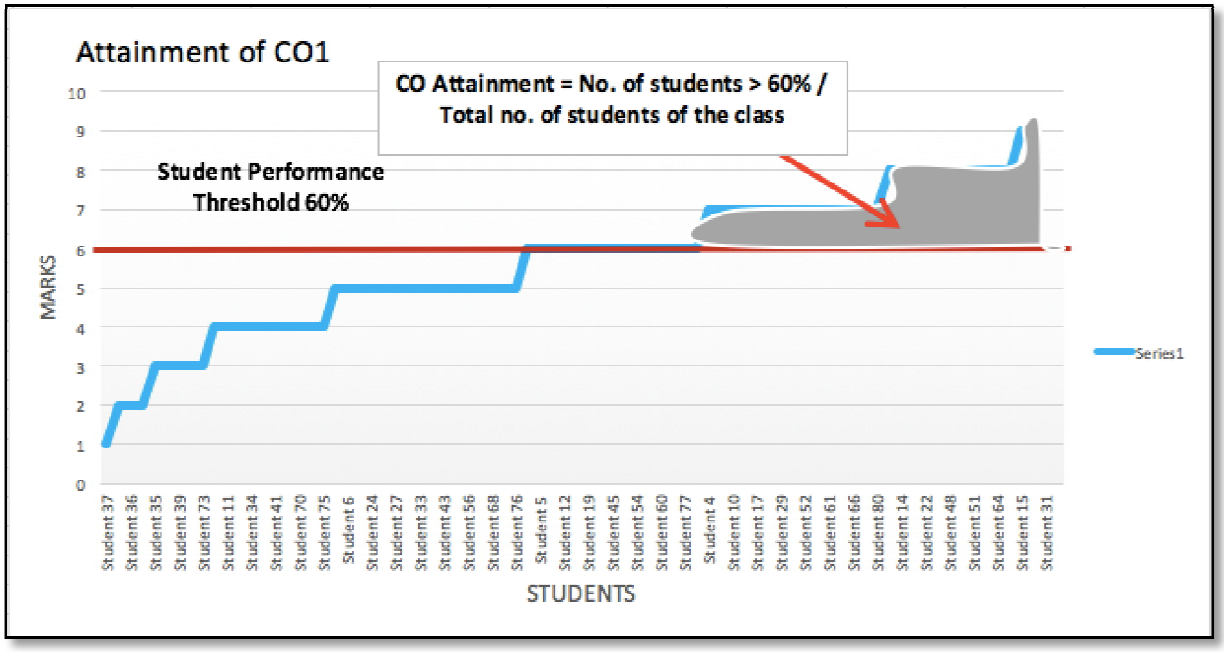
Attainment of Programme outcomes, Programme specific outcomes and course outcomes are evaluated by the institution

2.6.2: Attainment of Programme outcomes, Programme specific outcomes and course outcomes are evaluated by the institution

How CO attainment is calculated?



Sorted Order	
Max Marks	**10**
	Q1
	CO 1
Name of Students	**Marks Obtained**
Student 44	1
Student 37	1
Student 21	2
Student 36	2
Student 35	3
Student 38	3
Student 39	3
Student 1	4
Student 11	4
Student 25	4
Student 34	4

Student 40	4
Student 41	4
Student 57	4
Student 2	5
Student 6	5
Student 23	5
Student 24	5
Student 26	5
Student 27	5
Student 32	5
Student 33	5
Student 42	5
Student 43	5
Student 55	5
Student 56	5
Student 58	5
Student 3	6
Student 5	6
Student 7	6
Student 12	6
Student 18	6
Student 19	6
Student 28	6
Student 45	6
Student 46	6
Student 54	6
Student 59	6
Student 60	6
Student 4	7
Student 8	7
Student 10	7
Student 13	7
Student 17	7
Student 20	7
Student 29	7
Student 47	7
Student 52	7
Student 53	7
Student 9	8

Student 14	8
Student 16	8
Student 22	8
Student 30	8
Student 48	8
Student 49	8
Student 51	8
Student 15	9
Student 50	9
Student 31	9

