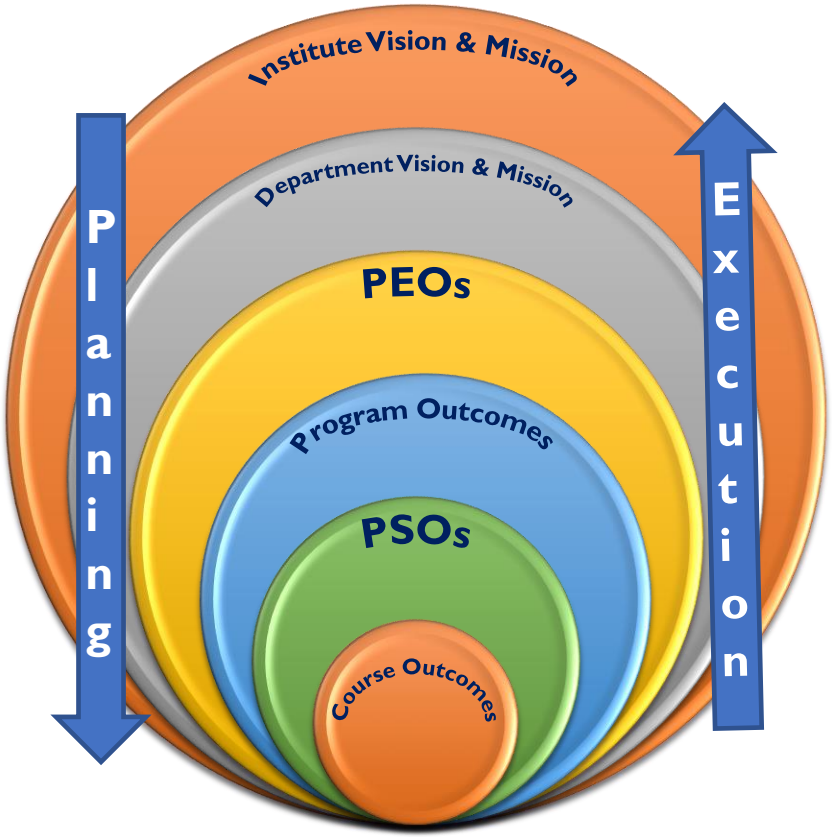
PROGRAM OUTCOMES & PROGRAM SPECIFIC OUTCOMES



Program Outcomes

- Engineering Knowledge
- Problem Analysis
- Design / Development of Solutions
- Conduct investigations of complex Problems
- Modern Tool usage
- Engineer & Society
- Environment & Sustainability
- Ethics
- Individual & Team work
- Communication
- Project Management & Finance
- Life long learning

