

Program Outcomes

- POs are statements about the knowledge, skills and attitudes (attributes) the graduate of a formal engineering program should have.
- Profile of the Graduates reached through POs - Target
- POs are defined by Accreditation Agencies of the country (NBA in India)
- Defining these is the Starting Point

Program Outcomes (POs)

- 1. Engineering Knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of **complex engineering** problems.
- 2. Problem Analysis:** Identify, formulate, review research literature, and analyze **complex engineering** problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- 3. 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
- 4. 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.

Conti...

- 5. Modern Tool Usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling **to complex engineering** activities with an understanding of the limitations.
- 6. 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.
- 7. 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.
- 8. Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

- 9. Individual and Team Work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- 10. 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.
- 11. 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.
- 12. Life-long Learning:** Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.

Attainment of P01 to P05

PO 1-5

- PO1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and engineering specialization to the solution of **complex engineering problems**.
- PO2. **Problem analysis:** Identify, formulate, review research literature, and analyze **complex engineering problems** reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- PO 3 **Design/development of solutions:** Design solutions for **complex engineering problems** and design system components, processes to meet the specifications with consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **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.
- **Modern Tool Usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to **complex engineering activities** with an understanding of the limitations.

Why place these POs in one Basket?

- The Statements show that one part *{That of (**complex**) Engineering Problem CEP}* is common to all.



- *Though, individually each PO deals with a different aspect of CEP. Recognizing this commonality makes the discussion easier.*

Complex Engineering Problem-CEP

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1. Problems not the kind generally encountered at the ends of text book chapters. (These often test if the contents of the chapter have been understood)
2. These are problems that have not been completely framed and leave at least a few* choices for the student to make.
3. Problems may require use of laws of physics, or bring in some mathematical tools in which the problem can be framed.

Course Outcomes (COs)

- “Statements of observable student actions that serve as evidence of the **K**nowledge, **S**kills and **A**ttitudes acquired in a course”.
- Each course is designed to meet (about 6) Course Outcomes
- The Course Outcomes are stated in such a way that they can be actually measured.
- POs are attained through program specific Core Courses