CO attainment = 55%

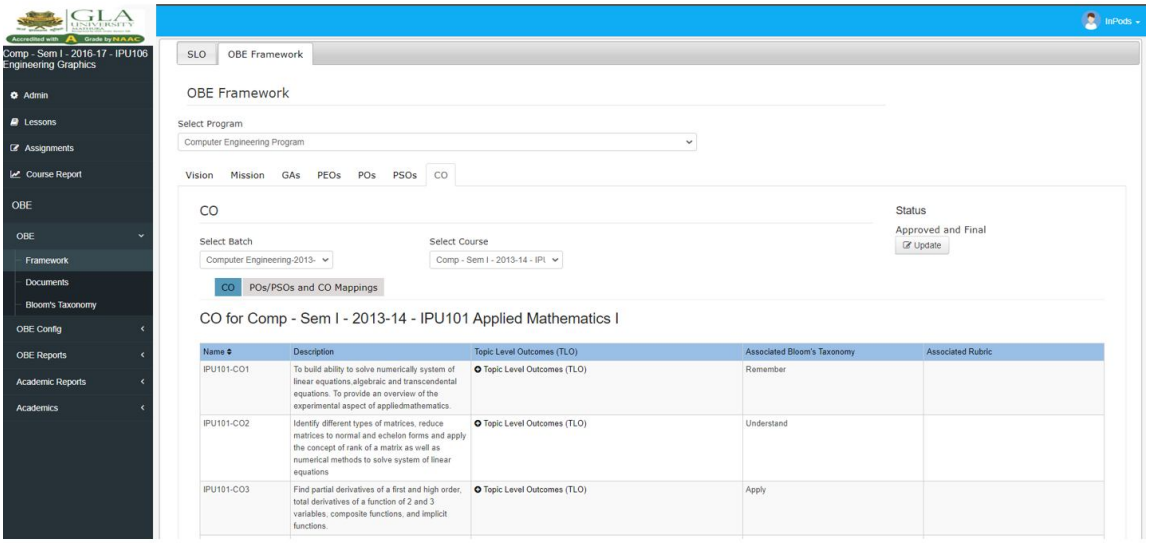
To calculate CO attainment:

1. What is the CO mapping to a question? = CO1
2. What is the class strength? = 60 students
3. What is the Max Marks of the questions = 10
4. What is the students' performance threshold? – 60% or 6 marks out of 10 marks
5. What is individual students' grade for the question?

CO 1's attainment in above case is 55% because, 33 students are equal or above 6 marks, therefore CO1 attainment = 33 / 60 * 100 = 55%

Likewise, if you calculate % attainment of all the questions in all assignments of your course, which are mapped to CO1, and for example, you got overall **60% CO attainment for CO1**.

For CO1, however, institute has set "Target % Attainment" as 55% and hence overall CO 1 attainment is 60%, therefore, the CO1 is said to be Attained.



What is Level of Attainment?

Level of attainment is derived by finding out in which bucket the overall CO attainment falls. NBA has suggested 3 levels of attainment – 1, 2 and 3, which corresponds to Low, Medium and High in a way.

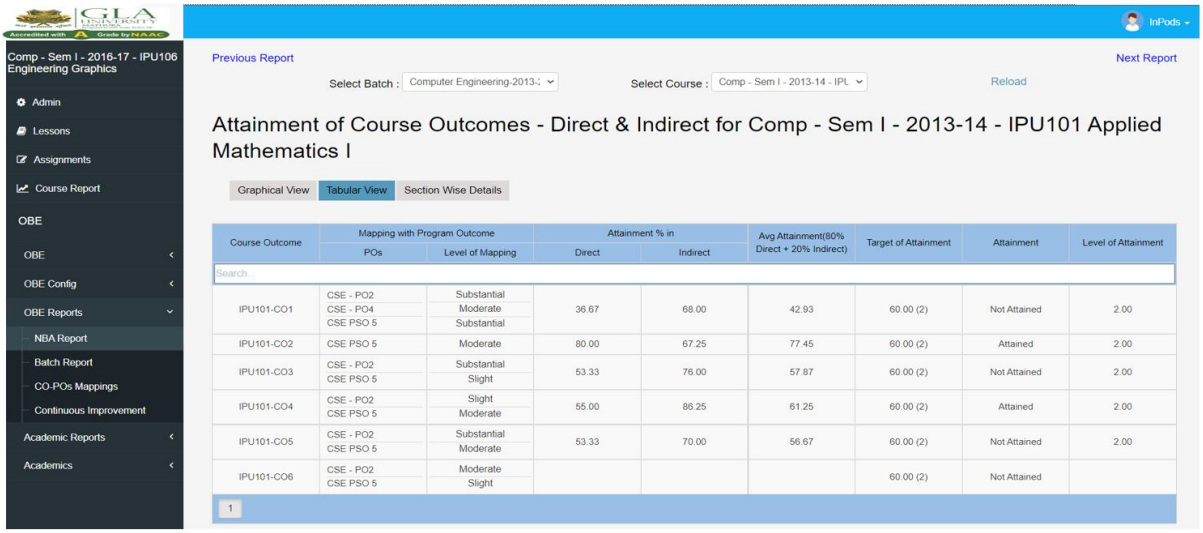
How GLA can define the buckets for CO attainment as shown below:

