INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal - 500 043, Hyderabad, Telangana

Attainment of Program Outcomes (POs) and Program Specific Outcomes (PSOs) of 2019 - 2023 batch (IARE - R18)

Course Code	Course	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
AHSB02	Linear Algebra and Calculus	1.80	1.70													
AHSB04	Waves and Optics	1.50	1.60		1.30	1.00								1.30		
ACSB01	Programming for Problem Solving	1.30	1.20	1.10	1.40	1.40	1.30	1.30	1.30		1.30		1.20			1.30
AHSB10	Engineering physics laboratory	0.60	0.60		0.60											0.60
ACSB02	Programming for Problem Solving Laboratory	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30		2.30		2.30			2.30
AMEB01	Workshop manufacturing practices laboratory	1.00		1.00			1.00			1.00	1.00				1.00	
AHSB01	English										2.70					
AHSB11	Mathematical transform techniques	2.40	2.10		2.80									2.60		
AHSB03	Engineering chemistry	2.30	2.40					1.90								
AMEB03	Engineering mechanics	1.70	1.70	1.70											1.80	
AHSB08	English Language and Communication Skills Laboratory									0.70	0.70					
AHSB09	Engineering chemistry laboratory	1.30	1.30													
AMEB02	Engineering Graphics and Design Laboratory	2.00	2.00			2.00				2.00	2.00				2.00	
AAEB01	Basic simulation with MAT Laboratory	1.30	1.30	1.30	1.30	1.30				1.30						1.30
AAEB02	Engineering thermodynamics	1.60	1.80	1.40												1.60
AEEB04	Basic electrical and electronics engineering	1.00	0.90											1.00		
AHSB12	Probability and statistics	2.10	2.50		1.90											

AAEB03	Fluid dynamics	1.50	1.50		1.80										1.60	
AAEB04	Mechanics of solids	2.50	2.50											2.20		
AAEB05	Fluid dynamics laboratory	0.90	0.90		0.90		0.90			0.90	0.90					0.90
AAEB06	Mechanics of solids laboratory	0.60	0.60				0.60			0.60	0.60				0.60	
AITB08	Object oriented programming through python laboratory	3.00	3.00		3.00	3.00					3.00		3.00	3.00		
AAEB07	Aerospace structures	1.10	1.20	1.30	0.70	1.10	0.60								1.00	1.00
ACSB03	Data structures	1.70	1.80	1.70	1.50	1.90					2.00		1.80			
AAEB08	Aerospace propulsion	2.20	2.10	0.40	2.80	2.30								0.40	0.40	
AAEB09	Flight mechanics	1.10	1.20	1.10	0.90	0.40	1.20				1.20		1.10	0.90	1.20	0.80
AAEB10	Aerodynamics	1.00	1.00	1.20	0.80	1.10							0.80	1.00		
AAEB11	Aerospace structures laboratory	0.90	0.90	0.90			0.90	0.90		0.90	0.90				0.90	
AAEB12	Aerodynamics and propulsion laboratory	3.00	3.00	3.00			3.00			3.00	3.00					3.00
ACSB05	Data structures laboratory	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00		3.00		3.00			3.00
AAEB16	Aircraft production technology	1.20						1.20					1.20		1.20	
AAEB18	Aircraft production technology laboratory	0.90					0.90	0.90		0.90	0.90				0.90	
AAEB13	Aircraft Stability and Control	2.70	2.80	2.90											2.90	2.80
AAEB14	Analysis of Aircraft Structures	1.20	1.20		1.20									1.20	1.20	
AAEB15	High speed aerodynamics	1.60	1.60	1.70	1.60	1.70					1.60		1.30	1.80		1.30
AAEB32	Unmanned air vehicles	1.10	1.20		1.20		1.10							1.20	0.90	
AMEB54	Mechanical Properties of Materials	1.10	1.10													
AHSB15	Project Based Learning (Prototype / Design building)	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
AAEB17	Computer Aided Design Laboratory	3.00	3.00			3.00				3.00	3.00		3.00			3.00
AAEB35	Experimental Aerodynamics	0.90	1.00	0.80										0.90		
AAEB40	Rocket and Missiles	2.20	2.00											2.20	2.50	
AAEB19	Finite Element Analysis	1.00	1.00			0.90										0.90