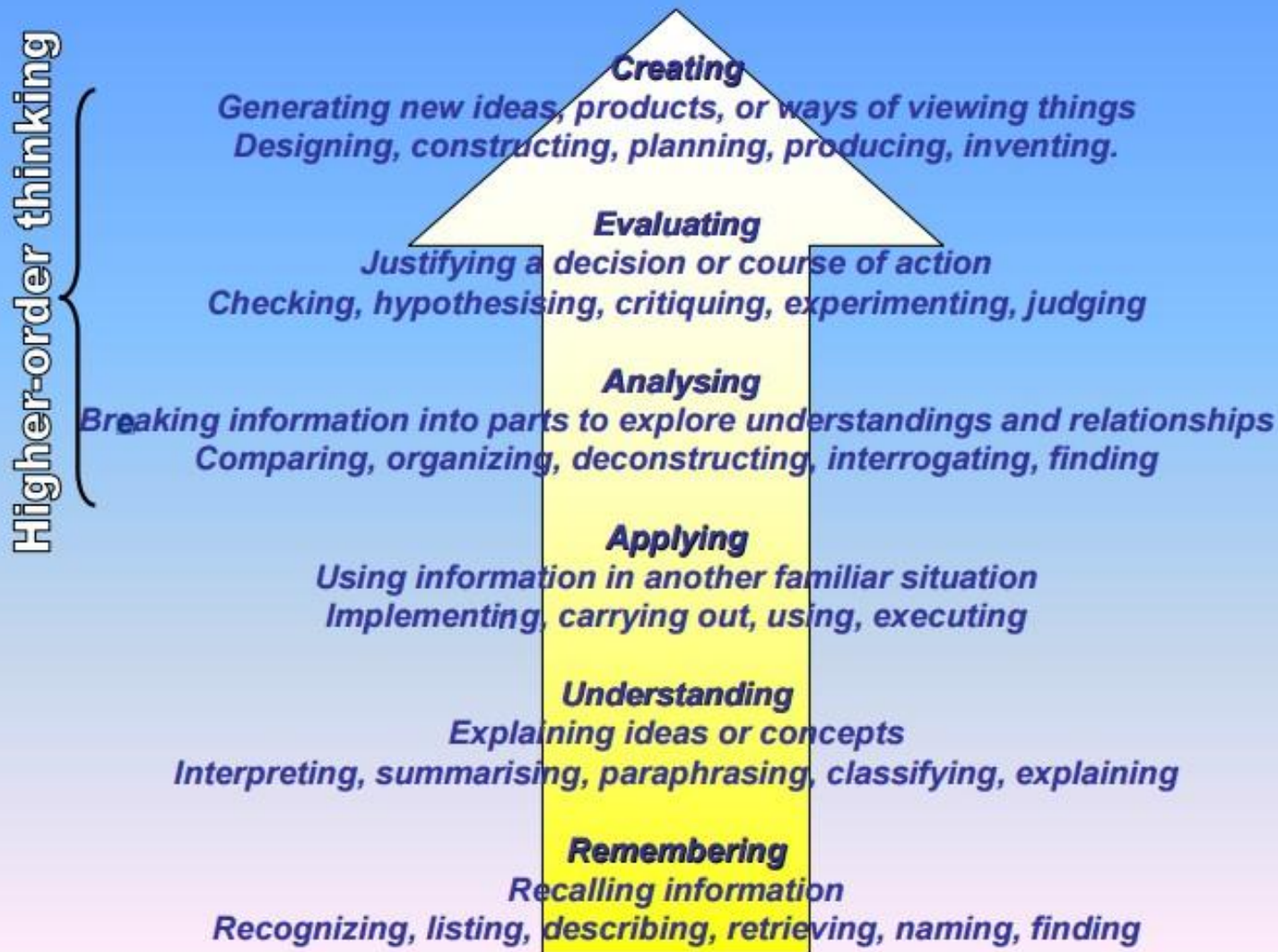
Course Outcomes

Engineering Physics (Not a Good Example)

- CO1:** Understand the knowledge of basic quantum mechanics, to set up one-dimensional Schrodinger's wave equations and its application to few physical problems.
- CO2:** Understand the fundamental aspects of crystallography, able to recognize various planes in a crystal and have knowledge of structure determination using x-rays.
- CO3:** Understand the role of free electrons in determining the properties of metals, the concept of Fermi energy, and the domain formation in ferromagnetic materials.
- CO4:** Understand the basic laser physics, working of lasers, holography and principle of propagation of light in optical fibers.
- CO5:** Understand the theory of free, damped and forced vibrations of a particle and also the concept of resonance and its applications in ESR & NMR.

What level of BLOOM,s Taxonomy you want your students to achieve?

BLOOM'S REVISED TAXONOMY



Retrieved from: <http://www.kurwongbss.qld.edu.au/thinking/Bloom/blooms.htm>

Comparison

Bloom's Levels	Program Outcomes	
Remember (K1)		
Understand (K2)		
Apply (K3)	Apply Knowledge	Engineering Knowledge: <i>Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems</i>
Analyze (K4)	Problem Analysis	Problem Analysis: <i>Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences</i>
Evaluate (K5)	Design/Development of Solutions	Design/Development of Solutions: <i>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.</i>

Structure of Course Outcomes:

Course Outcome statement may be broken down into two main components:

- **An action word** that identifies the performance to be demonstrated;
- **Learning statement** that specifies what learning will be demonstrated in the performance;

Examples of good action words to include in course outcome statements:

- Compile, identify, create, plan, revise, analyze, design, select, utilize, apply, demonstrate, prepare, use, compute, discuss, predict, assess, compare, rate, critique, outline, or evaluate

Course Title: Strength of Materials

Course Outcomes: Example

At the end of the course, student is able to:

Action Verb

1. **Apply** laws of physics (eg..Hook's law, etc.,) to compute different types of response (stress and deformation) in the given materials. (PO 1)
2. **Analyse** structural elements for different force systems to compute design parameters (BM and SF) (PO2)
3. **Design** compression elements using engineering principles to resist any given loads. (PO3)
4. **Conduct** experiments to validate physical behaviour of materials/components.(PO4)
5. **Prepare** laboratory reports on interpretation of experimental results (P10)

