



# INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad - 500 043

## Department of Electrical and Electronics Engineering

### Attainment of Program Outcomes (POs) and Program Specific Outcomes (PSOs) of 2016 - 2020 batch (IARE - R16)

Course Code	Subject Code	Course Title	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C101	AHS002	Linear Algebra and Ordinary Differential Equations	2.10	2.50	-	-	-	-	-	-	-	-	-	-	-	-	2.40
C102	AHS003	Computational Mathematics and Integral Calculus	2.10	2.20	-	-	-	-	-	-	-	-	-	-	-	-	-
C103	AHS005	Engineering Physics	1.50	1.70	-	-	-	-	1.70	-	-	-	-	-	-	-	-
C104	AHS006	Engineering Chemistry	2.20	2.10	-	2.00	-	-	-	-	-	-	-	-	-	2.10	-
C105	ACS001	Computer Programming	1.00	1.00	0.70	-	1.00	-	-	-	-	1.00	-	1.00	-	-	-
C106	ACS101	Engineering Physics and Chemistry Laboratory	2.30	2.30	2.30	2.30	2.30	2.30	-	2.30	-	2.30	-	2.30	-	-	-
C107	AME103	Computer Programming Laboratory	1.60	-	1.60	-	1.60	-	-	-	1.60	1.60	-	1.60	-	-	1.60
C108	AHS104	Computer Aided Engineering Drawing	2.00	2.00	-	2.00	-	-	2.00	2.00	-	-	-	-	2.00	2.00	-
C109	AHS102	Computational Mathematics Laboratory	3.00	3.00	-	3.00	-	-	-	3.00	-	-	-	-	3.00	-	-
C110	AHS001	English For Communication	-	-	-	-	-	-	-	-	-	1.90	-	-	-	-	-
C111	AHS011	Mathematical Transform Techniques	1.80	1.80	-	1.80	-	-	-	-	-	-	-	-	1.50	-	-
C112	AHS009	Environmental Studies	2.00	-	-	1.70	-	-	2.00	-	-	-	-	-	-	-	-
C113	ACS002	Data Structures	1.40	1.40	1.50	1.40	1.40	-	-	-	-	1.50	-	1.30	-	-	-
C114	AEE002	Electrical Circuits	1.60	1.70	1.60	-	-	-	-	-	-	1.60	-	1.60	1.20	-	-

<b>C115</b>	AHS101	Communication Skills Laboratory	-	-	-	-	-	-	-	-	-	2.30	2.30	-	-	-	-	-
<b>C116</b>	ACS102	Data Structures Laboratory	2.30	2.30	2.30	2.30	2.30	2.30	2.30	-	2.30	2.30	2.30	-	2.30	-	-	-
<b>C117</b>	AEE102	Electrical Circuits Laboratory	2.00	2.00	2.00	2.00	2.00	2.00	2.00	-	2.00	2.00	2.00	-	2.00	2.00	-	-
<b>C118</b>	ACS112	Engineering Practice Laboratory	2.40	2.40	2.40	2.40	2.40	-	-	-	-	2.40	-	-	2.40	-	2.40	
<b>C201</b>	AEE003	Power Generation Systems	2.20	2.20	2.20	2.20	-	2.20	2.20	2.20		2.20	-	2.90	2.20	-	-	
<b>C202</b>	AEE004	DC Machines and Transformers	1.40	1.50	1.80	1.20	-	-	-	-	1.40	1.40	-	1.30	0.90	-	-	
<b>C203</b>	AEE005	Network Analysis	1.50	1.30	-	-	-	-	-	-	-	-	-	-	-	1.50	-	
<b>C204</b>	AEE006	Electromagnetic Field Theory	1.70	1.70	1.70	1.70	-	-	-	-	-	1.70	-	1.70	1.70	-	-	
<b>C205</b>	AEC001	Electronic Devices and Circuits	1.40	1.40	1.50	-	-	-	-	-	-	1.40	-	-	-	-	-	
<b>C206</b>	AEE104	DC Machines Laboratory	2.7	2.7	2.7	2.7	2.7	2.7	2.7	-	2.7	2.7	2.7	-	2.7	2.7	-	2.7
<b>C207</b>	AEE105	Electrical Engineering Simulation Laboratory	1.70	1.70	1.70	1.70	1.70	1.70	1.70	-	1.70	-	-	-	1.70	1.70	1.70	-
<b>C208</b>	AEC113	Electronic Circuits Laboratory	-	2.00	-	-	2.00	-	-	-	-	2.00	-	-	2.00	-	-	
<b>C209</b>	AEE007	AC Machines	1.60	1.50	1.40	1.50	-	-	-	-	1.50	1.50	-	1.30	1.60	-	-	
<b>C210</b>	AEE008	Electrical Measurements and Instrumentation	1.70	1.90	1.80	-	-	-	-	-	-	1.70	-	-	2.00	-	-	
<b>C211</b>	AEC019	Digital And Pulse Circuits	1.80	1.80	1.50	1.60	-	-	-	-	-	1.80	-	-	-	1.60	-	
<b>C212</b>	AEE009	Control Systems	1.50	1.50	1.40	1.60	-	-	-	1.90	-	2.10	-	2.10	1.80	1.70	2.40	
<b>C213</b>	AHS004	Complex Analysis and Probability Distribution	1.00	0.80	-	1.00	-	-	-	-	-	-	-	-	-	-	-	
<b>C214</b>	AEE106	AC Machines Laboratory	2.10	2.10	2.10	2.10	2.10	2.10	2.10	-	2.10	2.10	2.10	-	2.10	2.10	-	2.10
<b>C215</b>	AEE107	Electrical Measurements and Instrumentation Laboratory	1.40	1.40	1.40	1.40	1.40	-	-	-	1.40	1.40	-	1.40	1.40	-	-	
<b>C216</b>	AEE115	Control Systems and Simulation Laboratory	1.60	1.60	1.60	1.60	1.60	1.60	1.60	-	1.60	1.60	1.60	-	1.60	1.60	1.60	

