

Institute

VISION



To provide **India and the World, technical manpower of the highest academic excellence** and World class by shaping our youth through holistic and integrated education of the highest quality.

MISSION



To develop Nitte Meenakshi Institute of Technology **through Quality, Innovative and State-of-art educational initiatives** into a center of academic excellence that will turn out youth with well-balanced personality & commitment to rich cultural heritage of India and who will **successfully face the scientific and technological challenges in the fast-evolving global scenario with a high degree of credibility, integrity and ethical standards.**

Department

VISION

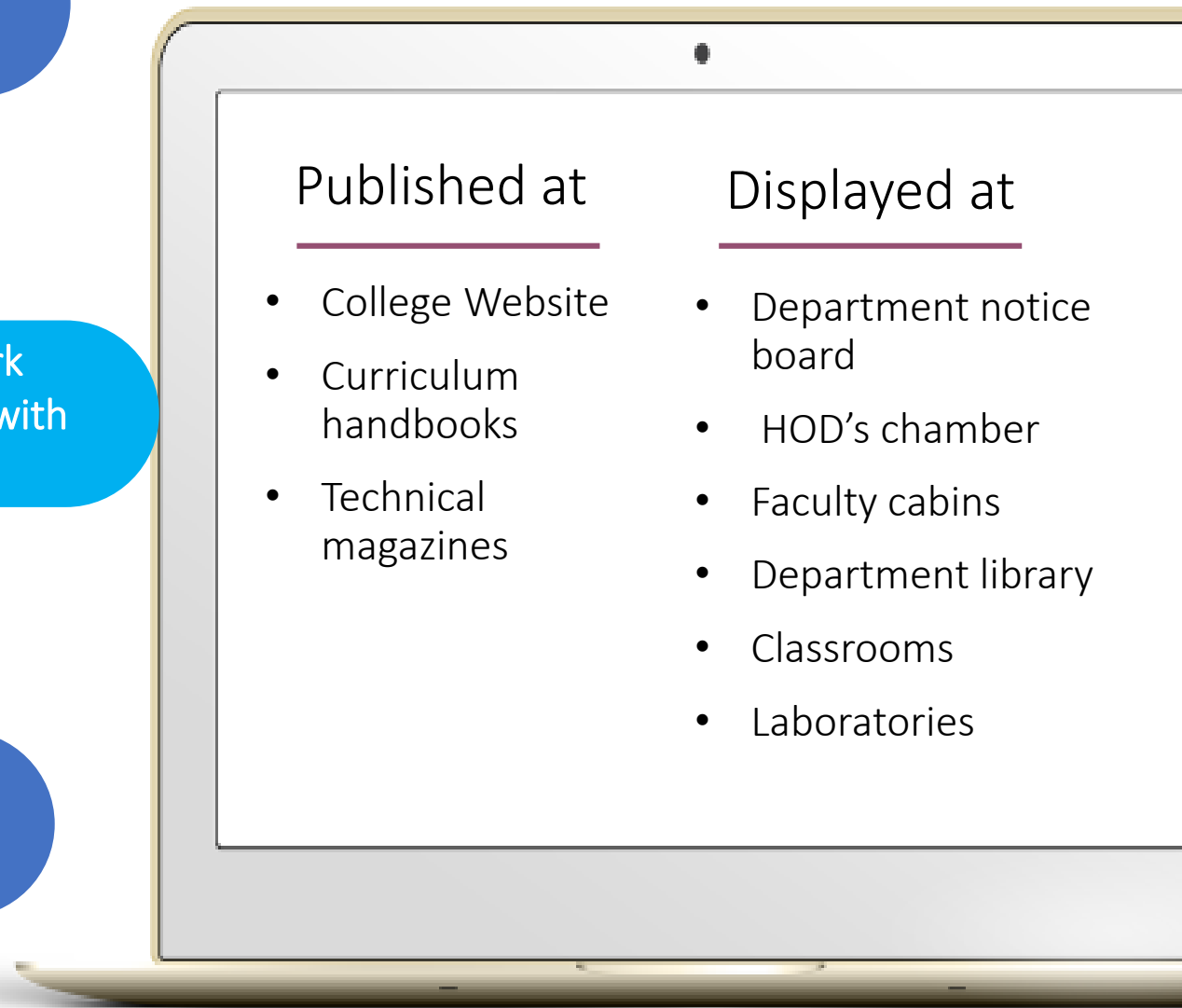
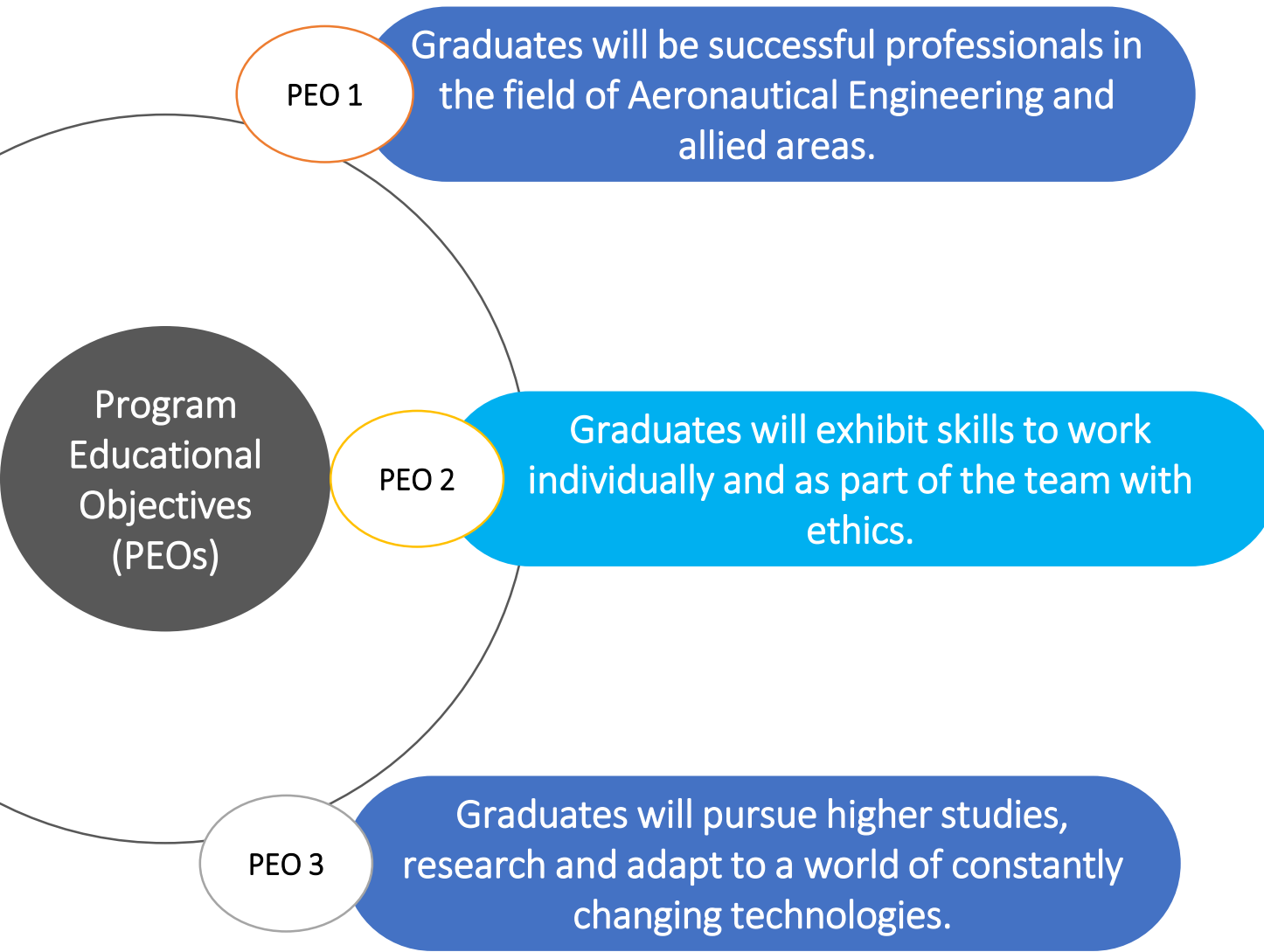