Learning Statement

Assessment:

It is one or more processes that identify, collect, and prepare data to evaluate the achievement of Course Outcomes and Program Outcomes

PO/Course Assessment Tool Types	PO/ Course Assessment Tool	1	2	3	4	5	6	7	8	9	10	11	12
Direct Tools	Tests	√	√	√	√								
	Assignments	√	√	√	√		√		√			√	√
	Lab/Seminars/Industrial Training/ Projects (Rubrics)	√	√	√	√	√		√	√	√	√	√	√
Indirect Tools	Course End Survey	√	√	√	√	√	√	√	√	√	√	√	√
	Exit Survey	√	√	√	√	√	√	√	√	√	√	√	√
	Faculty Survey	√	√	√	√	√	√	√	√	√	√	√	√
	Alumni Survey		√			√					√		
	Programme Statistics	√	√					√		√		√	√

CO-PO Relationship

- Each CO can be identified to address a subset of POs
- Based on the number of COs and the sessions dedicated to them it is possible to identify the strength of mapping (1, 2 or 3) to POs
- Based on these strengths of selected POs a CO matrix can be established.

CO-PO Relationship

COURSE	COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Problem solving and programming	CO1	3	3	-	-	-	-	-	-	-	-	-	-
	CO2	3	3	-	-	-	-	-	-	-	-	-	-
Data Structures	CO1	3	2	-	3	-	3	3	-	-	-	-	-
	CO2	3	3	-	-	-	3	3	-	-	3	-	-
	CO3	-	-	3	-	-	-	3	3	-	3	-	-
Operating systems	CO1	3	3	-	-	-	-	-	-	-	-	-	-
	CO2	3	3	-	-	-	-	-	-	-	-	-	-
	CO3	3	3	-	-	-	-	-	-	-	-	-	-
	CO4	3	3	2	-	-	3	-	-	-	-	-	-
Unix	CO1	3	-	-	-	-	-	-	-	-	-	-	-
	CO2	-	3	3	-	-	-	-	-	-	-	-	-
	CO3	-	3	3	-	-	-	-	-	-	-	-	-
	CO4	-	-	-	-	-	-	-	3	3	-	-	-
DBMS	CO1	3	3	-	-	-	-	-	-	-	-	-	-
	CO2	3	3	-	-	-	-	-	-	-	-	-	-
	CO3	3	3	3	-	-	-	-	3	-	-	-	-
Digital Electronics	CO1	3	3	-	1	-	-	-	-	-	-	-	-
	CO2	3	3	-	-	2	2	-	-	-	-	-	-
	CO3	3	3	-	-	-	-	-	-	-	-	-	-
	CO4	2	3	2	-	-	3	-	-	-	-	-	-
Computer organization	CO1	3	-	-	-	-	-	3	-	-	-	-	1
	CO2	-	3	-	-	-	-	3	-	-	-	-	3
	CO3	-	-	-	-	-	-	3	-	-	-	-	2
	CO4	-	-	3	-	2	-	2	3	-	-	-	-
Minor Project Phase I	CO1	-	-	-	-	-	-	3	-	3	-	-	-
	CO2	3	3	3	3	-	-	-	3	3	-	-	3
	CO3	-	-	-	-	3	-	-	-	3	-	-	-
	CO4	-	-	-	-	-	-	-	-	3	3	2	-

Alignment of Assessment to COs and
hence to POs...Example.

Topic: STACK

Stack is a linear data structure in which data can be inserted(PUSH) and can be deleted(POP) on the basis of First in First out.

When we are discussing about stack, students must be made familiar about following topics

1. Abstract data type
2. Domain
3. Operations
4. Axioms

Contd.,

- To introduce complexity, students can be asked to write a program to visualise the operations of stack.
- Students can be asked to list out various real time applications of stack
- Student can be asked to list out differences between array and stack

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

Example Situation 1:

CO3: Able to understand stack and its operations, applications.