Program Specific Outcomes

PSO-1

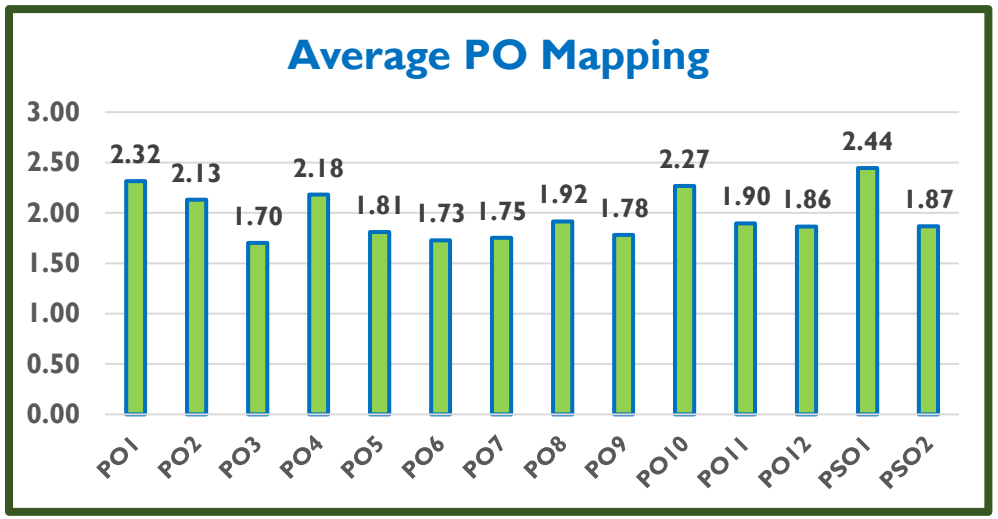
PSO-2

COs, POs & PSOs ARTICULATION MATRIX

Program Articulation Matrix

Course Code	Program Outcomes (POs) and Program Specific Outcomes (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO 12	PSO1	PSO2
C321	2.17	2.83	2	-	-	-	-	-	-	-	2	2	2.67	2
C322	3	3	2	-	2	2	2	-	-	-	-	2	3	2
C323	1	1.25	1.5	-	1.5	-	-	-	-	-	-	-	1.17	1.67
C324	2.17	2.17	-	-	2.33	-	-	-	2	-	-	1.83	-	2
C325	3	2.33	2	2	-	2.67	2.33	3	3	2.5	2.5	2.2	3	-
C326	3	2	1.8	3	1.4		1			2	2	1.2	2.2	2.8
C327	1	1.5	1.5	2	2.25	-	-	-	1.75	-	1	2	2	1.5
C328	2	2	-	-	2.2	-	-	-	2	-	-	1.6	-	2

$$\text{Avg} = \frac{\sum \text{COs Mapped to the POs}}{\text{Number of COs Mapped to POs}}$$



Course Articulation Matrix

Course Outcomes		Program Outcomes (POs)													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO 12	PSO1	PSO2
C322	CO1	3	3	2	-	2	-	-	-	-	-	-	-	3	2
	CO2	3	3	2	-	2	2	-	-	-	-	-	2	3	2
	CO3	3	3	2	-	-	-	-	-	-	-	-	-	3	2
	CO4	3	3	-	-	-	2	2	-	-	-	-	2	3	2
	CO5	3	3	-	-	-	2	2	-	-	-	-	2	3	2
	CO6	3	3	-	-	-	2	2	-	-	-	-	-	3	2
	Avg	3	3	2	-	2	2	2	-	-	-	-	2	3	2

CO - PO / PSO MAPPING JUSTIFICATION

Course Outcomes		Program Outcomes (POs)													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO 12	PSO1	PSO2
C322	CO1	3	3	2	-	2	-	-	-	-	-	-	-	3	2
	CO2	3	3	2	-	2	2	-	-	-	-	-	2	3	2
	CO3	3	3	2	-	-	-	-	-	-	-	-	-	3	2
	CO4	3	3	-	-	-	2	2	-	-	-	-	2	3	2
	CO5	3	3	-	-	-	2	2	-	-	-	-	2	3	2
	CO6	3	3	-	-	-	2	2	-	-	-	-	-	3	2

CO-1

- **PO1**: Application of knowledge of mathematics, and engineering fundamentals are used in the formation of matrices, formation of Y-Bus etc.
- **PO2**: The analysis is done with respect to the impedance diagram, formation of the admittance matrix by adopting complex engineering problems
- **PO3**: The analysis is done with respect to the configuration of the power system which is designed based on the societal needs in terms of power sector
- **PO5**: Modern Tools are used for the formation of Y-Bus of a power system
- **PSO1**: Design the power systems for transmitting the power efficiently
- **PSO2**: Software tools are also used for design and analysis of the power systems

CO-2

- **PO1**: Knowledge of mathematics in terms of iterative methods are used for load flow analysis .
- **PO2**: Formulation and complex engineering concepts are applied for load flow analysis
- **PO3**: Design of a system for the consideration of societal needs
- **PO5**: MATLAB is also used for study the load flows
- **PO6:** Contextual knowledge is used to meet the safety and legal issues
- **PO12:** Based on context of technological changes, analysis is performed for load flows for the need of the society
- **PSO1**: Load flows are necessary for design the interconnected power system
- **PSO2**: MATLAB is also used to run the load flows of power systems

