MANJARA CHARITABLE TRUST

RAJIV GANDHI INSTITUTE OF TECHNOLOGY, MUMBAI

Department of Computer Engineering

Procedure for CO-PO Articulation

In outcome-based education, a "design down" process is employed which moves from POs to Course Outcomes (COs) and outcomes for individual learning experiences. Outcomes at each successive level need to be aligned with, and contribute to, the program outcomes.

To connect high-level learning outcomes (POs) with course content, course outcomes and its assessment is necessary. There is a necessity to bring further clarity and specificity to the program outcomes attainment through course outcome AICTE given the examination reform policy in November 2018. This can be achieved through the following two-step process of identifying Competencies and Performance Indicators (PI).

(1) Identify Competencies to be attained: For each PO define the competencies –different abilities implied by program outcome statement that would generally require different assessment measures. This helps us to create a shared understanding of the competencies we want students to achieve. They serve as an intermediate step to the creation of measurable indicators. It should be noted that, when we consider the program outcome, it looks like, it can be achieved only in the Capstone project. But if we consider the competencies and performance indicators, we start seeing the opportunities of addressing them (and hence PO) in various courses of the program. Once the above process is completed for the program, the assessment of COs for all the courses is done by connecting assessment questions (used in various assessment tools) to the PIs. By following this process, where examination questions map with PIs, we get clarity and better resolution for the assessment of COs and POs.

Step 1: Formation of Domain Group / Mapping, Validation and Formation of Rubrics of CO PO as per syllabus content / Creation of Articulation Matrix / Specific remarks for CO PO attainment level

MATRIX FOR CO PO MAPPING FOR COURSE:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	X	X	X	X	--	--	--	--	--	--	--	X	X	--
CO2	X	X	X	X	X	--	--	--	--	--	X	X	--	X
CO3	X	X	X	X	X	X	X	X	--	--	X	X	--	
CO4	X	X	X	X	X	--	X	--	--	--	X	X	X	X
CO5	X	X	X	X	--	--	--	--	--	--	X	X	--	--
CO6	X	X	X	X	X	X	X	X	--	--	X	X	--	--

ARTICULATION MATRIX FOR SUBJECT / COURSE (Assigning weightages as percurriculum by using PO competency levels and its performance indicators)

High – 3
Moderate – 2
Low – 1

ATTAINMENT OF PO THROUGH COURSE OUTCOMES

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	1	2	--	--	--	--	--	--		2	--	--
CO2	2	2	2	3	1	--	--	--	--	--	2	2	2	2
CO3	2	3	3	3	2	2	1	2	--	--	2	2	--	--
CO4	2	2	1	2	2	--	1	--	--	--	1	1	--	1
CO5	1	1	1	1	--	--	--	--	--	--	2	2	2	--
CO6	2	3	3	3	3	2	2	1	--	--	2	2	--	--
AVG	**2**	**2.17**	**1.83**	**2.33**	**2.00**	**2.00**	**1.33**	**1.50**	--	--	**1.80**	**1.83**	--	--

Calculate the Average Value of PO through Course Outcomes

Average Value PO = Total Attainment level / total number of POs mapped with COs.