To **develop technically competent Aeronautical Engineers of the highest academic standards to meet the national and global requirements of industry and society.**

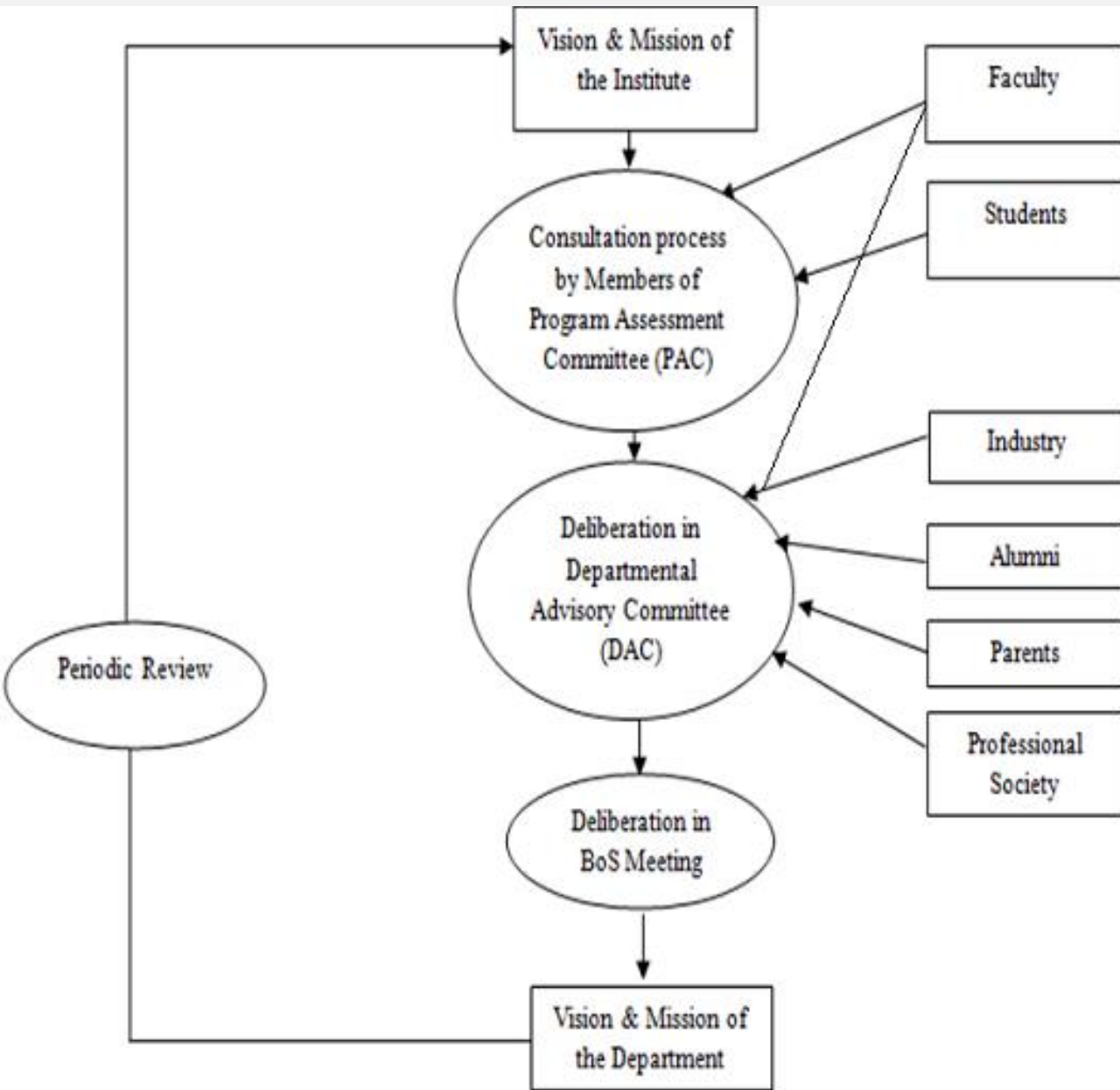
MISSION



- To impart quality education in Aeronautical Engineering **through top-class teaching – learning process**, well-designed curricular & co-curricular activities and state-of-the-art infrastructure.
- To **inculcate ethical values and develop innovative ideas to meet ever changing global requirements through industry-institute interaction and interdisciplinary research.**