<b>C301</b>	AEC008	Integrated Circuits Applications	1.50	1.40	1.40	1.60	-	-	-	-	-	1.50	-	-	-	1.20	-
<b>C302</b>	AEE010	Power Electronics	1.40	1.20	0.90	0.90	-	1.30	-	-	1.40	1.40	-	1.30	1.40	1.10	-
<b>C303</b>	AHS012	Optimization Techniques	1.90	1.90	1.90	1.80	-	-	-	-		1.90	-	1.90	1.90	-	1.90
<b>C304</b>	AEE011	Transmission and Distribution Systems	1.80	1.80	1.80	2.50	-	-	-	-	1.50	1.80	-	1.20	2.00	-	-
<b>C305</b>	AHS015	Business Economics and Financial Analysis	1.30	1.20	-	-	-	-	-	1.10	1.10	-	-	-	-	-	-
<b>C306</b>	AHS106	Industrial Automation and Control	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30
<b>C307</b>	AEE108	Research and Content Development	0.60	0.60	0.60	0.60	0.60	0.60	-	0.60	0.60	0.60	-	0.60	0.60	0.60	0.60
<b>C308</b>	AEC106	Power Electronics and Simulation Laboratory	1.70	1.70	-	1.70	1.70	1.70	-	1.70	1.70	1.70	-	-	-	1.70	1.70
<b>C309</b>	AEE511	Integrated Circuits Applications Laboratory	1.70	1.40	1.60	1.60	-	1.90	1.50	-	1.30	1.70	-	1.50	-	1.80	1.70
<b>C310</b>	AEE012	Power System Analysis	2.10	2.00	2.20	2.10	-	-	2.50	-	2.10	1.90	-	2.10	2.10	-	2.10
<b>C311</b>	AEE013	Solid State Electric Motor Drives	1.40	1.40	1.40	1.40	-	1.40	-	1.40	-	-	-	1.30	-	1.40	-
<b>C312</b>	AEC022	Microcontrollers and Digital Signal Processing	1.50	1.40	1.30	-	-	-	-	-	-	1.50	-	-	1.20	-	-
<b>C313</b>	AEE503	Energy Audit and Management	1.90	1.80	1.20	1.80		2.00	-	1.80	-	1.90	-	1.90	2.00	1.60	-
<b>C314</b>	ACE551	Disaster Management	2.30	2.30	2.30	2.30	2.30	2.30	-	2.30	2.30	2.30	-	2.30	2.30	2.30	-
<b>C315</b>	AEE201	Ideation and Product Development	1.60	1.60	1.60	1.60	1.60		-		1.60	1.60	-	1.60	1.60	1.60	1.60
<b>C316</b>	AEE013	Solid State Electric Motor Drives Laboratory	-	2.30	2.30	-	2.30	-	-	-	2.30	2.30	-	-	2.30	-	-
<b>C317</b>	AEE110	PLC And Automation Laboratory	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30
<b>C318</b>	AEE114	Microcontrollers and Digital Signal Processing Laboratory	1.80	-	-	-	-	1.80	2.10	-	1.40	-	-	-	-	-	-
<b>C401</b>	AEE014	Power System Protection	1.70	1.70	1.70	1.70	2.00	-	-	-	-	1.70	-	1.70	-	-	2.20
<b>C402</b>	AEE016	Power System Operation and Control	1.70	1.90	2.90	1.80	1.20	1.90	-	-	1.70	1.70	-	1.50	1.70	-	-