Assessment for CO3: (Question in Tests)

Briefly explain the various methods of creating stack

- *Does this CO reflects the intended measurement from PO1?*
- *Does the assessment correlates well with the CO?*

Mapping: CO3- PO1.

- In this case, **CO does not** reflect the intention of measuring application of either science, maths or engineering principles. It can measure only **remembrance** in this topic.
- Further, the **assessment**, does not test the requirement of application of engineering principles used in creating stack as per PO1. Hence, the correlation between CO-PO is weak.

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

Example Situation 2:

CO3: Able to apply pointers to create stack.

Assessment for CO3: (Question in Tests)

Specific application is given and student is asked to create stack for it.

- ***Is CO reflects the intended measurement from PO2?***
- ***Does the assessment correlates well with the CO?***

Mapping: CO3 - PO2

- In this case, the assessment does not test the students ability to identify, formulate and do some research for arriving at a suitable stack for a given situation since many variables of the design have already been identified in the problem and hence the strength of mapping of CO3 for PO2 in the above example can not be considered good. At best it can map well for PO1 as it involves application of engineering fundamentals.

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.

Example Situation 3:

CO3: Able to analyse characteristics of stack used in different applications.

Assessment: Study about stacks used in different operating systems and how they are used.

- *Is CO reflects the intended measurement from PO2, PO3 ?*
- *Does the assessment correlates well with the CO?*

Remarks:
CO3 –PO2, PO3

In this case, students are expected to identify and formulate various operating systems and how the stack in their architecture work.

The assessment correlates well with the CO and hence maps strongly for PO2 and PO3.

COs (Summary)

Example Situation 1:

- **Able to understand stack for different applications.**

Example Situation 2:

- **Able to apply different methods to design a stack.**

Example Situation 3:

- **Able to analyse characteristics of stacks used in different operating systems**
- ***(Choice of writing an appropriate CO and choosing the right assessment to map corresponding PO remains with the course instructor)***

Example of CO-attainment for a course

Course Name :	Data structures
Course Code :	CSE201
Session of Course	Batch-2013, Sep-Dec'2013
L : T : P -	
Semester :	I
Credits :	4
Batch :	2013
Faculty :	R V Ranganath

	Grading Scale	
50%	SCORE : < 50%	1
	50% - < 70%	2
70%	> =70%	3

75% Percent of Students should score > 70% of marks for Attainment

CO	CO Description	T1	T2	A1	A2		LAB
CO1	Identify stacks that are used in unix, windows etc operating systems. [K 2](P01)	Q1.a, b, Q2 a,b		-	-	-	-
CO2	Compare behaviour of and design of these stack in different applications(P02, P03)			A1	-	-	-
CO3	<u>Analyse different stacks and design new stack with new characteristics of applications.</u> { P02, P03}		Q1, Q2	-	A2 -	-	
CO4	Prepare a comprehensive report on new knowledge in any one of the topic related to c data structures [K5] (P08, P09)			-		-	lab-

