportunities (during the placement drives, also from the employers where the graduates are contributing)

#### **Overall PO attainment**

The evaluation POs is carried out with respect to student performance and surveys in both the terms of direct and indirect assessment methods. 80% weightage to direct attainment and 20% weightage is given to indirect attainment.

  
**PRINCIPAL**  
 Christu Jyothi Institute of Technology & Science  
 Colomco Nagar, Yeshwanthapuram (Vill)  
 Jangaon(Mdl), Jangaon (Dist)-506167,

Following is the sample Overall PO attainment sheet followed by all faculties for Theory Course.

**PO Attainment**

<b>CLASS</b>	<b>IV</b>	<b>AY</b>	<b>2022-23</b>
<b>Name Of The Course &amp; Code</b>	<b>HVDC Transmission-C413</b>	<b>Name Of The Faculty</b>	<b>G Saritha</b>

**CO-PO MAPPING:**

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C413.1	3				2	2	2				2	
C413.2	3	3			2					2		
C413.3	3	2	2		2	2				2		
C413.4	3	2	3			1						
C413.5	2	2	3									
C413.6	3	2	3									2

**CO ATTAINMENT**

Course Name	Att. Level
C413.1	2.792
C413.2	2.73
C413.3	2.49
C413.4	2.9
C413.5	2.84
C413.6	2.624

**PO ATTAINMENT :**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
<b>Overall PO Attainment</b>	<b>2.4</b>	<b>2.4</b>	<b>2.5</b>		<b>2.2</b>	<b>2.2</b>	<b>2.3</b>			<b>2.2</b>	<b>2.3</b>	<b>2.6</b>

**Faculty Signature**

**PRINCIPAL**  
 Christu Jyothi Institute of Technology & Science  
 Corom'co Nagar, Yeshwanthapuram (Vill)  
 Jangaon(Mdl), Jangaon (Dist)-506167.



Following is the sample Overall PO attainment sheet followed by all faculties for Theory Course.

**PSO Attainment**

<b>CLASS</b>	<b>IV</b>	<b>AY</b>	<b>2022-23</b>
<b>Name Of The Course &amp; Code</b>	HVDC Transmission-C413	<b>Name of The Faculty</b>	G Saritha

**CO-PO MAPPING:**

Course	PSO1	PSO2	PSO3
C413.1	2	2	2
C413.2	3	2	3
C413.3	2	2	3
C413.4	2	3	2
C413.5	3	2	
C413.6	2	3	2

**CO ATTAINMENT**

Course Name	Att. Level
C413.1	2.792
C413.2	2.73
C413.3	2.49
C413.4	2.9
C413.5	2.84
C413.6	2.624

**PSO ATTAINMENT :**

	PSO1	PSO2	PSO3
<b>Overall PSO Attainment</b>	<b>2.4</b>	<b>2.4</b>	<b>2.3</b>

**Faculty Signature**

  
**PRINCIPAL**  
 Christu Jyothi Institute of Technology & Science  
 Colom'to Nagar, Yeshwanthapuram (Vill)  
 Jangaon(Mdl), Jangaon (Dist)-506167.

