



# INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad - 500 043

## Department of Civil Engineering

### Attainment of Program Outcomes (POs) and Program Specific Outcomes (PSOs) of 2020 - 2024 batch (IARE -UG20)

Course Code	Subject Code	Course Title	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C101	AHSC01	English										2.80					
C102	AHSC02	Linear Algebra and Calculus	1.70	1.20													
C103	AHSC03	Engineering Physics	1.50	1.50		1.40											1.50
C104	ACSC01	Python Programming	1.30	1.10	1.10		1.30					1.10		1.10	1.30		1.10
C105	AHSC04	English Language and Communication Skills Laboratory									3.00	3.00					
C106	AHSC05	Physics Laboratory	3.00	3.00		3.00											3.00
C107	ACSC02	Python Programming Laboratory	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00		3.00	3.00		
C108	AHSC06	Chemistry	1.90	1.70					2.60								
C109	AHSC07	Mathematical Transform Techniques	1.20	1.20		1.20									1.20		
C110	AMEC01	Engineering Mechanics	1.10	1.20	1.00	1.20		0.90									0.90
C111	AEEC01	Basic Electrical Engineering	1.20	1.40											1.30		
C112	ACSC06	ExEEd – Academic Success	3.00		3.00	3.00		3.00	3.00	3.00	3.00	3.00	3.00		3.00	3.00	
C113	AMEC02	Manufacturing Practice	3.00		3.00			3.00	3.00		3.00				3.00		
C114	AMEC03	Computer Aided Engineering Drawing	2.10		2.10		2.10				2.10	2.10		2.10			2.10
C115	ACSC03	Programming for Problem Solving Laboratory	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
C201	ACEC01	Surveying and Geomatics	1.30	2.10			2.90								2.00		
C202	ACEC02	Strength of Materials	1.30	1.20											1.60	0.70	
C203	ACEC03	Fluid Mechanics	1.60	1.50	1.20	1.20						1.20			1.40	2.30	

C204	ACEC04	Engineering Geology	1.60		1.00	0.80			0.90						1.10	1.70	
C205	ACSC08	Data Structures	1.70	1.70	1.50	1.70	1.70					1.60		1.90			
C206	ACSC09	ExEEd – 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
C207	ACEC05	Surveying and Geomatics Laboratory	3.00	3.00			3.00								3.00		
C208	ACEC06	Engineering Geology Laboratory	3.00	3.00		3.00										3.00	
C209	ACSC10	Data Structures Laboratory	0.90	0.90	0.90	0.90	0.90					0.90		0.90			
C210	ACEC07	Theory of Structures	0.70	0.60		0.70						0.70		0.70	0.70		
C211	AHSC08	Probability and Statistics	1.30	1.40		1.40	1.20										
C212	ACEC08	Hydraulics and Hydraulic Machinery	1.20	1.20	1.20	1.20						1.20			1.20		
C213	ACEC09	Building Materials – Planning and Construction	1.40	1.10	1.30										1.10		
C214	ACEC10	Concrete Technology	1.20	1.20	1.10		1.20		1.60						1.20	1.80	
C215	ACSC14	ExEEd – Fabrication / Model Development	3.00		3.00	3.00	3.00	3.00	3.00		3.00	3.00			3.00	3.00	3.00
C216	ACEC11	Concrete Technology Laboratory	3.00		3.00		3.00		3.00						3.00		
C217	ACEC12	Hydraulics and Hydraulic Machinery Laboratory	3.00		3.00	3.00			3.00						3.00		3.00
C218	ACEC13	Strength of Materials Laboratory	3.00	3.00			3.00									3.00	
C301	ACEC14	Analysis of Structures	1.80	1.70	1.70							1.30		1.30	1.90		
C302	ACEC15	Hydrology and Water Resources Engineering	1.30	1.20	1.20	1.20			1.30						1.20	1.20	
C303	ACEC16	Reinforced Concrete Structures Design and Drawing	2.50	2.50	2.50		2.30								2.40		
C304	AHSC13	Business Economics and Financial Analysis	2.50	2.20						1.90	2.00		2.10				
C305	ACEC17	Remote Sensing and GIS	1.90			1.20			0.90						1.90		
C306	ACSC20	ExEEd – Project Based Learning	3.00	3.00	3.00	3.00	3.00				3.00	3.00		3.00	3.00	3.00	3.00
C307	ACEC21	Advanced Surveying Laboratory	3.00	3.00			3.00				3.00				3.00		
C308	ACEC22	Advanced Material Testing Laboratory	3.00		3.00		3.00		3.00						3.00		
C309	ACEC23	Steel Structures Design and Drawing	1.20	0.80	0.80	0.80									0.90		
C310	ACEC24	Geotechnical Engineering	1.00	1.00	1.20	0.70									1.10	1.00	1.20