Level of Attainment for CO1				
Levels	0	1	2	3
% CO attainment	0	0 to 30%	30 to 60%	60 to 100%

Since your CO1 has attained 60% attainment, it falls in 3rd bucket and hence, CO1's level of attainment is 3 from direct assessments.

Likewise, you can calculate CO attainment and level of attainment for all COs of your course. So, finally, you may come up with numbers like this:

	CO Attainment %	Level of Attainment
CO 1	60%	3
CO 2	76%	3
CO 3	65%	3
CO 4	59%	2
CO 5	45%	2
CO 6	29%	1
CO 7	24%	1



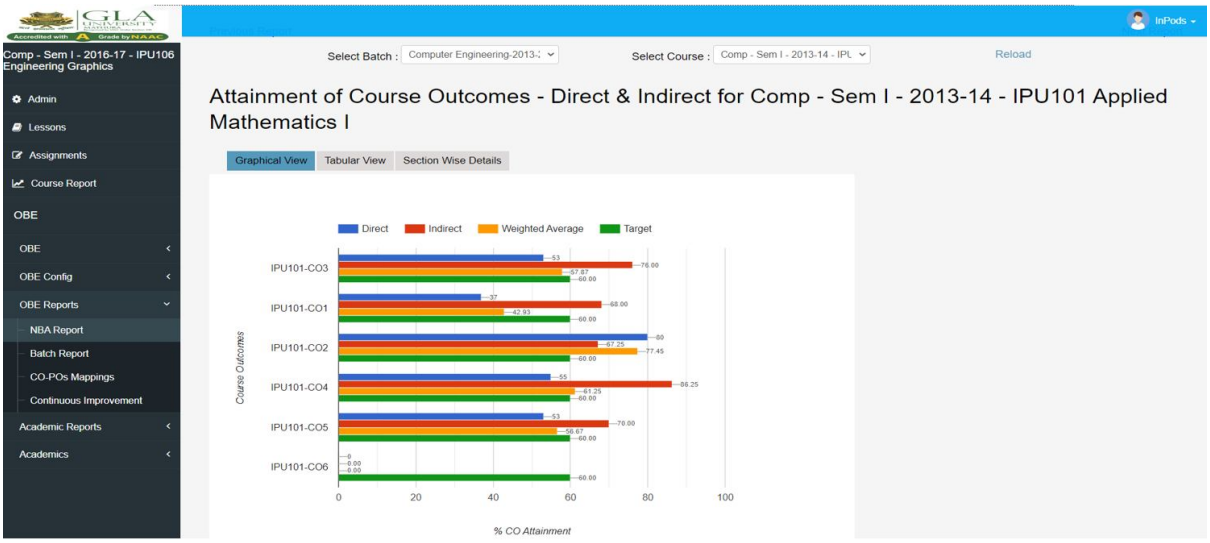
Course Outcome	Mapping with Program Outcome		Attainment % in		Avg Attainment(80% Direct + 20% Indirect)	Target of Attainment	Attainment	Level of Attainment
	POs	Level of Mapping	Direct	Indirect				
IPU101-CO1	CSE - PO2 CSE - PO4 CSE PSO 5	Substantial Moderate Substantial	36.67	68.00	42.93	60.00 (2)	Not Attained	2.00
IPU101-CO2	CSE PSO 5	Moderate	80.00	67.25	77.45	60.00 (2)	Attained	2.00
IPU101-CO3	CSE - PO2 CSE PSO 5	Substantial Slight	53.33	76.00	57.87	60.00 (2)	Not Attained	2.00
IPU101-CO4	CSE - PO2 CSE PSO 5	Slight Moderate	55.00	86.25	61.25	60.00 (2)	Attained	2.00
IPU101-CO5	CSE - PO2 CSE PSO 5	Substantial Moderate	53.33	70.00	56.67	60.00 (2)	Not Attained	2.00
IPU101-CO6	CSE - PO2 CSE PSO 5	Moderate Slight				60.00 (2)	Not Attained	