Process involved in defining Vision and Mission of the Department

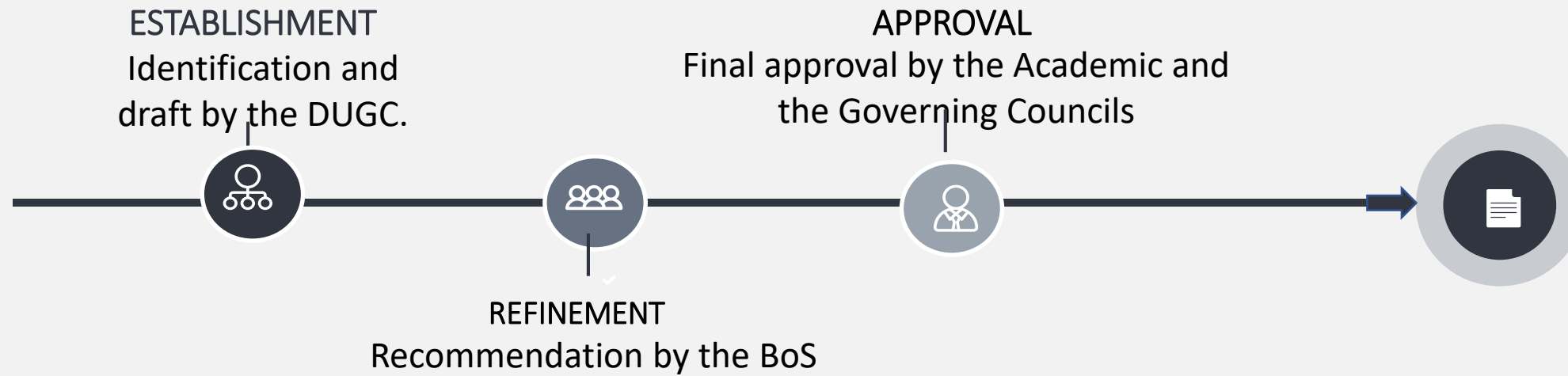


Dissemination of Vision, Mission and PEOs among stakeholders



Mission Statements 	M1 Teaching- learning process with well- designed curriculum	M2 Co-curricular activities	M3 State-of-the-art infrastructure	M4 Inter-disciplinary Research	M5 Industry Institute Interaction
PEO Statements 					
PEO 1: Graduates will be successful professionals in the field of Aeronautical Engineering and allied areas.	3	2	2	2	2
PEO 2: Graduates will exhibit skills to work individually and as part of the team, in Aeronautical Engineering & related domains of engineering, in an ethical and efficient manner.	2	3	2	2	2
PEO 3: Graduates will pursue higher studies, research and adapt to a world of constantly changing technologies.	3	1	2	3	2
* 3- substantially correlated, 2- moderately correlated, 1- slightly correlated					

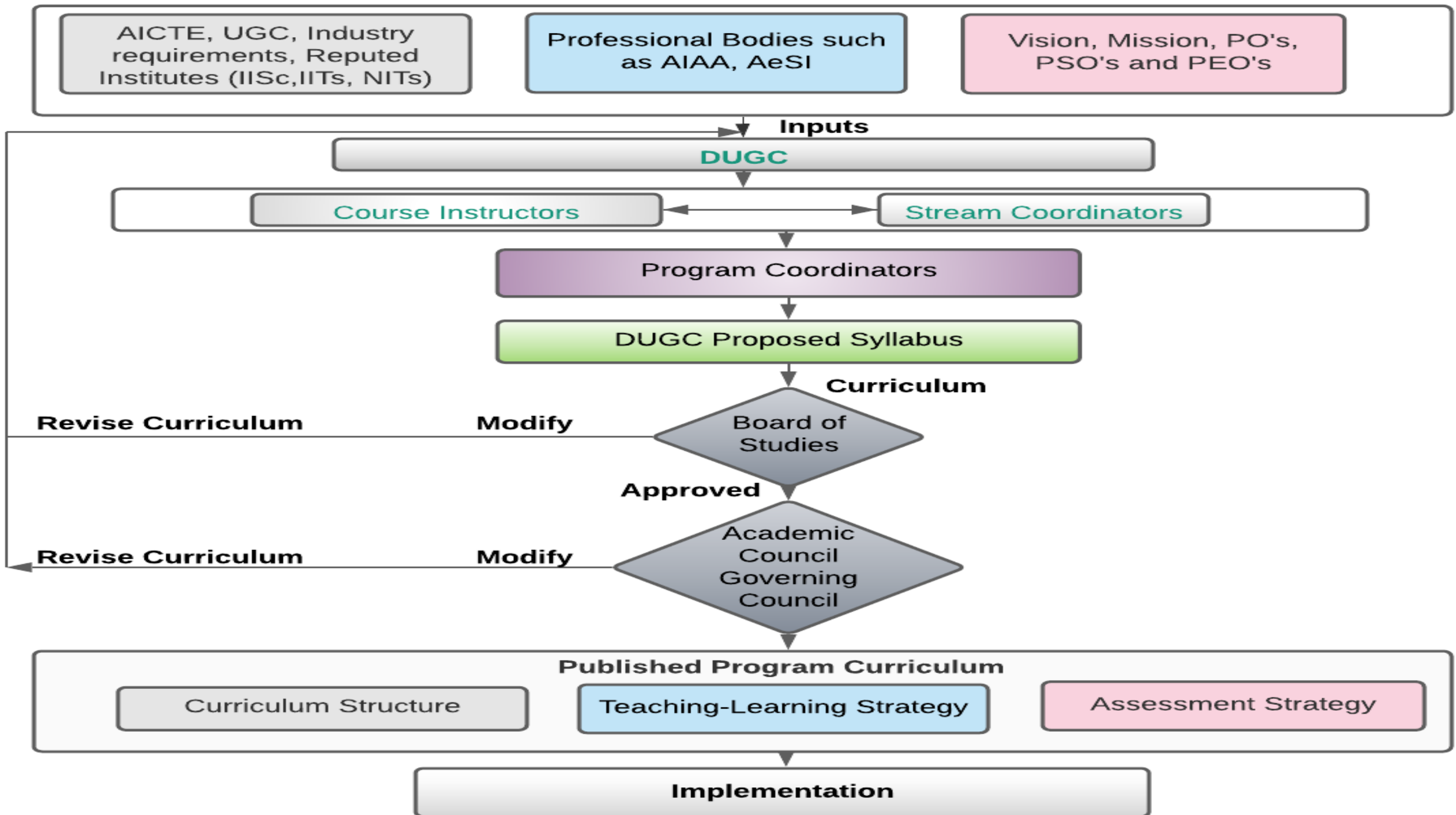
PROCESS OF DESIGNING PROGRAMME CURRICULUM



Course Component	Curriculum content (% of total no. of credits of the program)	Total no. of credits
Basic Sciences	13.5	27
Engineering Sciences	16.5	33
Humanities	4	8
Program Core	46.5	93
Program Elective	8	16
Open Elective	3	6
Projects	7.5	15
Internship/Seminar	1	2
Total	100	200

Curriculum content (% of total number of credits of the program)