C311	ACEC25	Transportation Engineering	2.60		2.40	2.40									2.60	2.40	
C312	ACEC26	Estimation, Costing and Valuation	1.80	2.00			1.40	1.70						1.20	1.50		1.20
C313	AMEC34	Industrial Management	1.20	1.20		1.20							1.30	1.20			1.20
C314	ACSC27	ExEEd – Research Based Learning	3.00	3.00	3.00	3.00	3.00				3.00	3.00		3.00	3.00	3.00	3.00
C315	ACEC32	Geotechnical Engineering Laboratory	3.00	3.00	3.00	3.00		3.00							3.00	3.00	
C316	ACEC33	Transportation Engineering Laboratory	3.00	3.00			3.00				3.00				3.00		
C401	ACEC34	Environmental Engineering	1.90	2.30	1.80	1.90									2.00	2.10	
C402	ACEC35	Foundation Engineering	1.70	0.90	0.90	1.70	2.00								1.50		
C403	ACEC36	Construction Engineering and Management	2.80	2.50	2.60		2.80		2.80						2.70	2.80	
C404	ACEC40	Prestressed Concrete Structures	2.60	2.50	2.40	2.40									2.50		
C405	AITC19	Cyber Crime and Computer Forensics	2.50	2.70	2.70	2.80	2.80										2.30
C406	ACEC44	Advanced Structural Design Laboratory	3.00		3.00		3.00								3.00		
C407	ACEC45	Project Planning Laboratory	3.00		3.00		3.00				3.00			3.00	3.00	3.00	3.00
C408	ACEC46	Project Work (Phase – I)	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
C409	ACEC47	Ground Improvement Techniques	1.80	1.80		1.50									1.90	1.50	
C410	ACEC51	Repair, Rehabilitation and Retrofitting of Structures	1.40	1.50	1.20	1.20	1.20								1.30	1.20	
C411	AHSC15	Soft Skills and Interpersonal Communication								2.80		2.90					
C412	ACEC55	Project Work (Phase - II)	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
Direct Attainment Value			2.2	2	2.2	2	2.5	2.7	2.5	2.8	2.9	2.3	2.6	2.2	2.2	2.4	2.3

## Overall Attainment

S No.	Assessment Component(Direct + Indirect)	Program 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)	2.2	2	2.2	2	2.5	2.7	2.5	2.8	2.9	2.3	2.6	2.2	2.2	2.4	2.3
2.	Student Program exit surveys (b)	2.3	2.3	2.3	2.3	2.3	2.4	2.3	2.5	2.3	2.3	2.4	2.3	2.3	2.3	2.4
3.	Employer surveys (c)	2.5	2.4	2.3	2.5	2.5	2.3	2.5	2.5	2.3	2.5	2.4	2.3	2.5	2.4	2.3
4.	Alumni Survey (d)	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.1	2.3	2.3	2.3
Overall attainment = $a*0.8 + b*0.1 + c*0.05 + d*0.05$		2.2	2.1	2.2	2.1	2.5	2.6	2.5	2.7	2.8	2.3	2.6	2.2	2.2	2.4	2.3