**Program level Course-PO Attainment Table: Year of Study: 2022-23**

Course Number	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C211	Engineering Mechanics	2.6	2.6	2.5	2.62	2.6	2.6						2.6
C212	Electrical Circuit Analysis	2.9	2.82	2.82			2.82	2.82					
C213	Analog Electronics	2.5	2.5	2.5		2.4	2.5						2.4
C214	Electrical Machines-I	2.4	2.4	2.42		2.42	2.52						
C215	Electromagnetic Fields	2.6	2.5	2.42	2.5								
C216	Electrical Machines Lab-I	2.9	2.9	3.0	2.9	3.0						2.92	
C217	Analog Electronics Lab	2.94	2.94	2.94	2.94	2.94	2.93					2.94	2.93
C218	Electrical Circuit Lab	2.8	2.84	2.5	2.2	2						2.2	
C219	Gender Sensitization Lab	3.0	3.0										
C221	Laplace Transforms, Numerical methods & Complex Variables	1.92	1.92	2.1	2.12								2.05
C222	Electrical Machines-II	2.4	2.4	2.4		2.3	2.4						
C223	Digital Electronics	2.6	2.6	2.6	2.6	2.62	2.7	2.1	2.6		2.5	2.6	2.5
C224	Control Systems	2.6	2.22	2.22	2.92								
C225	Power Systems-I	2.9	2.9	2.62	2.9	2.62	2.9	2.8	2.62		2.9		2.9
C226	Digital Electronics Lab-I	3.0	3.0	2.99	2.99	3						2.99	
C227	Electrical Machines Lab-II	2.92	2.92	3.0	2.92	3.0						2.92	
C228	Control Systems Lab	2.92	2.92	2.92	2.92	2.92	2.92			2.92			
C229	Constitution of India						3		3				
C311	Power Electronics	2.6	2.8	2.62	2.7	2.62	2.52		2.62		2.52	2.52	2.6
C312	Power Systems-II	2.9	2.8	2.8			2.9	2.8				2.8	2.8
C313	Measurements and Instrumentation	2.5	2.5	2.4		2.6							
C314	High Voltage Engineering-PE-I	2.82	2.82	2.82	2.82		2.82			2.82			2.82
C315	Business Economics and Financial	2.3	2.3		2.5		2.2	2.4				2.5	2.4

**PRINCIPAL**

	Analysis												
C316	Power System Simulation Lab-I	2.9	2.42	2.8	2.8	2.92			2.9				
C317	Power Electronics Lab	3.0	3.0	2.9	2.9	2.9					3.0	2.8	
C318	Measurements and Instrumentation Lab	2.92	2.92	2.92	2.92	2.92							
C319	Advanced Communication Skills Lab						2.9		2.9	2.9		2.9	
C3110	Intellectual Property Rights	2.72			2.62	2.62	2.62	3	3				2.62
C321	Fundamentals of Internet of Things-OE-I	2.22	2.22	2.22	2.12	2.2	2.1					2.1	
C322	Power Semiconductor Drives- PE-II	2.67	2.65	2.63	2.72	2.43							
C323	Signals and Systems	2.2	2.2		2.7	2.12	2.1		2.5				1.91
C324	Microprocessor and Microcontrollers	2.12	2.12	2.12	2.12	2.12	2.12		2.5			2.12	
C325	Power System Protection	2.82	2.82	2.82	2.82		2.82			2.82			2.82
C326	Power System Operation and Control	2.8	2.8	2.72	2.7	2.7	2.8				2.82	2.8	2.8
C327	Power System Lab	3.0	3.0	3.0	3.0	3.0	3.0			3.0		3.0	3.0
C328	Microprocessor and Microcontrollers Lab	2.72	2.72	2.72	2.72	2.72	2.72					2.72	2.72
C329	Signals and Systems Lab	3	3	3		3	3	3					
C3210	Environmental Science	2.5			2.52		2.5	2.5	2.5				2.5
C411	Principles of Entrepreneurship-OE-II	2.1	2.4	2.4		2.4	2.2		2.12	2.4	2.4	2.4	2.4
C412	Electrical and Hybrid Vehicles-PE-III	2.71	2.81	2.71	2.71	2.71	2.61	2.61	2.71	2.81	2.81	2.71	2.71
C413	HVDC Transmission-PE-IV	2.41	2.41	2.51		2.2	2.21	2.32			2.22	2.31	2.61
C414	Fundamentals of Management for Engineers	2.4				2.4	2.4	2.5		2.5			2.4
C415	Electrical and Electronics Design Lab	2.91	3.0	2.91		3.0	2.9				3.0	2.9	



C416	Industrial Oriented Mini Project / Summer Internship	1.98	2.15	2.21	1.67	2.27	1.83	1.68	1.75	2.25	2.23	1.91	1.75
C417	Seminar	1.99	2.15	2.21	1.67	2.27	1.83	1.67	1.75	2.25	2.38	1.91	1.76
C418	Project Stage -I	1.99	2.15	2.21	1.67	2.27	1.83	1.67	1.75	2.25	2.38	1.91	1.76
C421	Environmental Impact Assessment-OE-III	2.7			2.8		2.7	2.7		2.8		2.8	2.8
C422	Power Quality and FACTS-PE-V	2.9				2.9	2.9					2.9	2.9
C423	Electrical Distribution Systems-PE-VI	2.8	2.82	2.92	2.92	2.92	2.92				3		2.92
C424	Project Stage-II	1.99	2.15	2.21	1.67	2.27	1.83	1.67	1.75	2.25	2.38	1.91	1.76