CO-3

- **PO1**: Application of knowledge of mathematics, engineering fundamentals are used in the formation of matrices, formation of Z-Bus etc.
- **PO2**: Analysis is done with respect formation of an impedance matrix by adopting complex engineering problems
- **PO3**: Design the lines in the impedance diagram that meet the specified needs with appropriate considerations
- **PSO1**: Step by Step procedure is adopted for determining the Z-Bus of a system
- **PSO2**: MATLAB is also used to build the impedance matrix of an interconnected power system

CO-4

- **PO1**: Engineering fundamentals and knowledge of mathematics is used to formulate the expressions for fault current under short circuit conditions.
- **PO2**: Analysis of complex engineering problems in power systems under short circuit conditions
- **PO3**: With respect to the safety issues, fault currents are analyzed for short circuit studies
- **PO7:** With respect to the sustainable development, short circuit studies are analyzed
- **PO12:** Short circuit studies are important with respect to life long learning
- **PSO1**: Fault current calculations are required for transmitting the power without any disturbances
- **PSO2**: Modern tools are used for performing the short circuit studies

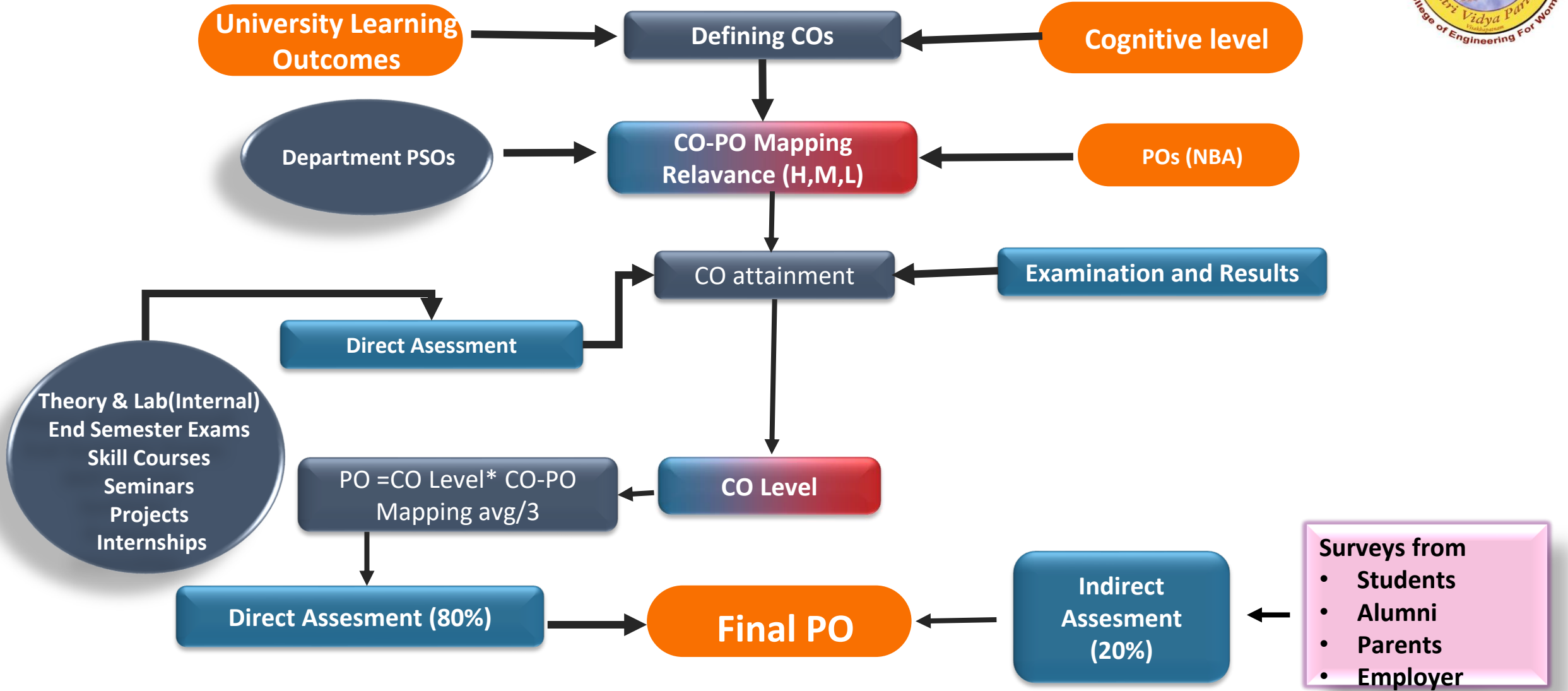
CO-5

- **PO1**: Engineering fundamentals and knowledge of mathematics are used to formulate the expressions for fault currents for different faults.
- **PO2**: Analysis of complex engineering problems in power systems for different fault conditions
- **PO6**: With respect to the safety issues, fault currents are analyzed for different faults
- **PO7:** With respect to sustainable development, fault currents are analyzed
- **PO12** Fault current calculations are important with respect to lifelong learning
- **PSO1**: Fault current calculations are required for transmitting the power without any disturbances
- **PSO2**: Modern tools are used for performing studying the behaviour of the system under fault conditions

CO-6

- **PO1**: Engineering fundamentals and knowledge of mathematics are used in stability studies and swing equation