<b>C403</b>	AEE015	High Voltage Engineering	2.00	2.00	1.90	-	-	2.00	-	2.20	-	2.00	-	2.70	2.20	2.00	-
C404	AEE516	Power Plant Control and Instrumentation	1.70	1.70	1.70	1.00	-	1.00	0.90	-	1.70	1.70	-	1.70	1.20	1.60	-
<b>C405</b>	ACS553	Fundamentals of Database Management Systems	2.40	2.60	2.30	2.10	2.40	2.60	-	-	-	2.60	-	2.50	2.60	-	-
<b>C406</b>	AEE111	High Voltage Engineering and Solar Laboratory	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	-	2.10	2.10	2.10	-
<b>C407</b>	AEE112	Power System Protection Laboratory	2.10	2.10	2.10	2.10	-	2.10	-	2.10	2.10	2.10	-	2.10	2.10	-	-
<b>C408</b>	AEE113	Power System Computer Aided Design Laboratory	2.10	2.10	2.10	2.10	2.10	2.10	-	2.10	-	-	-	2.10	2.10	2.10	-
<b>C412</b>	AEE401	Comprehensive Examination	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
<b>C413</b>	AEE302	Project Work	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
<b>Direct Attainment Value</b>			<b>1.8</b>	<b>1.8</b>	<b>1.8</b>	<b>1.8</b>	<b>1.9</b>	<b>1.9</b>	<b>2.0</b>	<b>2.0</b>	<b>1.8</b>	<b>1.9</b>	<b>2.1</b>	<b>1.8</b>	<b>1.9</b>	<b>1.8</b>	<b>2.0</b>

### 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)	1.8	1.8	1.8	1.8	1.9	1.9	2	2	1.8	1.9	2.1	1.8	1.9	1.8	2
2.	Student Program exit surveys (b)	2.2	2.2	1.9	1.9	1.8	1.8	1.5	2	2.2	1.8	2.1	1.8	1.9	1.8	2
3.	Employer surveys (c)	2.1	2.1	1.8	1.8	1.8	1.8	1.5	2	2.1	1.8	2.1	1.8	1.8	1.9	2.1
4.	Alumni Survey (d)	2.2	2	1.8	1.9	1.8	1.8	1.5	2	1.9	1.8	2	1.8	1.9	1.8	2.2
<b>Overall attainment = a*0.8 + b*0.1 + c*0.05 + d*0.05</b>		<b>1.88</b>	<b>1.87</b>	<b>1.81</b>	<b>1.82</b>	<b>1.95</b>	<b>1.88</b>	<b>1.90</b>	<b>2.00</b>	<b>1.86</b>	<b>1.88</b>	<b>2.10</b>	<b>1.80</b>	<b>1.90</b>	<b>1.81</b>	<b>2.02</b>

### POs & PSOs Attainment Levels and Actions for improvement:

Sustained efforts are made to ensure continuous attainment by monitoring the resources and processes. The following actions were taken to enhance the target level. The attainment of POs / PSOs and action taken for improvements in attainments for 2019-2020 is illustrated in table