Program Curriculum and teaching-learning Process



Program Curriculum and teaching-learning Process

Adherence to Academic Calendar

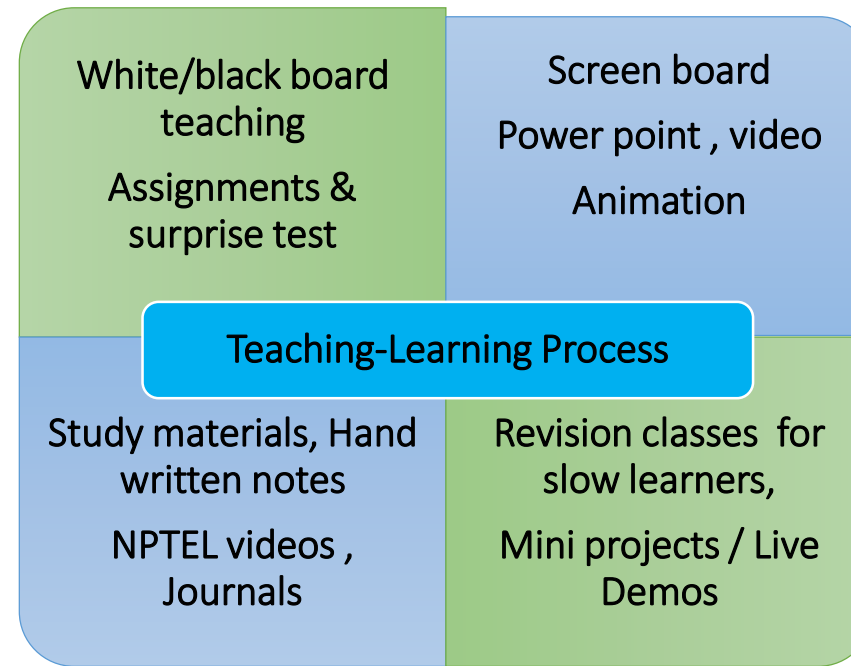
- The academic Calendar published at the beginning of every year is strictly followed by all the departments of the Institute.

Pedagogical initiatives

- Pedagogy training to the faculty members every year during semester break .
- Faculty members are deputed to FDPs, Seminars, Conferences, Technical paper presentations etc.

Teaching Methods

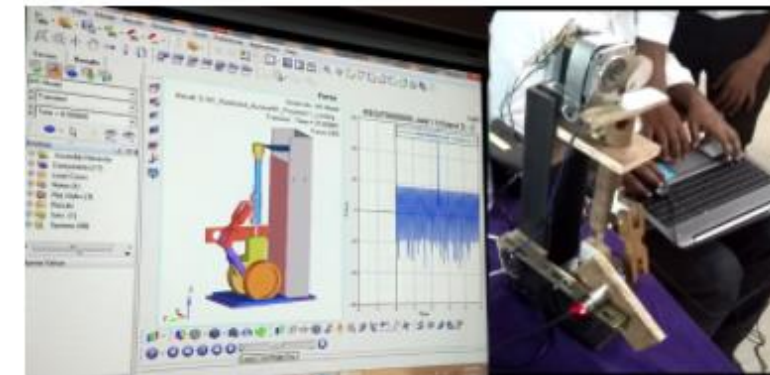
- Video-Based Learning
- Hands-on Training
- Demonstration Based Learning
- Tutorial
- Industrial visits etc.



Practical Session: Participants making the Chuck Glider based on Design



Team of Aeronautical students at IIT-K



Software Simulations and Prototype testing of landing Gear

Support to Fast Learners

- Class toppers will be provided with certificate and cash prize
- Encourage to take up competitive exams like GATE,GRE etc.
- Encouraged to participate in various extra curricular and co-curricular activities
- Encourage to publish papers attend conference, seminars and take up innovative projects and apply for funding.

Support to Slow Learners

- Well-defined process of monitoring, guiding and assisting slow learners.
- Additional exam oriented coaching & study material.
- One to one interaction with students
- PTA letters: parents are kept informed about the CIE marks and the attendance by post and attendance will be updated on regular basis.



Ms. S Spurthy is awarded Gold Medal for securing the highest CGPA of 9.74 in her Bachelor's Degree during 9th Graduation ceremony held on 10 August 2019




Extra classes for slow learners

PROCESS INVOLVED IN MSE QP SETTING

- In accordance with academic calendar,
- Department conducts meetings with stream coordinators and
- Course instructors for MSE Question paper preparations.



 NITTE MEENAKSHI INSTITUTE OF TECHNOLOGY (An Autonomous Institution under Visvesvaraya Technological University, Belgaum) Yelahanka, Bangalore Department of Aeronautical Engineering			
MID SEMESTER EXAM - I			
Semester: 3		Duration: 01 Hour	
Subject and Code: Elements of Aeronautics (14AE32)		Max Marks: 30	
Answer any two full questions		Date:15/09/2015	
Q No	Questions	Marks	COs/BL
1.	a) With a neat sketch of fixed wing aircraft explain briefly different major components and its types	6	CO1/2
	b) Explain in detail about Advantage and Disadvantage of Unconventional Configuration over conventional Configuration.	5	CO1/2
	c) Write short notes on Aircraft Axis System	2	CO1/2
	d) Differentiate Aircraft and Airplane	2	CO1/2
2.	a) What is aircraft? Explain the classification of aircraft with the help of flow chart	8	CO1/2
	b) Define the principles behind the generation of lift in case of airfoil? Describe with neat sketches.	4	CO4/2
	c) Difference Between Airspeed And Ground Speed With Sketch	3	CO4/2
3.	a) Explain with help of graphs the variation of Temperature and Pressure with Altitude considering isothermal and gradient layer.	6	CO4/2
	b) Explain in details about Properties of Atmosphere	6	CO4/2
	c) Define Bernoulli's theorem with Example.	3	CO4/2

MSE Question Paper

PROCESS INVOLVED IN SEE QP SETTING

- Chairman and members of the Board of Examiners (BoE) identify a panel of subject experts (external) and one internal faculty, per subject for SEE question paper.
- Each question/component is mapped to the respective Course outcomes and blooms level, as below:



13AE32 USN

III SEMESTER END EXAMINATION (2014 – 2015)
Aeronautical Engineering
ELEMENTS OF AERONAUTICS(13AE32)

Time:3Hrs Max. Marks: 100

Instructions: 1. Answer one full question from each unit.
 2. Any missing Data can be suitably assumed.