CO Attainment for Indirect Assessments:

For indirect assessments, we use formula of ratings for each Option of the Survey question. Then the CO attainment is calculated for each question (which is mapped to a CO), by using the formula as:

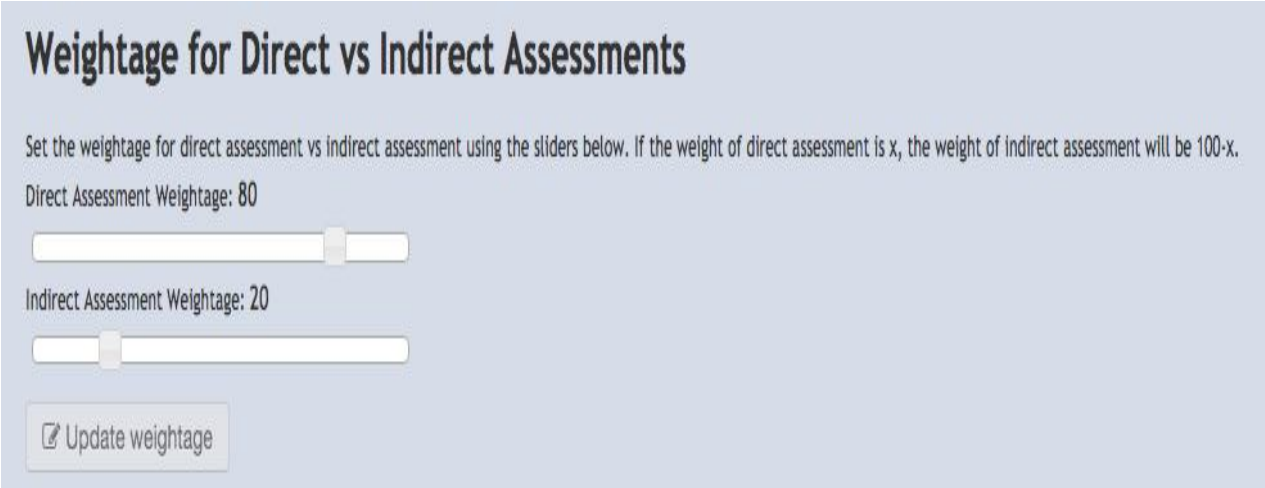
Total count of students in a class = CSC
Count of students who chose an option = CSCO
**Rating of question = Option 1 = 5, Option 2 = 4, Option 3 = 3, Option 4 = 2, Option 5 = 1

Thus, % CO attainment = [(CSCO x 5) + (CSCO x 4) + (CSCO x 3) + (CSCO x 2) + (CSCO x 1)] / CSC x 5



Weightage for Direct and Indirect Assessments

Program Head may want to decide what should be the weightage for Direct and Indirect assessments.



PO Attainment Calculation

We now know how have we arrived at following table. This table shows "Level of Attainment". This Level of Attainment is passed onto the POs which are affiliated to the COs.

	CO Attainment %	Level of Attainment
CO 1	60%	3
CO 2	76%	3
CO 3	65%	3
CO 4	59%	2
CO 5	45%	2
CO 6	29%	1
CO 7	24%	1

PO Attainment:
Programme: B.Tech CS
Course: BCSG0001: PYTHON PROGRAMMING

Program Outcomes (Common to All B.Tech Programmes)

PO1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2. Problem analysis: Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

PO6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one’s own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