AAEB20	Computational Aerodynamics	1.20	1.10	1.20	1.40	1.10	0.70	1.60			0.90		1.40	1.00		1.40
AAEB21	Aircraft Systems	1.40	1.40												1.60	
ACSB34	Relational Database Management Systems	1.70	1.90	1.70	1.70									1.70		
AHSB16	Research based learning (Fabrication / Model Development)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AAEB22	Computational Aerodynamics Laboratory	1.00	1.00	1.00	1.00	1.00				1.00	1.00		1.00			1.00
AAEB23	Computational Structural Analysis Laboratory	3.00	3.00	3.00	3.00	3.00				3.00	3.00		3.00			3.00
AAEB43	Mechanism and Machine Design	1.10	1.10	1.10											1.10	1.10
AAEB45	Avionics and Instrumentation	2.60		2.60			2.50								2.90	2.90
AAEB24	Flight vehicle design	2.70	2.60	2.60			2.90	2.80	2.60	2.30	2.30		2.30	2.70	2.90	2.60
AAEB25	Aerospace structural dynamics	2.50	2.50	2.30										2.40		
AHSB18	Soft Skills and Interpersonal Communication						2.90	2.90	2.90	2.90	2.90	2.90	2.90			
AAEB26	Flight vehicle design laboratory	2.30	2.30	2.30	2.30	2.30				2.30	2.30		2.30		2.30	2.30
AAEB27	Aerospace structural dynamics laboratory	0.60	0.60	0.60			0.60			0.60	0.60				0.60	
AAEB56	Project Work - (Phase - I)	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40
AAEB49	Automatic Control of Aircraft	2.10	2.10		2.00										2.00	2.20
AEEB56	Non-conventional energy sources	2.60	2.70	2.30				2.50								
AAEB57	Project Work - (Phase - II)	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70
Direct Attainment Value		1.7	1.8	1.7	1.7	1.8	1.6	2	2.2	1.7	1.8	2.2	2	1.7	1.6	1.9

Overall Attainment

S.No	Assessment Components (Direct + Indirect)	Program Outcomes(PO)												Program Specific Outcomes (PSOs)		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	Direct Assessment (CIA + SEE + Course End Survey) (a)	1.7	1.8	1.7	1.7	1.8	1.6	2	2.2	1.7	1.8	2.2	2	1.7	1.6	1.9
2	Program Exit Survey (b)	2.2	2.2	2.2	2.1	2.3	2.4	2.2	2.2	2.2	2.4	2.2	2.2	2.2	2.2	2.6
3	Alumni Survey (c)	2.4	2.4	2.4	2.5	2.4	2.3	2.4	2.4	2.5	2.5	2.4	2.4	2.5	2.4	2.4
4	Employer Survey (d)	2.4	2.4	2.6	2.4	2.4	2.5	2.4	2.4	2.5	2.3	2.4	2.5	2.4	2.4	2.6
Final attainment = a*0.8 + b*0.1 + c*0.05 + d*0.05		**1.9**	**1.8**	**1.9**	**1.8**	**1.8**	**1.9**	**1.8**	**2.1**	**2.2**	**1.8**	**1.9**	**2.2**	**1.8**	**1.8**	**1.7**

Action taken to improve the attainment of POs and PSOs:

POs	TargetLevel	AttainmentLevel	Observation
PO1: Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.			
PO1	**2.0**	**1.9**	**Target not achieved. Following courses were identified which didn't meet the attainment target** AHSB02, AHSB04, ACSB01, AHSB10, AMEB01, AMEB03, AHSB09, AAEB01, AAEB02, AEEB04 AAEB03, AAEB05, AAEB06, AAEB07, ACSB03 AAEB09, AAEB10, AAEB11, AAEB16, AAEB18 AAEB14, AAEB15, AAEB32, AMEB54, AAEB35 AAEB19, AAEB20, AAEB21, ACSB34, AHSB16 AAEB22, AAEB43, AAEB27, AAEB56
Action: **1.** Additional theory classes and tutorials to be conducted for students to gain a better understanding of the concepts of science and engineering. 2. Guest lectures and expert talk to be conducted to enrich the industry-oriented engineering knowledge.			
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.			
PO2	**1.5**	**1.8**	**Target Achieved. Following courses were identified which didn't meet the attainment target**

			ACSB01, AHSB10, AHSB09, AAEB01, AEEB04 AAEB05, AAEB06, AAEB07, AAEB09, AAEB10 AAEB11, AAEB14, AAEB32, AMEB54, AAEB35 AAEB19, AAEB20, AAEB21, AHSB16, AAEB22 AAEB43, AAEB27, AAEB56

Action:

1. More emphasize on tutorial classes for problem solving.
2. Research journal access in the library is available for students to read journal articles on the latest research.
3. Students are encouraged to participate in science project exhibition for developing an analytical mind which can work towards problem solving.

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.

PO3	**1.6**	**1.9**	**Target Achieved. Following courses were identified which didn't meet the attainment target** ACSB01, AMEB01, AAEB01, AAEB02, AAEB07 AAEB08, AAEB09, AAEB10, AAEB14, AAEB32 AAEB35, AAEB20, AHSB16, AAEB22, AAEB43 AAEB27, AAEB56

Action:

1. The Careers and Employability Skills Training (CEST) is working on Industry-Institute Interaction and preparing manpower of world class in the field of science and technology by inculcating various skills required by the industry.
2. Multiple workshops will be conducted on design and development of UAVs for multidisciplinary applications
3. Students are motivated to participate in design contests organized by national and international agencies.
4. The Skill Bridge Program has created a platform for students to horn their Employability skills along with Aptitude through various activities. Skills covered under this program are
   - Aircraft structure design (software used CATIA)
   - Structural Analysis (software used ANSYS)
   - Mechanism Design (CATIA DMU)
   - Computational Fluid Analysis (CFD) (software used ANSYS FLUENT)

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.

PO4	**1.5**	**1.8**	**Target Achieved. Following courses were identified which didn't meet the attainment target** AHSB04, ACSB01, ACSB02, AAEB01, AHSB12 AAEB10, AAEB15, AAEB20, ACSB34, AAEB22 AAEB26, AAEB56

Action:

1. Expert talk and Academic workshops will be conducted to improve the knowledge on experiments and analysis of results.
2. Research based Courses will be included, syllabi to be updated to include and inculcate the analysis, research skills.

PO5: 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.			
PO5	**1.9**	**1.8**	**Target not achieved. Following courses were identified which didn't meet the attainment target** AHSB04, ACSB01, AAEB01, AAEB07, AAEB09 AAEB10, AAEB19, AAEB20, AHSB16, AAEB22 AAEB56
Action: 1. Modern labs will be developed to learn/ demonstrate the use of Modern software tools likeMATLAB (for analysis); Auto CAD (for basic modeling); ABAQUS (for FEM), Aircraft structure design (software used CATIA), Mechanism Design (CATIA DMU), Computational Fluid Analysis (CFD) (software used ANSYS FLUENT. 2. Students will be taught with modern modes and methods of teaching like using LCD Projectors andwith interactive and digital boards and learning in smart class rooms equipped with real time lecture webcast/broadcast facilities.			
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.			
PO6	**1.5**	**1.9**	**Target Achieved. Following courses were identified which didn't meet the attainment target** ACSB01, AMEB0, AAEB05, AAEB06, AAEB07 AAEB09, AAEB11, AAEB18, AAEB32, AAEB20 AHSB16, AAEB27, AAEB56
Action: 1. Student industry visits will be arranged to understand the safety concern, social aspects and expand their practical knowledge. 2. Students will be encouraged to participate in Swachch Bharat drives, Blood Donation Camps, village visits, and teaching and mentoring of downtrodden children.			
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.			
PO7	**1.6**	**1.8**	**Target Achieved. Following courses were identified which didn't meet the attainment target** ACSB01, AAEB11, AAEB16, AAEB18, AHSB16 AAEB56
Action: 1. Students are encouraged to engage in projects relating to energy consumption and the use of renewable energy resources that address global and environmental issues. 2. The activity like Tree Plantation (Haritha Haram) is being organized to encourage the students for understanding the responsibility towards environment.			
PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.			
PO8	**1.6**	**2.1**	**Target Achieved. Following courses were identified which didn't meet the attainment target** ACSB01, AHSB16, AAEB56