		Marks	CO:BL
UNIT-I			
1.	a. Write a note on history of aviation.	06 Marks	1:2
	b. List the Indian major R & D organization	06 Marks	1:1
	c. What are the types of aircraft?	08 Marks	1:1
2.	a. Explain with neat sketch the basic component of civil aircraft. Indicate clearly its axis system & control surfaces.	10 Marks	1:2
	b. What are the software packages used for CAD, CAM & CAE? What is the importance of it in the aerospace industry? Explain it in brief.	10 Marks	1:2
UNIT-II			
3.	a. Explain with neat sketch pump driven vacuum system.	10 Marks	2:2
	b. Explain anti-icing / De-icing system.	10 Marks	2:2
4.	a. Explain with neat sketch components of hydraulic systems.	10 Marks	2:2
	b. Explain with neat sketch, gravity feed fuel system.	10 Marks	2:2
UNIT-III			
5.	a. Explain with neat sketch Fly-by wire system.	10 Marks	2:2
	b. Explain Auto-pilot system.	10 Marks	2:2
6.	a. What is meant by Avionics? Explain briefly ADF, DME.	06 Marks	2:2
	b. What are the six basic flight instruments used in an aircraft?	06 Marks	2:2
	c. What is meant by navigation? Explain any two methods of navigation.	08 Marks	2:2
UNIT-IV			
7.	a. Calculate the standard atmosphere values of temperature(T) Pressure(P) & Density (ρ) at Geopotential altitude of 16km. (assume at sea level: $P_s=1.013 \times 10^5 \text{N/m}^2$, $\rho_s=1.23 \text{kg/m}^3$, $T_s=288.16 \text{K}$)	14 Marks	3:3
	b. With neat sketch explain airfoil nomenclature.	06 Marks	3:2
8.	a. What are the types of Drag?	06 Marks	3:1
	b. Explain NACA 23012 airfoil.	06 Marks	3:3
	c. Discuss the pressure distribution on an airfoil? Sketch the pressure distribution on an airfoil at various angles of attack.	08 Marks	3:2
UNIT-V			
9.	a. Explain: i) stalling (ii) Gliding	06 Marks	4:2
	b. Explain longitudinal stability & how is it controlled?	06 Marks	4:2
	c. An aircraft is flying at an altitude of 15km where the temperature is -57°C . The speed of the airplane corresponds to mach number of 1.6. Calculate i) speed of the aircraft ii) Mach angle	08 Marks	4:3
	Assume for air, $\gamma=1.4$, $R=287 \text{J/kg.K}$		
10.	a. Explain the effect of altitude on power required.	06 Marks	4:2
	b. What is meant by maneuverability? Explain inverted maneuverability.	06 Marks	4:2
	c. Name the different flaps used in an aircraft? Compare it with C_L vs α curve.	08 Marks	4:2

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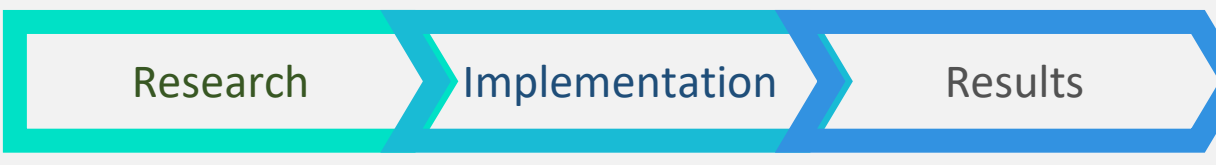
possession of any kind of written material, mobile/ electronics gadgets & scribbling on QP, amounts to Malpractice

SEE Question Paper

Process Involved			
Phase I	Literature Survey	Problem definition	Viva-voce
Phase II	Methodology	Work progress	Viva-voce
Phase III	Experiment conduction/Analysis	Data collection/Design/Fabrication work etc.	Viva-voce
Phase IV	Results, Discussions, & Conclusions	Future Scope of work & Final Report	Viva-voce

Quality of Student Projects

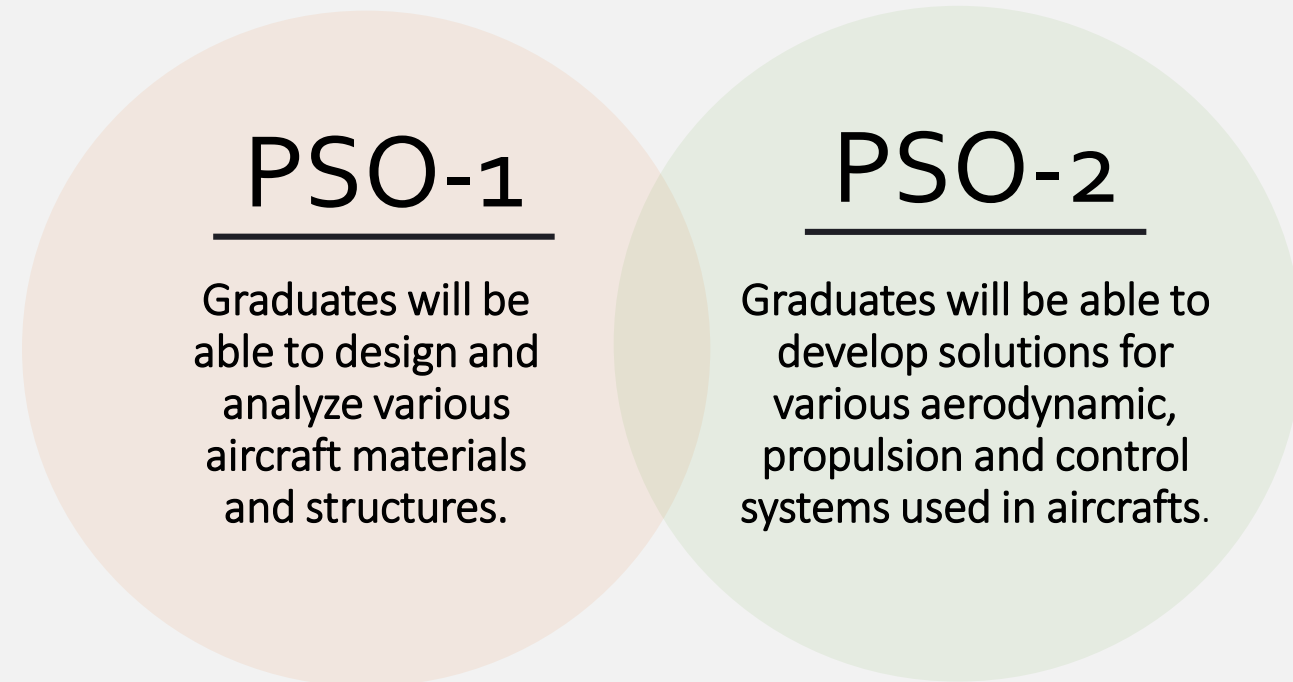
- The final year students have to carry out project work. They carry out projects under various areas like, propulsion, CFD, structures, manufacturing in reputed institutes/industries/CoE, such as Tata Advanced Materials Limited, STS Tite-flex Aerospace Pvt.Ltd, ISTRAC, GTRE, HAL etc.
- The performance of the students will be evaluated through presentation using rubrics and viva voce.
- Department organizes national level project exhibition every year each project will be evaluated by top industry and academic representative and best project award will be awarded.