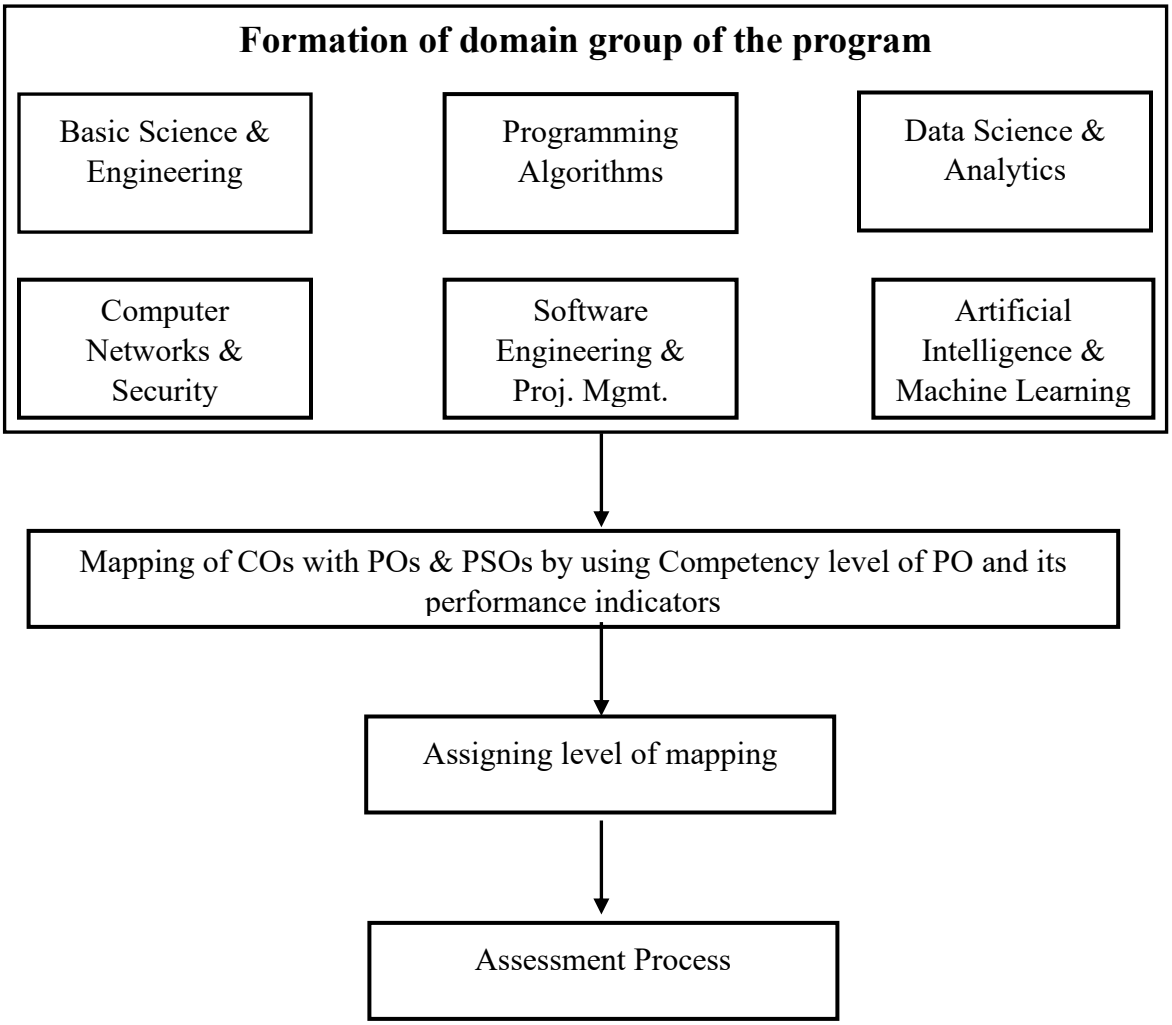

Fig: Mapping Process of CO with PO

Year:	FINAL YEAR	**Subject:**	Distributed Computing	**Course Code:**	CSC 802

CO1	Demonstrate the knowledge of basic elements and concepts related to distributed system technologies.
CO2	Illustrate the middleware technologies that support distributed applications such as RPC, RMI and Object-based middleware.
CO3	Analyze the various techniques used for clock synchronization, mutual exclusion and deadlock.
CO4	Demonstrate the concepts of Resource and Process management.
CO5	Demonstrate the concepts of Consistency, Replication Management and fault Tolerance
CO6	Apply the knowledge of Distributed File systems in building large-scale distributed applications

Value of PI	**Level**
<=0.33	1
Between 0.34 & 0.67	2
Between 0.68 & 1	3

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Program Outcomes	Competency		Indicators		Course Outcomes					
					CO1	CO2	CO3	CO4	CO5	CO6
PO1	1.1	Demonstrate competence in mathematical modeling	1.1.1	Apply the knowledge of discrete structures, linear algebra, statistics, numerical techniques and theoretical computer science to solve problems.	--	--	--	√	--	--
			1.1.2	Apply the concepts of probability, statistics and queuing theory in modeling of computer based system, data and network protocols.	--	√	--	√	√	√
	1.2	Demonstrate competence basic sciences	1.2.1	Apply laws of natural science to an engineering problem.	--	--	--	--	--	--
	1.3	Demonstrate competence engineering fundamentals	1.3.1	Apply engineering fundamentals	√	√	√	√	√	√
	1.4	Demonstrate competence in specialized engineering knowledge to the program	1.4.1	Apply theory and principles of computer science to solve an engineering problem.	--	√	√	√	--	--
	PO1	**Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.			1	3	2	3	2	2

Program Outcomes	Competency		Indicators		Course Outcomes					
					CO1	CO2	CO3	CO4	CO5	CO6
PO1	1.1	Demonstrate competence in mathematical modeling	1.1.1	Apply the knowledge of discrete structures, linear algebra, statistics, numerical techniques and theoretical computer science to solve problems.	1.1.1 Apply knowledge to solve numericals in task assignment approach					
			1.1.2	Apply the concepts of probability, statistics and queuing theory in modeling of computer based system, data and network protocols.						
	1.2	Demonstrate competence basic sciences	1.2.1	Apply laws of natural science to an engineering problem.	--					
	1.3	Demonstrate competence engineering fundamentals	1.3.1	Apply engineering fundamentals	1.3.1 Explore knowledge of DFS to design modern File syatems like HDFS, GFS, HFS, Amazon's S3					
	1.4	Demonstrate competence in specialized engineering knowledge to the program	1.4.1	Apply theory and principles of computer science to solve an engineering problem.						
	PO1	**Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.			1	3	2	3	2	2

ARTICULATION MATRIX

Year:	FINAL YEAR	Subject:	Distributed Computing	Course Code:	CSC 802

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	1	1		--	--	--	--	--	--	--	--	--	--
CO2	3	3	1	2	1	--	--	--	--	--	--	--	--	--
CO3	2	3	2	2	2	1	--	--	--	--	--	--	1	2
CO4	3	3	3	2	2	1	--	--	--	--	--	--	1	2
CO5	2	1	1	1	--	--	--	--	--	--	--	--	--	--
CO6	2	1	1	1	3	--	--	--	--	--	--	--	1	2
AVG	**2.17**	**2.00**	**1.50**	**1.60**	**2.00**	**1.00**							**1.00**	**2.00**