Action:

1. Guest lecture were arranged to motive the students and made aware about the demands of engineering profession, duties towards society & fellow human beings and importance of honesty and ethics.
2. Students are encouraged to engage in Co-Curricular activities, Games, promote commitment to ethical principles.

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

PO9	**2.0**	**2.2**	**Target achieved. Following courses were identified which didn't meet the attainment target** AMEB01, AHSB08, AAEB01, AAEB05, AAEB06 AAEB11, AAEB18, AHSB16, AAEB22, AAEB27 AAEB56

Action:

1. Institute has initiated Program which provides a platform to work in individual as well as a group in the fields of Engineering. It helps the students to groom the skills like leadership or as an effective team member. There are a number of societies and clubs where the students learn to work both as individuals and in a team work environment.
2. The laboratory work of the students is conducted by framing student groups so that students learn to work in a team environment.
3. The final year project work is conducted by first making student groups in which students with different abilities are included (decided on the basis of CGPA). These groups are allotted to faculty members as per the area-preference given by the students. This helps students to learn to work with team members of different capabilities and background.

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.

PO10	**1.8**	**1.8**	**Target Achieved. Following courses were identified which didn't meet the attainment target** ACSB01, AMEB01, AHSB08, AAEB05, AAEB06 AAEB09, AAEB11, AAEB18, AAEB15, AAEB20 AHSB16, AAEB22, AAEB27, AAEB56

Action:

1. Soft skill training is imparted to students to develop various expressions of communication or technical talks by group discussion, presentation and new learning outcomes.
2. Alternate Assessment Tools like Tech talk and concept video presentations help them to overcome stage fear and come out with presentations

P11: 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.

PO11	**1.9**	**1.9**	**Target Achieved. Following courses were identified which didn't meet the attainment target** AHSB16, AAEB56

Action:

1. Project Expo and METE Expo are conducted for students from the first year itself along with their seniors to understand the concept of product development as well finance management for completion of such small projects.
2. Students are encouraged to take up full semester internship program in various organizations to take up industry-oriented project works.

P12: 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.

PO12	**1.5**	**2.2**	**Target Achieved. Following courses were identified which didn't meet the attainment target** ACSB01, AAEB09, AAEB10, AAEB16, AAEB15 AAEB20, AHSB16, AAEB22, AAEB56

Action:

1. Students are made to recognize the importance of lifelong learning through pep/ motivational talks. Using ICT facilities, such as PPTs, live demonstration of topics imparted using video lecture and real time webcast and lecture contents including new technological developmental tools and knowledge of new products, gives students and lifelong knowledge to be further improved upon.

PSOs	TargetLevel	AttainmentLevel	Observation
PSO1: Build the prototype of UAVs and aero-foil models for testing by using low speed wind tunnel towards research in the area of experimental aerodynamics.			
PSO1	**1.6**	**1.8**	**Target Achieved. Following courses were identified which didn't meet the attainment target** AHSB04, AEEB04, AAEB08, AAEB09, AAEB10, AAEB14 AAEB32, AAEB35, AAEB20, AHSB16, AAEB56

Action:

1. Multiple workshops will be conducted on design and development of UAVs for multidisciplinary applications.
2. Project works are encouraged that involve the usage of technical resources such as software's and existing experimental facilities for solving technical problems.