**Action taken to improve the attainment of POs and PSOs:**

POs	Target value	Attainment Level	Observations
<b>PO1: Engineering Knowledge:</b> Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.			
<b>PO1</b>	<b>1.8</b>	<b>2.2</b>	Target is achieved. Still there is scope to increase attainment levels for the courses Data Structures [ACSC08] and Basic Engineering Geology [ACEC04]
<b>Action:</b> <ol style="list-style-type: none"> <li>1. In Data Structures [ACSC08], Assignments will be given for the topics like binary tree &amp; Binary search trees.</li> <li>2. In Basic Engineering Geology [ACEC04], Assignments will be given for the topics like Identification and Properties of Engineering Minerals &amp; Impact of Geological Structures on Engineering Projects.</li> </ol>			
<b>PO2: Problem analysis:</b> Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.			
<b>PO 2</b>	<b>1.8</b>	<b>2.1</b>	Target is achieved. This can be improved further in courses like Building Materials – Planning and Construction [ACEC09].
<b>Action:</b> <ol style="list-style-type: none"> <li>1. In Building Materials – Planning and Construction [ACEC09], some of the topics like Alternative materials for wood - explained with more examples.</li> <li>2. Additional inputs will be provided on identifying the mineral and chemical admixtures for enhancing the strength and durability of concrete mixtures.</li> </ol>			

**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.

<b>PO 3</b>	<b>1.8</b>	<b>2.2</b>	Target is achieved. Attainment can be increased further in this course Ground Improvement Techniques [ACEC47]
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**Action:**

1. Conducting a workshop on "Challenges in Ground Conditions and Methods for Ground Improvement.
2. Training programs focused on geotechnical engineering to comprehend prevailing ground conditions crucial for designing effective dewatering systems.
3. Organizing invited lectures on grouting techniques based on in-situ evidence analysis.

**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.

<b>PO 4</b>	<b>1.8</b>	<b>2.1</b>	Target is achieved. Attainment can be increased further in these courses Foundation Engineering [ACEC35], and Environmental Engineering [ACEC34]
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**Action:**

1. Organized discussions on critical topics such as the impact of climate change on slope stability, new materials and technologies for slope reinforcement in Foundation Engineering [ACEC35].
2. Arranged Industrial visits to local wastewater treatment facilities to give students a firsthand look at the processes involved in the ultimate disposal of sewage Environmental Engineering [ACEC34].

**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.

<b>PO 5</b>	<b>1.8</b>	<b>2.5</b>	Target is achieved. This PO attainment can be increased for the course Building Materials – Planning and Construction [ACEC09].
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**Action:**

1. Giving assignments and conducting tutorials on various types of stair cases used in modern construction scenario for improving the accessibility of building floors.

<b>PO6: The Engineer and Society:</b> 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.			
<b>PO 6</b>	<b>1.8</b>	<b>2.6</b>	Target is achieved. Hence the same practice will be continued for the next year.
<b>Action:</b> <ol style="list-style-type: none"> <li>1. Target will be retained and will be observed for next academic year.</li> <li>2. Additional classes will be conducted beyond the regular classes to provide more problems and assignments.</li> </ol>			
<b>PO7: Environment and sustainability:</b> Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.			
<b>PO 7</b>	<b>1.8</b>	<b>2.5</b>	Target is achieved. Attainment can be improved in the courses Remote Sensing and GIS [ACEC17].
<b>Action:</b> <ol style="list-style-type: none"> <li>1. Project-based assessments focusing on sustainability solutions will be introduced, and workshops will be organized to enhance understanding of GIS applications.</li> <li>2. To comprehend the influence of professional engineering solutions in societal and environmental contexts and the necessity of bringing about sustainability in overall development, courses and expert lectures that deal with environmental and sustainability issues have been presented.</li> </ol>			
<b>PO8: Ethics:</b> Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.			
<b>PO 8</b>	<b>1.8</b>	<b>2.7</b>	Target is achieved. Along with technical knowledge, ethical knowledge should be included while teaching the programming courses.
<b>Action:</b> <ol style="list-style-type: none"> <li>1. To educate the students to maintains the ethics during the design and fabrication project.</li> </ol>			