- **PO2**: Analysis of complex engineering problems is done in stability studies
- **PO6**: With respect to professional issues, stability studies are analyzed
- **PO7:** With respect to sustainable development, the stability of a power system is analyzed
- **PSO1**: Stability studies are required for transmitting power without any disturbances
- **PSO2**: Modern tools are used for analyzing the swing equation and equal area criteria.

CO-PO ATTAINMENT PROCESS



MARKS COMPUTATION & ATTAINMENT LEVEL

Sheet 1

Direct Assessment of COs based on Marks

Roll no	CO-1	CO-2	CO-3	A-1	CO-4	CO-5	CO-6	A-2	Q-1	Q-2	Sem End	Sem End	Internal Marks	Sem End
	10	10	10	5	10	10	10	5	10	10	Grade	Marks (100)	Marks (30)	Marks (70)
16JG1A0202	2	1	1	5	10	4	0	5	2	5	C	55	16	39
16JG1A0207	-1	-1	-1	2	-1	-1	-1	3	0	0	F	0	3	0
17JG1A0201	0	1	0	5	1	1	2	5	4	3	F	0	10	0
17JG1A0202	1	0	0	5	0	1	0	5	5	5	F	0	11	0
17JG1A0203	0	4	1	4	2	0	1	5	4	4	D	45	11	34
17JG1A0204	7	10	1	5	10	10	10	5	6	5	A	75	24	51
17JG1A0205	10	10	1	5	10	10	0	5	5	5	A	75	21	54

Sheet 2

	Roll No	CO1	CO2	CO3	CO4	CO5	CO6	OBE based result
1	16JG1A0202	49.80	48.60	48.60	63.00	55.80	51.00	Cleared
2	17JG1A0201	10.80	12.00	10.80	10.80	10.80	12.00	Not Attained
3	17JG1A0202	13.20	12.00	12.00	12.00	13.20	12.00	Not Attained
4	17JG1A0203	43.60	48.40	44.80	47.20	44.80	46.00	Cleared
5	17JG1A0204	72.60	76.20	65.40	75.00	75.00	75.00	Cleared
6	17JG1A0205	78.00	78.00	67.20	78.00	78.00	66.00	Cleared

Sheet 3

Final CO Calculation

Course Outcomes	Overall CO Attainment	Level Attained 1/2/3
CO1	74.67	2
CO2	71.31	2
CO3	70.13	2
CO4	88.89	3
CO5	81.20	3
CO6	75.67	2

$$\text{Overall CO Attainment} = \frac{No.\,of\ Students\ Attained\ Target\ Level}{Total\ No.\,of\ Students} * 100$$

If **80% or more** of the students attain the set target, the attainment level is **3**.
If **70% or more** of the students attain the set target, the attainment level is **2.**
Otherwise, the students attain the attainment level is **1**

$$\text{POs / PSOs Attainment} = \frac{CO\ Attainment\ Level\ \times Average\ PO\ Level}{3}$$

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C322	2.00	2.00	1.33	-	1.33	1.33	1.33	-	-	-	-	1.33	2.00	1.33