POs	Target Level	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.			
PO1	1.95	1.88	<p><b>Target is achieved</b></p> <p>The attainment statistics of PO1 is as follows:            PO Average: 2.79            PO Target: 70% of PO Average            PO Attainment: 67.20</p>
<p><b>Action 1:</b>  <i>Conducted additional classes for mathematics and basics of electrical engineering courses.</i></p> <p><b>Action 2:</b>  <i>Tutorial classes have been conducted.</i></p> <p><b>Action 3:</b>  <i>The students have been encouraged to participate in technical events and industrial visits so that they can gain insight in engineering fundamental problems.</i></p> <p><b>Action 4:</b>  <i>Bridge courses were conducted as additional mandatory courses for lateral entry students.</i></p> <p><b>Action 5:</b>  <i>Remedial classes were arranged to enhance the performance of the students.</i></p>			
<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.			
PO2	1.61	1.87	<p><b>Target is achieved</b></p> <p>The attainment statistics of PO2 is as follows:            PO Average: 2.3            PO Target: 70% of PO Average            PO Attainment: 81.09</p>
<p><b>Action 1:</b>  <i>Encouraging students to participate in project expo, technical events and industrial visits so that they can gain insight in solving complex engineering problems.</i></p> <p><b>Action 2:</b>  <i>Incorporation of more numerical problems during their regular lectures</i></p> <p><b>Action 3:</b>  <i>Assignments and tutorials classes have been conducted for solving complex engineering problems.</i></p>			

<p><b>Action 4:</b> Model based learning is implementing.</p> <p><b>Action 5:</b> E-learning recorded videos are provided for the slow learners for better understanding.</p>			
<p><b>PO3: Design/development of solutions:</b> 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.</p>			
<b>PO3</b>	1.42	1.81	<p><b>Target is achieved</b></p> <p>The attainment statistics of PO3 is as follows:            PO Average: 2.04            PO Target: 70% of PO Average            PO Attainment:89.60</p>
<p><b>Action 1:</b> Research based learning and ideation &amp; product development modules have been included in the curriculum.</p> <p><b>Action 2:</b> Students are encouraged to participate in project expos, full semester internships and coding competitions like Code-chef, Hackathon etc.</p> <p><b>Action 3:</b> More design-based problems are given as a part of AAT in Control Systems, Electromagnetic field theory and Power system computer aided design laboratory courses.</p> <p><b>Action 4:</b> Guest lecture have been organized by industry experts on High Voltage Engineering and FACTS courses.</p> <p><b>Action 5:</b> In laboratory-based theory courses, open ended experiments have been introduced to inculcate the modelling skills.</p>			
<p><b>PO4: Conduct investigations of complex problems:</b> 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.</p>			
<b>PO4</b>	1.36	1.82	<p><b>Target is achieved</b></p> <p>The attainment statistics of PO4 is as follows:            PO Average: 1.94            PO Target: 70% of PO Average            PO Attainment: 94.53</p>
<p><b>Action 1:</b> Research based complex problems were discussed through Experiential Learning.</p> <p><b>Action 2:</b> Additional facilities like Maker-space and STSP are provided for the students to bring out the innovative ideas.</p> <p><b>Action 3:</b></p>			

More emphasis is given on real life problem in Control System and DC machines and transformer.

**Action 4:**

Smart Indian hackathons, Student’s Innovation Proposals (SIP) are invited for developing prototype models.

**Action 5:**

The students, who are working on modelling and developing the prototypes, are providing the financial aid.

**Action 6:**

Special attention was given on METE (Modeling and Experimental Tools in Engineering) project expos to demonstrate how to analyze and interpreted experimental data and deriving the conclusion of model.

**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>PO5</b>	1.76	1.95	<p><b>Target is achieved</b></p> <p>The attainment statistics of PO5 is as follows:            PO Average: 2.52            PO Target: 70% of PO Average            PO Attainment: 77.18</p>
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**Action 1:**

PLC industrial automation, HVE solar laboratories enable the students to perform experiments on modern tools in addition to conventional laboratories.

**Action 2:**

Some of the experiments in electrical machines laboratories are validated with automation tools.

MATLAB, LabVIEW, Microsoft Visio, SCADA, WPL soft and PSCAD, are the tools used in the laboratories, improves the computing skills of the students.

**Action 3:**

Python, C Programming, Data Structures were introduced in the curriculum.

**Action 4:**

The students are encouraged to use Akanksha: Learning management system, where the digital content of curriculum is made available.

**Action 5:**

The faculty are using ICT tools for teaching-learning.

**Action 6:**

Webinars were conducted “Industrial Software Tools for Electrical Design Engineering”

**Action 7:**

Evaluation of the answer scripts is also done in online mode so the students are made habituated to use modern tools and familiar to use them.

**Action 8:**

The institute have 160 KW roof-top grid connected solar plant which provides the students to get exposed to modern tools, perform analysis of live data.