<b>PO9: Individual and teamwork:</b> Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.			
<b>PO 9</b>	<b>1.8</b>	<b>2.8</b>	Target is achieved. Students are ready to work both independently and together. Low attainment is observed in the course Basic Electrical and Electronics Engineering Laboratory [AEEB08]
<b>Action:</b> <ol style="list-style-type: none"> <li>The students are allowed to work in groups on co- and extra-curricular activities, which are conducted through the department association, inter college activities.</li> </ol>			
<b>PO10: Communication:</b> 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.			
<b>PO 10</b>	<b>1.8</b>	<b>2.3</b>	Target is achieved.
<b>Action:</b> <ol style="list-style-type: none"> <li>Students were motivated to Students that are seen to be weak in communication skills are encouraged to undergo relevant courses and are also referred to language lab for improving their communication skills.</li> <li>In project-based learning and research-based learning, faculties are instructed to give students reviews and project presentations in English language only.</li> </ol>			
<b>P11: Project management and finance:</b> 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.			
<b>PO 11</b>	<b>1.8</b>	<b>2.6</b>	Target is achieved. Multidisciplinary projects are observed as a gap.
<b>Action:</b> <ol style="list-style-type: none"> <li>Students are encouraged to organize department association activities to increase their management skills. Students are encouraged to take up full semester internship program in various organizations to take up industry-oriented project works.</li> </ol>			



<b>P12: Life-long learning:</b> 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.			
<b>PO 12</b>	<b>1.8</b>	<b>2.2</b>	Target is achieved.
<b>Action:</b> <ol style="list-style-type: none"> <li>1. Industrial visits will be organized to promote independent and lifelong learning.</li> <li>2. Students are motivated to do online courses like MOOC courses on recent technologies.</li> <li>3. In Programming for problem solving course [ACSB01] extra classes will be conducted on Pointers and files.</li> </ol>			
<b>PSO 1</b> Design and Supervise Sub-Structures and Super Structures for Residential and Public Buildings, Industrial Structures, Irrigation Structures, Power Houses, Highways, Railways, Airways, Docks and Harbors.			
<b>PSO 1</b>	<b>1.8</b>	<b>2.2</b>	Target is achieved. This PO attainment can be increased for the course Construction Engineering and Management [ACEC36].
<b>Action:</b> <ol style="list-style-type: none"> <li>1. In Construction Engineering and Management [ACEC36] additional classes are being conducted to concepts like Earned Value Management and Risk Quantification and Management.</li> <li>2. 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.</li> </ol>			
<b>PSO 2:</b> Focus on Improving Performance of Structures with reference to Safety, Serviceability and Sustainable Green Building Technology.			
<b>PSO 2</b>	<b>1.8</b>	<b>2.4</b>	Target is achieved. Attainment can be improved in the course Construction Engineering and Management [ACEC36]
<b>Action:</b> <ol style="list-style-type: none"> <li>1. In Construction Engineering and Management [ACEC36] more practice will be given to solve more problems on Project Scheduling and Network Analysis and on Cost Estimation and Control.</li> </ol>			

**PSO 3:** Make use of Advanced Structural Analysis and Project Management Software for creating Modern Avenues to succeed as an Entrepreneur, Pursue Higher Studies and Career Paths.