PSO2: Focus on formulation and evaluation of aircraft elastic bodies for characterization of aero elastic phenomena.			
PSO2	**1.5**	**1.8**	**Target Achieved. Following courses were identified which didn't meet the attainment target** AMEB01, AAEB06, AAEB07, AAEB08, AAEB09 AAEB11, AAEB16, AAEB18, AAEB14, AAEB32 AHSB16, AAEB43, AAEB27, AAEB56

Action:

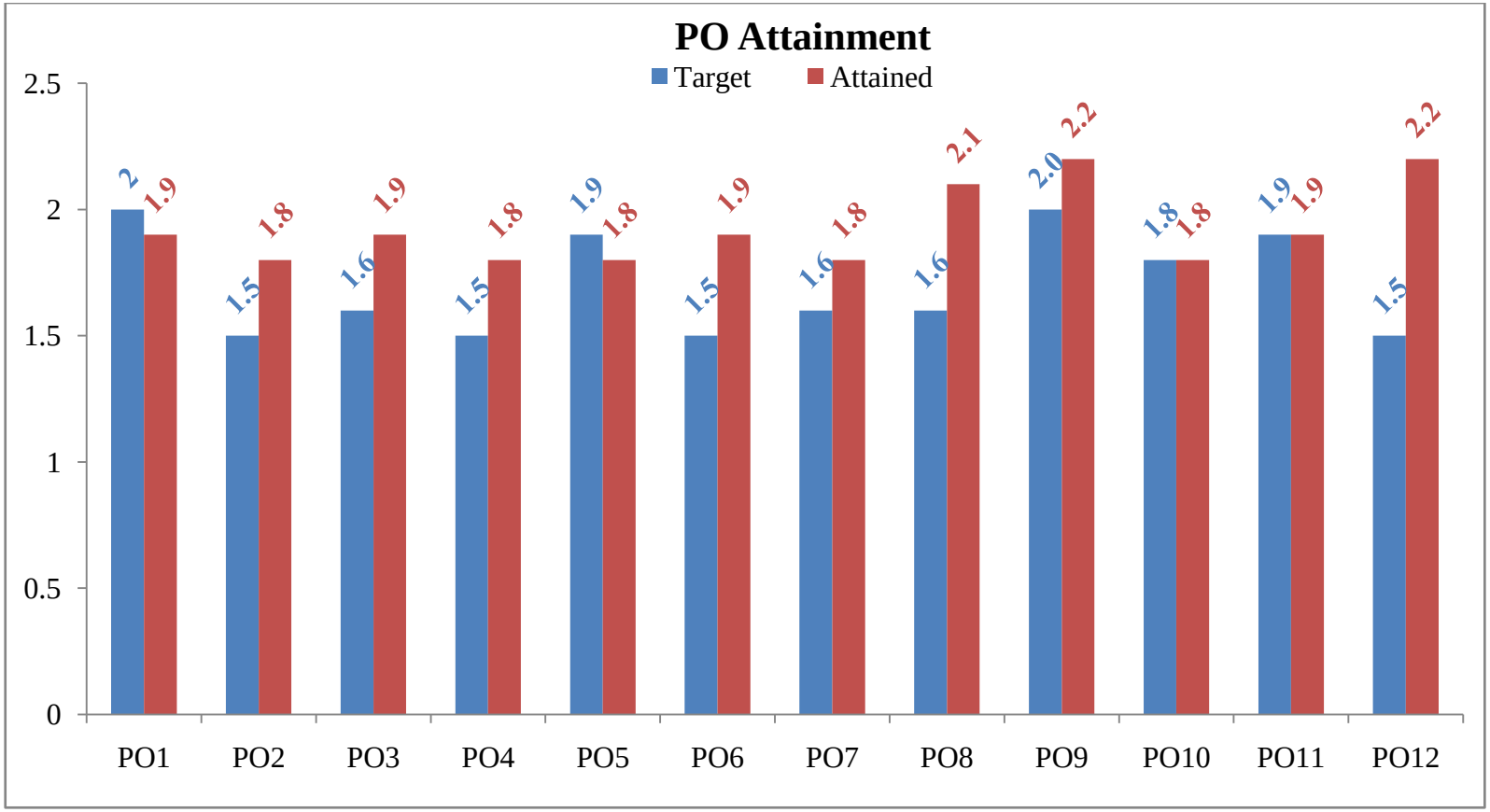
1. Students are motivated to take up the real-life problems during their project work so that they can design, analyze and find solution which gives exposure to latest technologies.