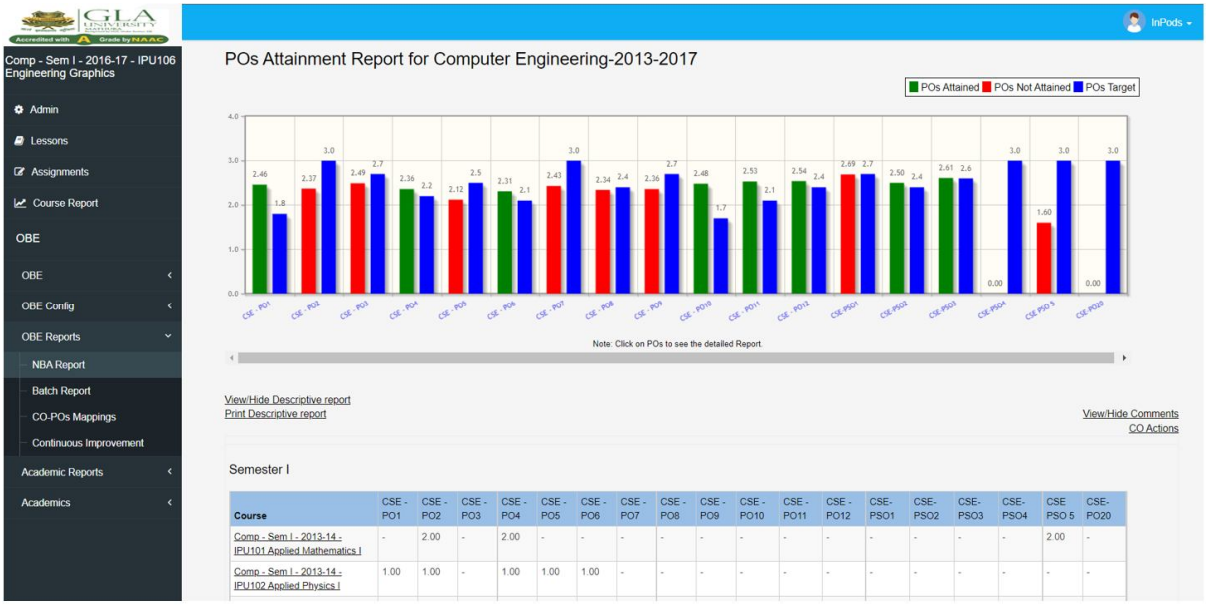
PO12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

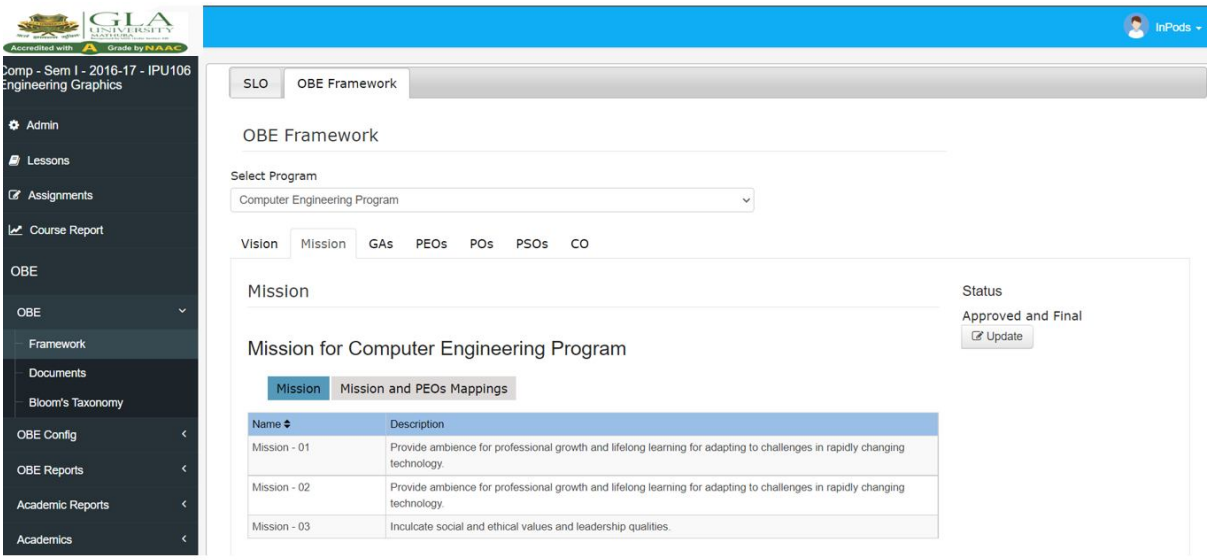
Program Educational Objectives (PEOs)