Example of CO-attainment for a course

	Program Outcomes	PO1																						
	Max Marks	10	10	10	10				40					5				5						
	Course Outcomes	CO1							TOTAL OBTAINED	TOTAL MARKS ATTEMPTED	PERCENT, %	SCORES OR GRADING BASED ON SCALE OF 3	Target > =70%	CO2				TOTAL OBTAINED	TOTAL MARKS ATTEMPTED	PERCENT, %	SCORES OR GRADING BASED ON SCALE OF 3	Target > =70%		
USN	Name	T1-Q1.a	T1-Q1.b	T1-Q2.a	T1-Q2.b									Assignment-1										
1BM13CCT01	ANUSHA S. B.	8	7	8				23	30	77%	3	Y	3				3	5	60.00%	2				
1BM13CCT02	BHAVISH DAS (discontinued after I sem)	5	6	12	8			31	40	78%	3	Y	4				4	5	80.00%	3	Y			
1BM13CCT03	DEEPA M NAIK			8	7			15	20	75%	3	Y	5				5	5	100.00 %	3	Y			
1BM13CCT04	GOLLAPALLI NIRANJAN REDDY			9	7			16	20	80%	3	Y	4				4	5	80.00%	3	Y			
1BM13CCT05	JHANSI RAMA PRIYA			9	9			18	20	90%	3	Y	4				4	5	80.00%	3	Y			
1BM13CCT06	NIRANJANA N	7	6	9	3			25	40	63%	2		4				4	5	80.00%	3	Y			
1BM13CCT07	PAVAN J.			9	9			18	20	90%	3	Y	4				4	5	80.00%	3	Y			
1BM13CCT08	PRAMOD B. V.			10	9			19	20	95%	3	Y	3				3	5	60.00%	2				
1BM13CCT09	PRAVEEN GONGACHI	4	7					11	20	55%	2		4				4	5	80.00%	3	Y			
1BM13CCT10	RAJESH A.			9	7			16	20	80%	3	Y	4				4	5	80.00%	3	Y			
1BM13CCT11	SALMAN PASHA	7	7	6				20	30	67%	2		4				4	5	80.00%	3	Y			
1BM13CCT12	SHARATH R.	7	7	8	8			30	40	75%	3	Y	3				3	5	60.00%	2				
1BM13CCT13	SHRINATH			9	8			17	20	85%	3	Y	4				4	5	80.00%	3	Y			
1BM13CCT14	SOWMYA H. V.			9	7			16	20	80%	3	Y	4				4	5	80.00%	3	Y			
1BM13CCT15	SUNIL KUMAR B. M.		2	7	7			16	30	53%	2		3				3	5	60.00%	2				
1BM13CCT16	VIKAS PRABHAKAR ATTIGERI			9	8			17	20	85%	3	Y	4				4	5	80.00%	3	Y			
1BM13CCT17	VIKRAM C GATEGAR			7	8			15	20	75%	3	Y	4				4	5	80.00%	3	Y			
1BM13CCT18	VILASKUMAR S. LONIMATH			8	8			16	20	80%	3	Y	5				5	5	100.00 %	3	Y			
											SUM	50	14								SUM	50	14	
											AVG GRADING	2.78									AVG GRADING	2.78		

Example of CO-attainment for a course

10	10	10	10				40				
CO3							TOTAL OBTAINED	TOTAL MARKS ATTEMPTED	PERCENT, %	SCORES OR GRADING BASED ON SCALE OF 3	Target > =70%
T1-Q3.a	T1-Q3.b	T2-Q2.a	T2-Q2.b								
8	7						15	20	75.00%	3	Y
		5	12				17	20	85.00%	3	Y
6	8	8	5				27	40	67.50%	2	
	9						9	10	90.00%	3	Y
9	9						18	20	90.00%	3	Y
-	-	-	-				0	40	0.00%	1	
-	-	-	-				0	40	0.00%	1	
8	8						16	20	80.00%	3	Y
8	8						16	20	80.00%	3	Y
6	8						14	20	70.00%	3	Y
		7	7				14	20	70.00%	3	Y
-	-	-	-				0	40	0.00%	1	
8	9	8	7				32	40	80.00%	3	Y
9	9						18	20	90.00%	3	Y
5	6						11	20	55.00%	2	
9	8	8	8				33	40	82.50%	3	Y
7	8	8					23	30	76.67%	3	Y
8	9						17	20	85.00%	3	Y
									SUM	46	13
									AVG GRADING	2.56	

Example of CO-attainment for a course

COURSE OUTCOMES	GRADING AVG ON SCALE OF 3	DISTRIBUTION %		
		3	2	1
CO1	2.78	14 / 18 = 77.77%	4 / 18 = 22.22%	0 / 18 = 0%
CO2	2.78	14 / 18 = 77.77%	4 / 18 = 22.22%	0 / 18 = 0%
CO3	2.56	13 / 18 = 72.22%	2 / 18 = 11.11%	3 / 18 = 16.66%
CO4	2.56	10 / 18 = 55.55%	8 / 18 = 44.44%	0 / 18 = 0%

TARGET is > = More than 75% of Students Must Achieve 70% Marks.