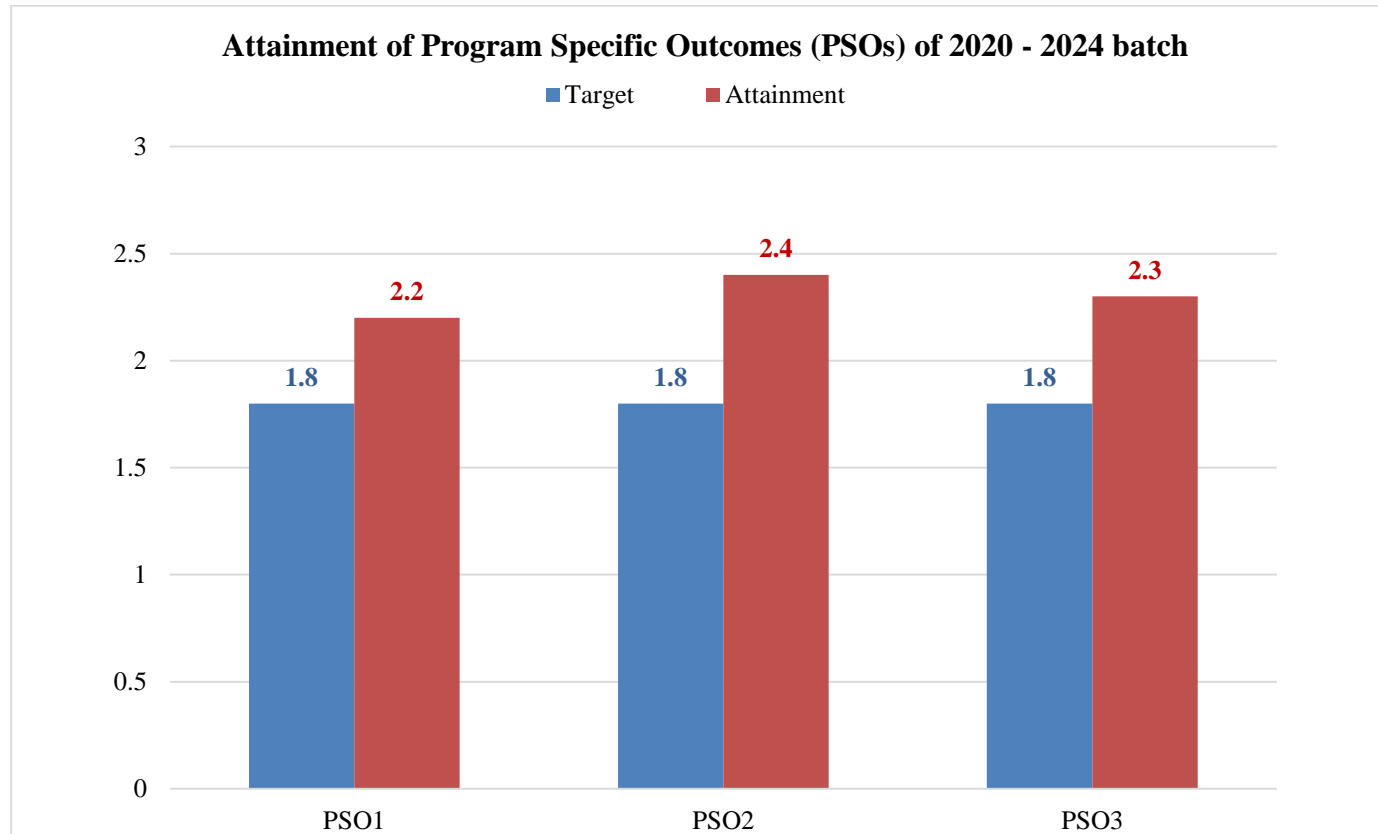
<b>PSO 3</b>	<b>1.8</b>	<b>2.3</b>	Target is achieved. Low attainment is observed in the course Industrial Management [AMEC34]
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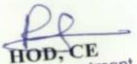
**Action:**

1. Students will be motivated to enroll for higher studies and entrepreneur.
2. In the course Industrial Management [AMEC34], extra classes will be conducted on topics Operations Scheduling and Sequencing and Inventory Management and Control to make the student understand better.

**Attainment of Program Outcomes (POs) of 2020 - 2024 batch**





  
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