Program Outcomes

PO-1	Engineering knowledge
PO-2	Problem analysis
PO-3	Design/development of solutions
PO-4	Conduct investigations of complex problems
PO-5	Modern tool usage
PO-06	The engineer and society
PO-07	Environment and sustainability
PO-08	Ethics
PO-09	Individual and team work
PO-10	Communication
PO-11	Project management and finance
PO-12	Life-long learning

Program Specific Outcomes



Sample of Course Outcome

CO's	Course outcome of Aircraft Structures - 1	BL
CO - 1	<u>Outline the types of loads</u> experienced by aircraft structure and materials used for aircraft structures.	L2
CO - 2	<u>Apply different methodologies</u> to analyze statically determinate and indeterminate structures under various loading conditions	L3
CO - 3	<u>Develop different methodologies</u> available to analyze the aircraft structures under different loading conditions	L3
CO - 4	<u>Solve aircraft structural problems</u> by applying the concepts of theory of classical mechanics and energy methods	L3

Mapping COs with POs & PSOs

➤ The Correlation levels (1, 2 and 3) for COs to POs will be decided depending upon the attainment of statements of **COs and POs, delivery methods and assessment methods.**

* **Low-1/moderate-2/high-3**

PO & PSO	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2
CO's														
CO-1	3								1	2			3	
CO-2	3	2	3						1	2			3	
CO-3	3	2	3						1	2			3	
CO-4	3	2	3						1	2			3	
14AE42	3	2	3						1	2			3	
Time Spent	35.00	15.00	35.00	0.00	0.00	0.00	0.00	0.00	10.00	15.00	0.00	0.00	35.00	0.00
% Time Spent	58.3	25.00	58.3	0.00	0.00	0.00	0.00	0.00	16.67	25.00	0.00	0.00	58.3	0.00
Correlation Level	3	2	3	-	-	-	-	-	1	2	-	-	3	-

Mapping course with POs & PSOs

- The correlation between the course and POs & PSOs are decided depending on the number of hours spent by the student on each POs and PSOs.
- The course coordinator will compute the total number of hours student spend on the course and also for each PO based on curriculum content and delivery & evaluation method.


Similarly COs of all the courses are mapped to their corresponding POs and PSOs to get Program Articulation matrix

Course code	PO & PSO													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO 2
C201	3	2							2	2				1
C209	3	3		2					3			1	3	
C210	3	3	2	2	3	2							2	2
C302	3	2	3						1	2			3	
C303	3	3	3											3
C312	3	2	3						1	2				3
C403	2			2		2	2	2		3	2			
C409	3	3	3	3	3	3	3	3	3	3	2		3	3
C410	3								2	2			3	3

Attainment of Course Outcomes of all courses with respect to set attainment levels Course Outcome target

Initial target set by the institution is 80%.



Course Outcomes	blooms level	multiplying factor	Average	Bloom's Levels	L1	L2	L3	L4	L5	L6
CO-1	L2	0.95	0.9125	Multiplying factor	1	0.95	0.9	0.85	0.8	0.75
CO-2	L3	0.9								
CO-3	L3	0.9								
CO-4	L3	0.9								
CO Target (80%*0.925)			73%							

Attainment of course outcomes through Mid Semester Examination (MSE), Assignment, Surprise Tests and Semester End Examination (SEE).

Tools for CO Assessment	
Mid Semester Exams (MSE)	Continuous Internal Evaluation (CIE)
Surprise tests & Assignments	
Rubrics to evaluate case studies/course projects/Seminars	
Rubrics to evaluate main project	
Semester End Examination	SEE

Attainment of course outcomes through Mid Semester Examination (MSE), Assignment, Surprise Tests and Semester End Examination (SEE).

- Each question/component is mapped to the respective Course outcomes and Bloom's level.
- After the evaluation of MSE, Assignment, Surprise Tests and SEE books, marks scored by the students in each questions and maximum marks for the respective question will be populated in a student management software and maintained in department.
- Multiple questions can map to single CO.
- The Percentage of Attainment for the respective CO will be computed as:

$$\text{Percentage of CO attainment} = \left[\frac{\text{(No of students who scored } \geq 60\% \text{ marks)}}{\text{(Total No. of Students who attempted the Question corresponding to the same CO)}} \right] * 100$$

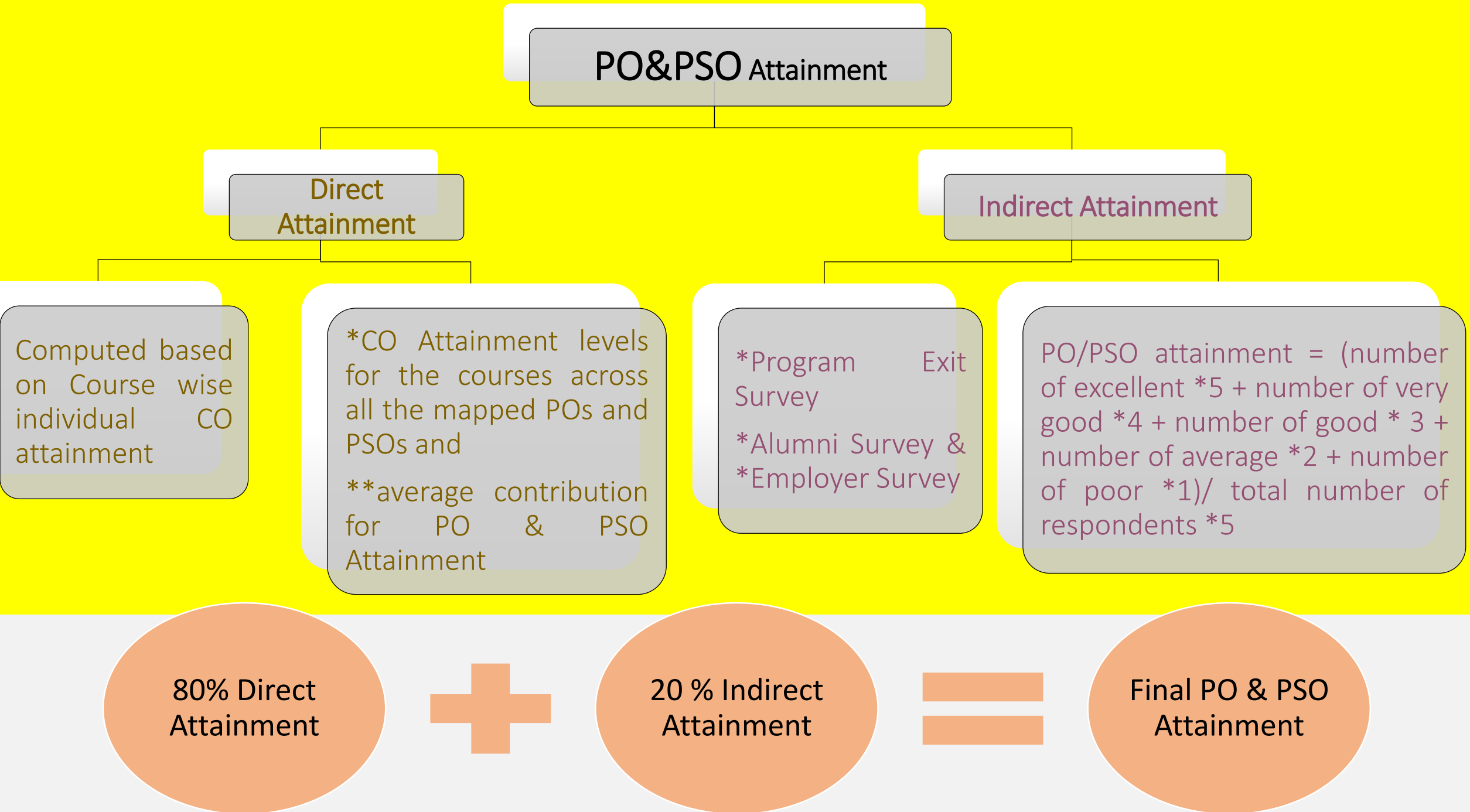
- Same procedure is followed for Surprise test, Assignment and SEE as explained for CO attainment for MSE.