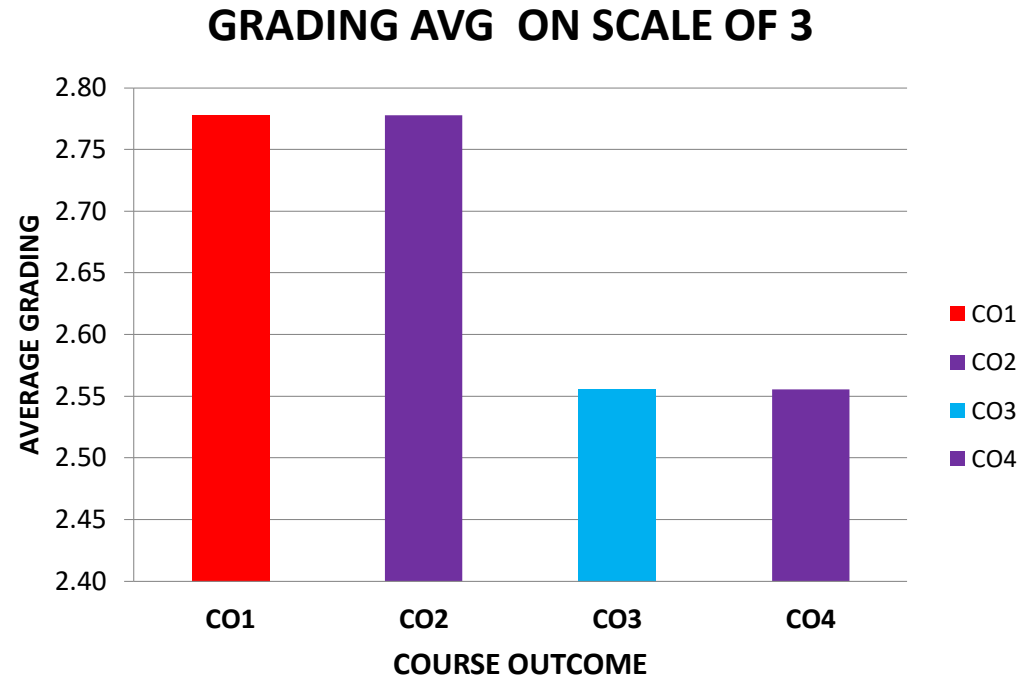
PO AND CO SCALE	3	Strongly Related
	2	Moderate
	1	Low

NUMBER OF STUDENTS SCORING > =70%

COURSE OUTCOMES	% OF STUDENTS ACHIEVED CO	CO RESULT
CO1	77.78%	Y
CO2	77.78%	Y
CO3	72.22%	N
CO4	55.56%	N

Example of CO-attainment for a course

COURSE OUTCOMES	GRADING AVG ON SCALE OF 3	DISTRIBUTION %		
		3	2	1
CO1	2.78	77.78%	22.22%	0.00%
CO2	2.78	77.78%	22.22%	0.00%
CO3	2.56	72.22%	11.11%	16.67%
CO4	2.56	55.56%	44.44%	0.00%



CO Attainment

- The assessments should be in alignment with the COs
- Question paper should be so set to assess all COs
- The average marks obtained in assessments against items for each CO will indicate the CO attainment.
- Instructors can set targets for each CO of his/her course.
- Attainment gaps can therefore be identified.
- Instructor can plan to reduce the attainment gaps or enhance attainment targets.

PO Attainment – Example..

Attainment of Pos:

[illegible]

Course Name	COs	CO Attainment, %	CO Result	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Quantity Surveying and Costing	CO1	95.00%	YES	95%	95%	-	32%	-	-	-	-	-	-	-	-
	CO2	35.00%	NO	-	-	-	-	-	-	-	-	-	-	-	-
	CO3	89.00%	YES	89%	89%	-	-	-	-	-	-	-	-	-	-
	CO4	24.00%	NO	-	-	-	-	-	-	-	-	-	-	-	-
Alternate Building Materials & Technology	CO1	75.00%	YES	75%		-	-	-	-	75%		-	-	-	25%
	CO2	75.00%	YES		75%	-	-	-	-	75%		-	-	-	75%
	CO3	75.00%	YES		-	-	-		-	75%		-	-	-	50%
	CO4	75.00%	YES			75%	-	50%	-	50%	75%	-	-	-	-
Major Project Phase - II	CO1	100.00%	YES	-	-	-	-	-	-	100 %	-	100%	-	-	-
	CO2	100.00%	YES	100%	100%	100%	100%	-	-	-	100%	100%	-	-	100%
	CO3	100.00%	YES	-	-	-	-	100%	-	-	-	100%	-	-	-
	CO4	100.00%	YES	-	-	-	-	-	-	-	-	100%	100 %	67%	-
			PO Attainment	80%	78%	72%	84%	72%	83%	71 %	69%	98%	84%	67%	82%