**PO Attainment Level:**

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO Attainment	2.43	2.47	2.47	2.49	2.43	2.43	2.42	2.21	2.56	2.50	2.45	2.46
Direct Attainment	2.61	2.62	2.62	2.58	2.60	2.56	2.39	2.37	2.63	2.60	2.55	2.53
In Direct Attainment	1.95	1.97	1.98	1.95	1.98	1.97	2	2.04	1.97	1.96	1.99	1.98

**Program level Course-PSO Attainment Table: Year of Study: 2022-23**

Course Number	Course Name	PSO1	PSO2	PSO3
C211	Engineering Mechanics	2.6	2.6	2.52
C212	Electrical Circuit Analysis	2.9	2.82	2.82
C213	Analog Electronics	2.5	2.4	2.4
C214	Electrical Machines-I	2.4	2.6	2.33
C215	Electromagnetic Fields	2.5	2.4	2.5
C216	Electrical Machines Lab-I	2.9	2.9	
C217	Analog Electronics Lab	2.94	2.94	2.94
C218	Electrical Circuit Lab	2.92	2.92	
C219	Gender Sensitization Lab	3.0	3.0	3.0
C221	Laplace Transforms, Numerical Methods & Complex Variables	2.05	1.9	1.92
C222	Electrical Machines-II	2.92	2.92	2.3
C223	Digital Electronics	2.6	2.62	2.6

C224	Control Systems	2.6	2.22	2.22
C225	Power Systems-I	2.9	2.9	2.6
C226	Digital Electronics Lab-I	2.99	2.99	3.0
C227	Electrical Machines Lab-II	2.6	2.6	
C228	Control Systems Lab	2.92	2.92	2.92
C229	Constitution of India	3		
C311	Power Electronics	2.7	2.6	2.6
C312	Power Systems-II	2.82	2.8	2.9
C313	Measurements and Instrumentation	2.82	2.82	2.82
C314	High Voltage Engineering-PE-I		2.5	2.3
C315	Business Economics and Financial Analysis	2.9	2.8	2.5
C316	Power System Simulation Lab-I	3.0	3.0	3.0
C317	Power Electronics Lab	2.92	2.92	
C318	Measurements and Instrumentation Lab			2.9
C319	Advanced Communication Skills Lab	2.72	2.72	2.72
C3110	Intellectual Property Rights	2.22		2.22
C321	Fundamentals of Internet of Things-OE-I	2.67	2.65	2.7
C322	Power Semiconductor Drives- PE-II	2.12		2.12
C323	Signals and Systems	2.82	2.82	2.82
C324	Microprocessor and Microcontrollers	2.8	2.72	2.72
C325	Power System Protection	2.92	3.0	3.0
C326	Power System Operation and Control	3.0	3.0	
C327	Power System Lab	3	3	3
C328	Microprocessor and Microcontrollers Lab	2.6	2.7	2.42
C329	Signals and Systems Lab	2.52	2.71	
C3210	Environmental Science	2.71	2.71	2.8
C411	Principles of Entrepreneurship-OE-II	2.41	2.41	2.41
C412	Electrical and Hybrid Vehicles-PE-III		2.4	2.4
C413	HVDC Transmission-PE-IV	2.91	3.0	2.91
C414	Fundamentals of Management for Engineers	2.62	2.62	2
C415	Electrical and Electronics Design Lab	2.62	2.62	2
416	Industrial Oriented Mini Project / Summer Internship	2.62	2.62	2
C417	Seminar	2.6		2.8
C418	Project Stage -I	2.9	2.9	2.8
C421	Environmental Impact Assessment-OE-III	2.92	2.92	2.92
C422	Power Quality and FACTS-PE-V	2.33 2.6	1.90 2.6	1.51 2.52

C423	Electrical Distribution Systems-PE-VI	2.9	2.82	2.82
C424	Project Stage-II	2.5	2.4	2.4

**PSO Attainment Level:**

Course	PSO1	PSO2	PSO3
CO Attainment	2.58	2.46	2.54
Direct Attainment	2.72	2.70	2.57
In Direct Attainment	3	3	3

**Coordinator**

**HoD**