- The final CO attainment is calculated by considering the 50 % CIE component, 50% SEE component for the course.

Final CO attainment due to all components (50% of CIE +50% of SEE)			
Attainment in %			
CO	CIE	SEE	Final Attainment %
CO1	83.82	78.47	81.14
CO2	75.59	69.14	72.36
CO3	75.53	72.45	73.99
CO4	73.40	68.48	70.94

- Final CO attainment for all the courses are calculated as per above mentioned assessment components

Course Name/ Course code	Final CO Attainm ent %	CO target %	Observation	Action taken
AIRCRAFT STRUCTURE 1 /C302	CO1- 81.14	73	The attainment is reached the target level.	<ul style="list-style-type: none"> •Students will be encouraged to know about various loads acting in an aircraft •and behavior of material for better understandings of concepts.
	CO2- 72.335		Students are found difficulty in understand the different methodology to analyse structures for different loading condition.	<p><u>More emphasis on</u></p> <ul style="list-style-type: none"> • MSE and SEE questionnaires •Special attention to the weak students during teaching of statically determinate and indeterminate structures and •Special numerical practices on beam columns under different loading condition
	CO3- 73.99		There is 2% gap between the target and attainment because the lack of understanding the concept of failure theories	<ul style="list-style-type: none"> •Tutorial classes for weak students •Special coaching hours for slow learners
	CO4- 70.94			



Course Outcomes and Program Outcomes

Attainment of program outcomes and program specific outcomes



Initial Level Fixed by the programme	80%
(LEVEL 3) X= Avg *initial level	73%
(LEVEL 2) Y= 80% of X	58%
(LEVEL 1) Z=60% of X	44%

Particulars	CO1	CO2	CO3	CO4	Final CO attainment due to all components Attainment in %			
					CO	CIE	SEE	TOTAL %
MSE	78.58	72.54	68.25	69.51				
Assignment	89.45	75.78	78.45	79.48	CO1	83.82	78.47	81.14
Surprise	83.42	78.46	79.89	71.22	CO2	75.59	69.14	72.37
Total CIE attainment (AVG)	83.82	75.59	75.53	73.40	CO3	75.53	72.45	73.99
TOTAL SEE ATTAINMENT	78.47	69.14	72.45	68.48	CO4	73.40	68.48	70.94

Course Outcome	Target attainment (%)	level	Attainment (%)
CO1	74%	3	81.14
CO2		2	72.37
CO3		3	73.99
CO4		2	70.94

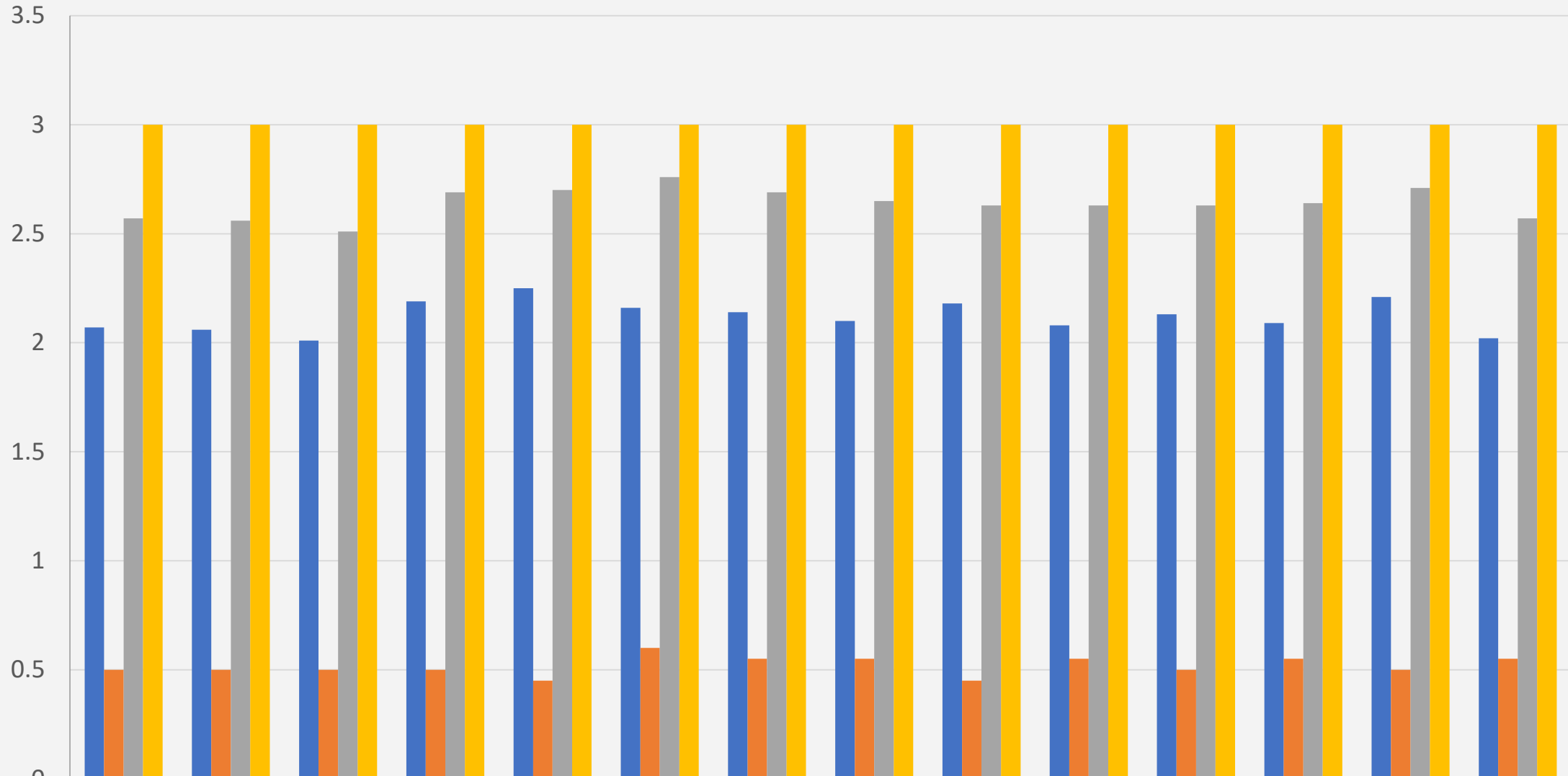
Program Outcome Attainment

PO & PSO	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2
CO's														
CO-1	3.00								3	3			3	
CO-2	2.00	2	2						2	2			2	
CO-3	2.00	2	2						2	2			2	
CO-4	3.00	3	3						3	3			3	
PO Attnmt.	2.5	2.3	2.3						2.5	2.5			2.5	