**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.			
<b>PO6</b>	1.46	1.88	<p><b>Target is achieved</b></p> <p>The attainment statistics of PO6 is as follows:            PO Average: 2.09            PO Target: 70% of PO Average            PO Attainment: 89.95%</p>
<p><b>Action 1:</b>  <i>All the students are required to complete Project Based Learning, Research Based Learning and Ideation and Product development, METE, project work etc. in which the emphasis on learning to follow the complete design engineering process from identification of need, problem formulation, generation of ideas, analysis of solutions, preliminary design, verifying technological feasibility and economic viability, detailed design and implementation.</i></p> <p><b>Action 2:</b>  <i>A separate division is made available for the students through which several community related real life projects are being taken up in the institute. These provide practical real-life situations for understanding the responsibilities relevant to the professional engineering practice.</i></p> <p><b>Action 3:</b>  <i>The students observe the various measures taken up by the institute in the areas of renewable energy, garbage recycling, water harvesting, minimization of energy usage, non-polluting transportation using cycles and electric vehicles and learn frugal innovation for solution of pressing problems and consequent responsibilities relevant to professional engineering practice.</i></p>			
<p><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.</p>			
<b>PO7</b>	1.37	<b>1.94</b>	<p><b>Target is achieved</b></p> <p>The attainment statistics of PO7 is as follows:            PO Average: 1.96            PO Target: 70% of PO Average            PO Attainment: 98.9%</p>
<p><b>Action 1:</b>  <i>Students are encouraged to take up innovative projects on Renewable energy/green energy sources to provide solutions for environmental issues.</i></p> <p><b>Action 2:</b>  <i>A compulsory course on Environmental studies has been introduced for better understanding of the environ-mental issues.</i></p> <p><b>Action 3:</b>  <i>A culture and use of sustainable energy through solar rooftop plant have been promoted. The students are getting awareness on the green initiatives and impact on environment.</i></p> <p><b>Action 4:</b>  <i>The Institution has increased the involvement of its staff and students in several environment related activities with the active participation of students and faculty through the outreach programs.</i></p> <p><b>Action 5:</b>  <i>Tree planting in the campus and in the adopted villages is done regularly as part of the activities of NSS volunteers, Street Cause, well-wisher foundation etc.</i></p>			



<p><b>Action 6:</b> Energy conservation day is celebrated by departmental students' technical association (EETA). The energy conservation is practiced by the installation of energy efficient lighting and other BEE rated appliances in the campus.</p> <p><b>Action 7:</b> Academic workshops are planned to apply more knowledge in the field of solar and wind energy.</p>			
<p><b>PO8: Ethics:</b> Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.</p>			
PO8	1.67	2	<p><b>Target is achieved</b> The attainment statistics of PO8 is as follows: PO Average: 2.38 PO Target: 70% of PO Average PO Attainment: 84.03%</p>
<p><b>Action 1:</b> Career readiness program, intensive training programs, corporate lectures and motivational talks are arranged to inculcate ethical values among students.</p> <p><b>Action 2:</b> All the students have to undergo courses on Professional Ethics and Human Values as a means of promoting harmony and understanding of the Unity in diversity.</p> <p><b>Action 3:</b> Ethical practices are promoted by the ethos of IARE.</p> <p><b>Action 4:</b> Students participate in NSS activities and learn that Service to the Society is an important part of professional life.</p> <p><b>Action 5:</b> Participation in Co-Curricular activities and Extra-curricular which promotes commitment to ethical principles.</p>			
<p><b>PO9: Individual and team work:</b> Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.</p>			
PO9	1.49	1.86	<p><b>Target is achieved</b> The attainment statistics of PO9 is as follows: PO Average: 2.13 PO Target: 70% of PO Average PO Attainment: 87.32%</p>
<p><b>Action 1:</b> Students are encouraged to participate in various activities conducted by EETA to improve their leadership, management and communication skills.</p> <p><b>Action 2:</b> The students have to complete several courses involving team projects like RBL, PBL, ExL, Ideation and Product development, in the course of study. These courses enable students to learn to work in teams and in multidisciplinary areas.</p> <p><b>Action 3:</b></p>			

The department has a class committee representative of each section which extracts their latent leadership qualities.

**Action 4:**

The final year project work may also be taken up as an individual or a group activity depending on the project through the students learn to work in teams.

**Action 5:**

The institute conducts various workshops, seminars and symposiums to increase the co-ordination capabilities of students.