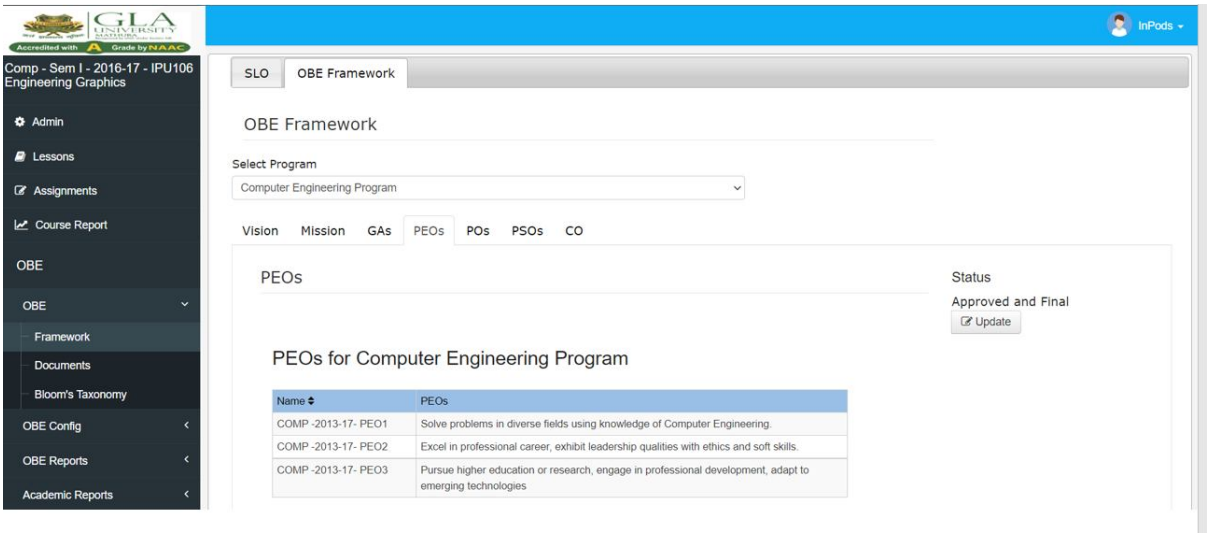
PEO1: Become globally competent computer professionals, researchers or entrepreneurs, for developing sustainable solutions.

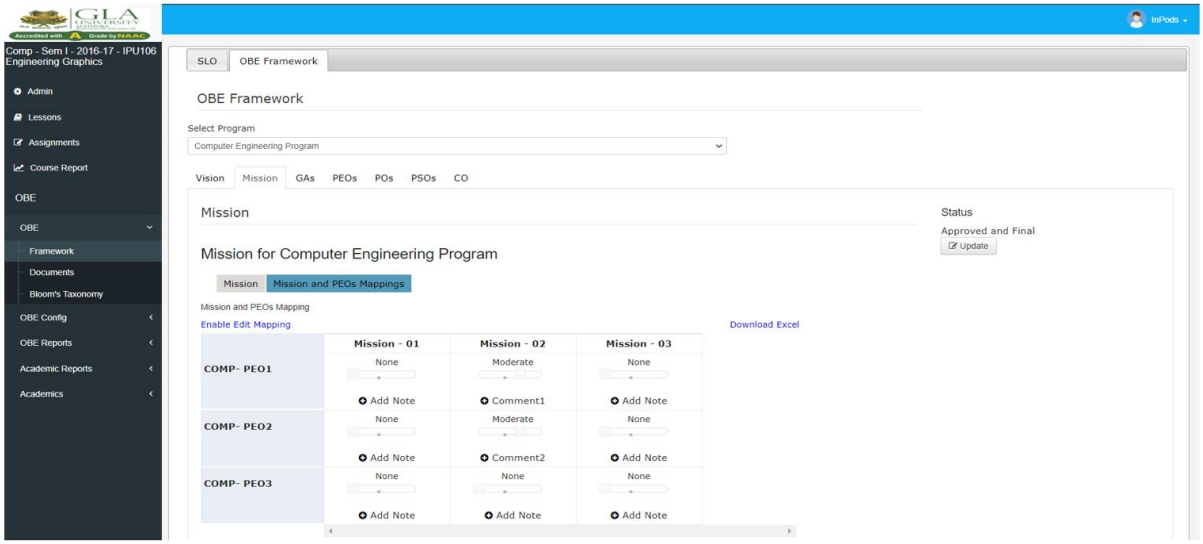
PEO2: Attain positions of leadership in an organization and /or on teams.

PEO3: Engage in lifelong learning to improve their professional skills and knowledge to address industrial and societal needs using latest technologies.