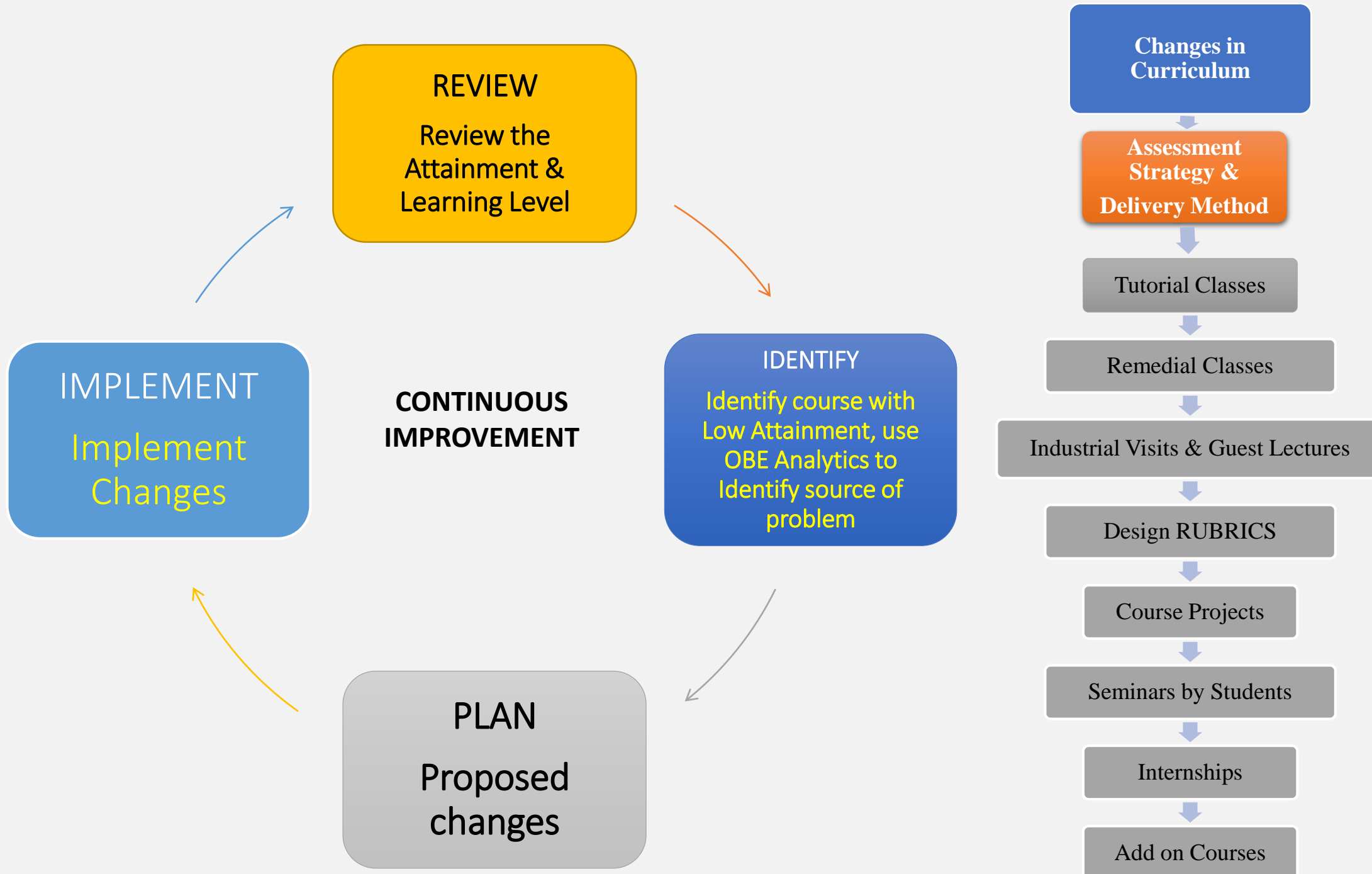
Attainment of program outcomes and program specific outcomes for all core courses

Sl. No.	Course code	PO & PSO													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO1 2	PSO1	PSO 2
1	C201	1.60	1.60							1.60	1.60				1.60
12	C212	2.40	2.40	2.40	2.40		2.40						2.40	2.40	
22	C305	2.20	2.20	2.13									2.20		2.40
30	C313	2.13			2.13		2.00	2.00	2.13		2.00	2.13	2.13		
41	C407	2.40	2.40			2.40				2.40	2.40		2.40	2.40	
42	C408	2.40	2.40	2.40	2.40	2.40				2.40					2.40
Direct PO & PSO Attainment		2.07	2.06	2.01	2.19	2.25	2.16	2.14	2.10	2.18	2.08	2.13	2.09	2.21	2.02

POs & PSOs Attainment level



	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
Direct PO & PSO Attainment	2.07	2.06	2.01	2.19	2.25	2.16	2.14	2.1	2.18	2.08	2.13	2.09	2.21	2.02
Indirect PO & PSO Attainment	0.5	0.5	0.5	0.5	0.45	0.6	0.55	0.55	0.45	0.55	0.5	0.55	0.5	0.55
FINAL PO & PSO ATTAINMENT	2.57	2.56	2.51	2.69	2.7	2.76	2.69	2.65	2.63	2.63	2.63	2.64	2.71	2.57
PO & PSO Target	3	3	3	3	3	3	3	3	3	3	3	3	3	3



POs& PSOs Attainment Levels and Actions for improvement

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.	
	target	Attain
	3	2.56

The attainment level is lower than the target level in the range of 0.8 to 2.4 for the following courses C201,C203,C204,C209,C210,C12,C213,C303,C305,C306,C312,C314 & C316.

Observations :

- Students are facing difficulty in analyzing and applying principles to engineering problems

Some students find it difficult to understand analytical based engineering subjects.

Students are constrained themselves for classroom teaching and study materials provided by teachers.

The deviations of attainment related to above mentioned observations are overcome by following action plans.

Action	1	To encourage students to carryout case studies, seminars and mini projects to imbibe research mind set.
	2	Provide opportunity to the students to undergo short term training in industries during vacations to enhance their ability to solve real life aeronautical engineering problems
	3	Relevant journal papers, problems involving current research to be discussed in class or be a part of assignment.
	4	Students are encouraged to undergo online MOOC courses such as NPTEL and Coursera which makes the students to carryout literature survey and analyzing research problems