**Action 6:**

The bonding between the students and the capability of working in team has increased during laboratory classes and collaborative learning sessions.

**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.

<b>PO10</b>	1.32	1.88	<p><b>Target is achieved</b>                      The attainment statistics of PO10 is as follows:                      PO Average: 1.89                      PO Target: 70% of PO Average                      PO Attainment: 98.43</p>
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**Action 1:**

Students are to be encouraged to participate and present their work in various conferences / technical meets.

**Action 2:**

Group discussions, seminars, presentations and soft skill training programs at regular interval are organizing to enhance the communication skills.

**Action 3:**

Tech-talk and concept videos are inculcated in curriculum to improve the communication skill of the students.

The presentation on latest technological topics may go beyond the syllabus of theory courses and promote self-learning as well as communication skills.

**Action 4:**

Laboratory and project courses have viva – voce examinations which improves the communication skills.

**Action 5:**

The students are required to submit detailed reports on their project work and seminars for promoting written and oral communication skills.

**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.

<b>PO11</b>	1.58	2.10	<p><b>Target is achieved</b>                      The attainment statistics of PO11 is as follows:                      PO Average: 2.25                      PO Target: 70% of PO Average                      PO Attainment: 93.11%</p>
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**Action 1:**

All the students are required to complete Project Based Learning, Research Based Learning and Ideation and Product development, METE, project work etc. in which the emphasis is on learning to follow the complete design engineering process from identification of need, problem formulation, generation of ideas, analysis of solutions, preliminary design, verifying technological feasibility and economic viability, detailed design and implementation.

**Action 2:**

The electrical engineers' technical associations, (EETA) are formed by the students to promote and conduct various activities by the department like, energy conservation day, science day, women's day engineers' day etc. Thus, the management skills of the students will be improved.

**Action 3:**

The students are also the members of the professional students' chapters, actively conducting technical events etc.

**Action 4:**

The final semester project may also be taken up as an individual or a group activity depending on the project and the students learn to work in teams.

**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.

<b>PO12</b>	1.34	1.80	<p><b>Target is achieved</b>  The attainment statistics of PO12 is as follows:  PO Average: 1.88  PO Target: 70% of PO Average  PO Attainment: 92.78%</p>
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**Action 1:**

The curriculum is prepared such that the students can apply the concepts in future (life-long learning process).

**Action 2:**

Faculties are encouraged to highlight the allied areas of Electrical and Electronics engineering to keep pace with contemporary technologies.

**Action 3:**

Students are encouraged to take an internship through Internshala and other reputed platforms.

**Action 4:**

Introduced usage of modern tools in curriculum.

**Action 5:**

Entrepreneurship awareness and development programs are conducted in regular intervals.

**Action 6:**

Arithmetic reasoning and aptitudes training classes were provided to the students by experts.

**Action 7:**

STSP related activities enable the students to pursue independent projects in an industrial setting with limited mentorship which prepare them for life-long learning.

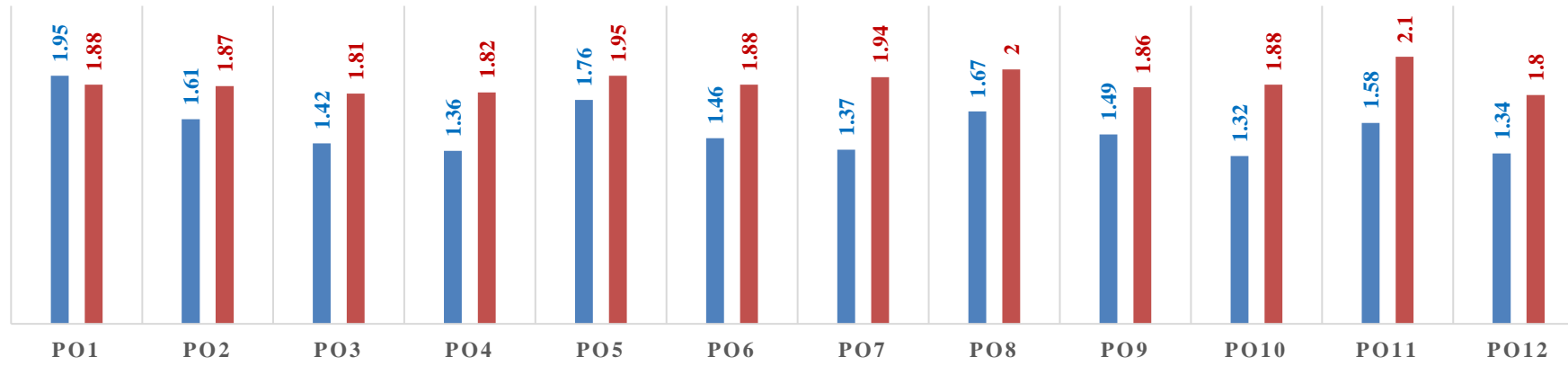
**PSO1:** Design, develop, fabricate and commission the electrical systems involved in power generation, transmission, distribution and utilization.