PSO3: Make use of multi physics, computational fluid dynamics and flight simulation tools for building career paths towards innovative startups, employability and higher studies.

PSO3	**1.5**	**1.7**	**Target Achieved. Following courses were identified which didn't meet the attainment target** ACSB01, AHSB10, AAEB01, AAEB05, AAEB07, AAEB09 AAEB15, AAEB19, AAEB20, AHSB16, AAEB22, AAEB43 AAEB56

Action:

1. Career readiness program and corporate lectures are arranged to meet required expertise in field of engineering.
2. Students are encouraged to take up certified courses on computational tools from various digital platforms.
3. Project works are encouraged that involve the usage of computational tools.


PO Attainment
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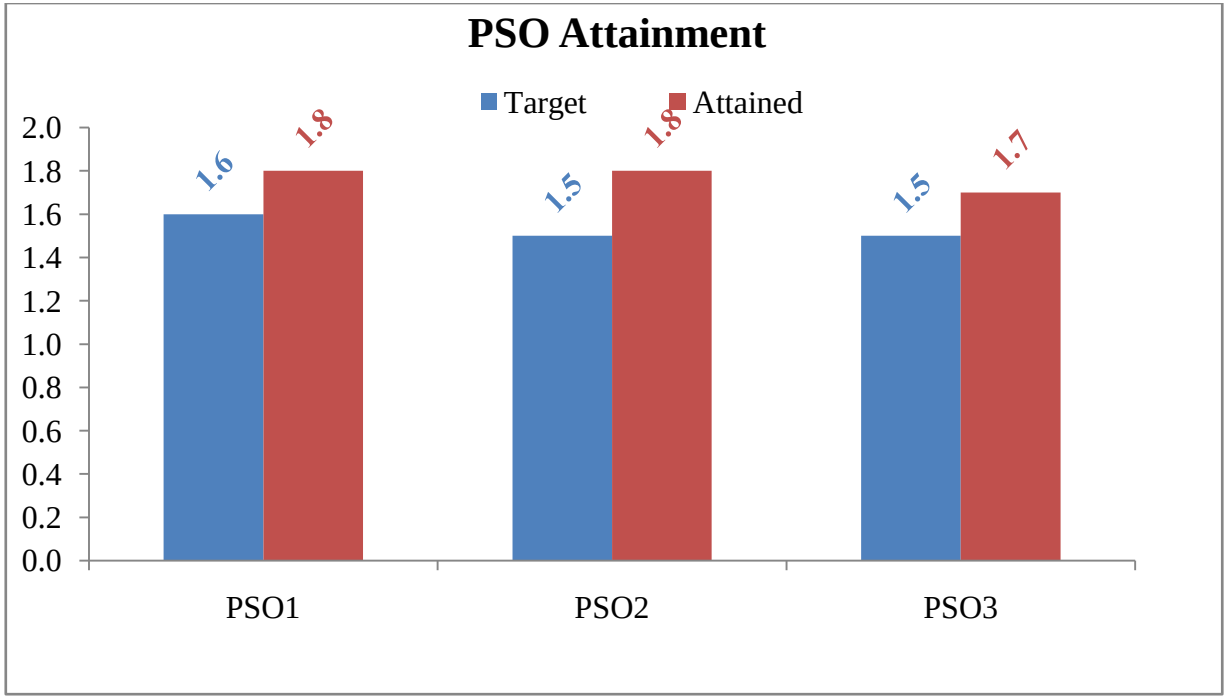

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