EXIT SURVEY DATA ANALYSIS

PO No.	PO Description	Exist Survey Questions	Ratings						Total	Weighted Average	Percentage Attainment
			0 (Not At All)	1	2	3	4	5 To a Great Extent			
PO1	An ability to apply the knowledge of mathematics, science, and engineering fundamentals to the solution of Civil Engineering problems.	To what level you are able to apply science and engineering concepts to problem solving	0	0	2	3	14	6	25	3.96	76%
		To what extent you are able to support technical problem solving	0	0	5	4	11	5	25	3.64	
PO2	An ability to identify and analyse Civil Engineering problems for meaningful solutions to form the basis for design of Civil Engineering system components.	To what extent you are able to analyse Civil Engineering problems	0	0	2	5	14	4	25	3.8	76%
PO3	An ability to design solutions for Civil Engineering problems and design system components.	To what extent you are able to design Civil Engineering components	0	1	4	7	10	3	25	3.4	68%
		To what extent you are able to design Civil Engineering systems (such as buildings, structures, roads etc.)	1	1	1	11	7	4	25	3.36	
PO4	An ability to conduct experiments, analyse and interpret data to provide valid conclusions.	To what extent you are able to analysis and interpret data	0	1	1	4	13	6	25	3.88	78%
PO5	An ability to apply appropriate techniques and	To what extent you are able to use state of art tools for	0	0	5	5	11	4	25	3.56	71%

Results of attainment of POs through Semester End Exam (SEE) results,

Sl. no.	Course									marks (%)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1.	Analysis of Structures-II								59%													
2.	Environmental Engineering-I								81%	81%	81%	81%	81%		81%	81%	81%			81%		
3.	Geotechnical Engineering - II								56%													
4.	Highway Engineering								72%	72%	72%	72%	72%		72%		72%			72%		
5.	Hydrology & Water Resources								60%													
6.	Software Applications								75%		75%	75%	75%	75%						75%		75%
7.	Minor Project/Industrial Visit								86%											86%		86%
8.	Design of Steel Structures								56%													
9.	Environmental Engineering-II								70%	70%	70%	70%			70%	70%						
10.	Extensive Survey Project								86%	86%	86%	86%	86%	86%			86%	86%	86%			86%
11.	Pre Stressed Concrete								62%	62%	62%	62%					62%					
12.	Transportation Systems &								68%	68%	68%	68%			68%							

Example Weightages for PO Attainment

PO No .	Method of Assessment	Direct Assessment (CIE)	Direct Assessment (SEE)	Student Exit Survey	Course End Survey	Faculty Survey	PO Attainment, %
	Weightage PO Description	50%	30%	10%	5%	5%	
PO 1	Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.	38%	22%	7%	4%	4%	76%
PO 2	Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.	37%	22%	7%	4%	4%	75%
PO 3	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.	32%	23%	7%	3%	3%	68%
PO 4	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.	39%	23%	7%	4%	3%	77%

PO Attainment

- All POs can be adequately addressed through the selection of core courses and their COs
- Attainable targets can be selected for each of the CO.
- If assessment is in alignment with COs the performance of the students indicates the CO attainment.
- These measurements provide the basis for continuous improvement in the quality of learning.

Continuous Improvement

- Closing the loop at course level, programme level and Institute level ensures quality assurance for stakeholders.
- All attainment analysis is made to provide continuous improvement through either in course delivery, Assessment and curriculum (**Essence of OBE**)