PSO1	1.41	1.90	<p><b>Target is achieved</b></p> <p>The attainment statistics of PSO1 is as follows:          PSO Average: 2.02          PSO Target: 70% of PSO Average          PSO Attainment: 94.75%</p>
<p><b>Action 1:</b>  <i>Students are motivated to take up the real-life problems during their project work which gives the understanding on various areas of power system.</i></p> <p><b>Action 2:</b>  <i>More emphasis on tutorial classes has been given in electrical circuits and control system.</i></p> <p><b>Action 3:</b>  <i>Importance is given on model-based learning.</i></p> <p><b>Action 4:</b>  <i>Guest lectures have been organized on 'Transient stability in electrical transmission line', 'Smart grid technology', 'Modern power plant instrumentation' etc. to improve the insight of the students towards the operation and control of power system.</i></p> <p><b>Action 5:</b>  <i>Industrial visits to power plants, substations have been organized regularly.</i></p>			
<p><b>PSO2:</b> Focus on the components of electrical drives with its converter topologies for energy conversion, Management and auditing in specific applications of Industry and sustainable rural development.</p>			
PSO2	1.35	1.81	<p><b>Target is achieved</b></p> <p>The attainment statistics of PSO2 is as follows:          PSO Average: 1.93          PSO Target: 70% of PSO Average          PSO Attainment: 93.52%</p>
<p><b>Action 1:</b>  <i>Internships and trainings are arranged for the students.</i></p> <p><b>Action 2:</b>  <i>Guest lecture have been organized on converter topologies.</i></p> <p><b>Action 3:</b>  <i>Students are sent for NSIC for energy auditing.</i></p> <p><b>Action 4:</b>  <i>Students are also made aware of the distribution and management of power in the campus.</i></p> <p><b>Action 5:</b>  <i>Students are also encouraged to take the projects on electric vehicles.</i></p>			
<p><b>PSO3:</b> Gain the hands-on competency skills in PLC automation, process controllers, HMI and other computing tools necessary for entry level position to meet the requirements of the employer.</p>			

<b>PSO3</b>	1.58	<b>2.02</b>	<p><b>Target is achieved</b>  The attainment statistics of PSO3 is as follows:  PSO Average: 2.26  PSO Target: 70% of PSO Average  PSO Attainment: 88.77</p>
<p><b>Action 1:</b>  A well-defining mentoring system through which the students are counselled and encouraged for placements in core as well as in allied areas.</p> <p><b>Action 2:</b>  PLC laboratory is introduced in the curriculum which resembles the basics of industrial operation.</p> <p><b>Action 3:</b>  Some of the experiments in electrical machines laboratories are validated with automation tools.  MATLAB, LabVIEW, Microsoft Visio, SCADA, WPL soft and PSCAD, are the tools used in the laboratories, improves the computing skills of the students.</p> <p><b>Action 4:</b>  Python, C Programming, Data Structures were introduced in the curriculum, improves the placement opportunities in the software industry.</p> <p><b>Action 5:</b>  DBMS, graph theory and courses on algorithms were taught to the students during placement training.</p> <p><b>Action 6:</b>  Arithmetic reasoning and aptitudes training classes were provided to the students by experts.</p> <p><b>Action 7:</b>  The practice test is conducted on in house modules like skill-bridge and skill-up and IARE Go-labs, Build-IT.  Coding competitions are regularly conducted.</p> <p><b>Action 8:</b>  Students are permitted to do their full semester internship at prominent organizations like DRDO, HAL, BHEL, IIT Hyderabad etc.</p>			

### PO ATTAINMENT

■ Target ■ Attainment



### PSO ATTAINMENT

■ Target ■ Attainment



**HOD, EEE**