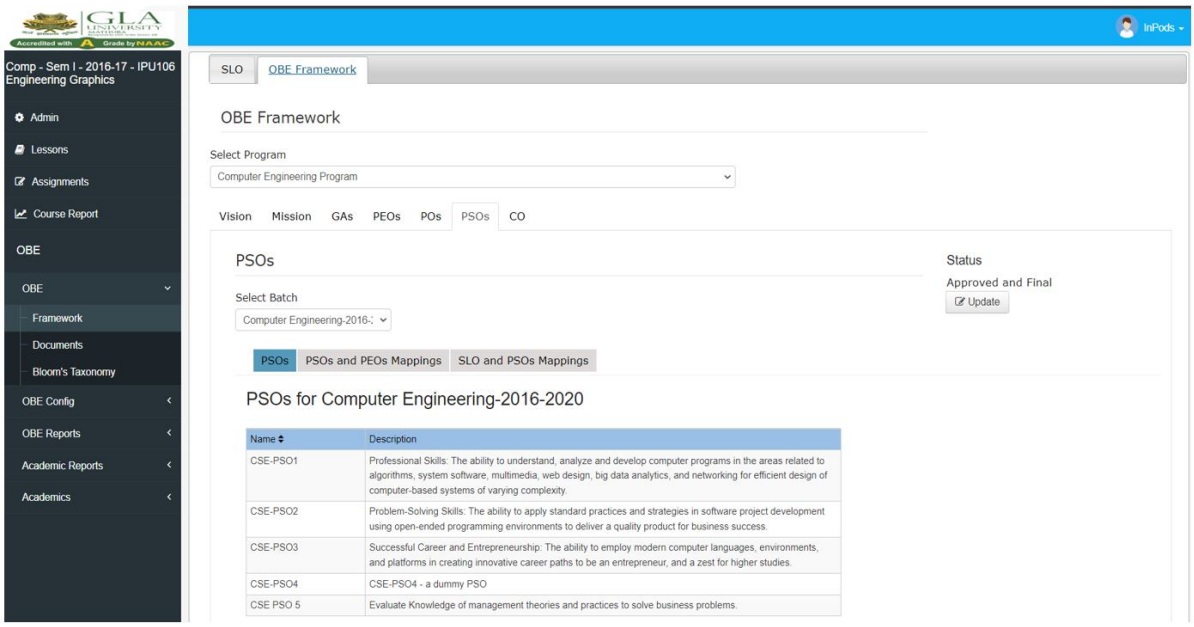
Program Specific Outcomes (PSOs)

PSO1: Solve real world problems using competency in computational logic, analytical ability, system design principles and programming skills.

PSO2: Design and develop hardware and software interfaces along with latest tools and technology to meet the needs of industry.

PSO3: Analyze the algorithmic principles, theory of computation and mathematical foundations for the modeling and design of computing systems.

PSO4: Apply knowledge to provide innovative solutions to existing problems and identify research gaps.



Course Outcomes of Python Programming:

• CO1: Understand the basics of Python Programming.

• CO2: Apply the concepts of control structures and string manipulations of python programming.

• CO3: Understand the use of data structures available in Python List, Tuple and Dictionary.

• CO4: Experiment user-defined functions and access built-in functions.

• CO5: Experiment user-defined modules and access built-in modules- math, random, string, date, time, date time.

• CO6: Develop the programs using the concept of File Handling.

• CO7: Develop programs based on Exceptional Handling.

Mapping of Course Outcomes (COs) with Program Outcomes (POs) and Program Specific Outcomes (PSOs):

COs	POs/PSOs
CO1	PO2/PSO4
CO2	PO4/PSO1
CO3	PO5/PSO4
CO4	PO5,PO7/PSO1
CO5	PO2,PO8/PSO4
CO6	PO3,PO10/PSO2
CO7	PO5,PO9/PSO1

	PO1	PO2	PO3	PO4	PO5	…….	PO12	**PSO1**	**PSO2**	**PSO3**	**PSO4**
BCSG0001_**CO1**		3									3
BCSG0001_**CO2**				3				3			
BCSG0001_**CO3**					3						3
BCSG0001_**CO4**					2			2			
BCSG0001-**CO5**		2									2
BCSG0001-**CO6**			1						1		
BCSG0001-**CO7**					1			1			
Average PO Attainment		**2.5**	**1**	**3**	**2**			**2**	**1**		**2.7**