



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal - 500 043, Hyderabad, Telangana

Department of CSE (Data Science)

PO / PSO Attainment Direct of IARE - UG20 (2022Batch) courses

S No	Course No	Course Code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	C101	AHSC02	Linear Algebra and Calculus	2.50	2.50													
2	C102	AHSC06	Chemistry	2.40	2.90					2.50							2.40	2.90
3	C103	AEEC01	Basic Electrical Engineering	1.80	1.80											1.90		
4	C104	ACSC01	Python Programming	2.40	2.40	2.30		2.40					2.20		2.20	2.40		2.40
5	C105	ACSC06	Experiential Engineering Education (ExEEd)- Academic Success	2.30		2.30	2.30		2.30	2.30	2.30	2.30	2.30	2.30		2.30	2.30	
6	C106	AEEC04	Basic Electrical Engineering Laboratory	.00							3.00	3.00	3.00		3.00	3.00		
7	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	3.00	3.00
8	C108	AMEC04	Engineering Workshop Practice	3.00		3.00			3.00	3.00		3.00						
9	C109	AHSC01	English									2.70						
10	C110	AHSC08	Probability and Statistics	2.00	2.00		2.00	1.80										
11	C111	AHSC09	Applied Physics	1.90	2.00		1.50											
12	C112	ACSC04	Programming for Problem Solving using C	1.50	1.50	1.50		1.50					1.50		1.40	1.50		1.50

13	C113	AHSC04	English Language and Communication Skills Laboratory								3.00	3.00						
14	C114	AHSC05	Physics Laboratory	3.00	3.00		3.00											
15	C115	ACSC05	Programming for Problem Solving using C 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
16	C201	ACSC07	Computer Organization and Architecture	2.40	2.50	2.30	2.20						2.20		2.20	2.30		2.50
17	C202	ACSC08	Data Structures	2.80	2.80	2.80	2.80	2.80					2.80		2.80	2.80	2.80	2.80
18	C203	ACSC12	Operating Systems	2.20	2.10	2.10	2.00	2.20					2.10		2.10	2.10	1.90	2.30
19	C204	ACDC01	Principles of Data Science	2.30	2.10	2.10	2.20	2.00	2.10	2.10		2.10	2.10	2.10	2.10	2.10	2.40	2.20
20	C205	AITC02	Programming with Objects	2.90	2.90	2.90	2.90	2.90					2.90		2.90	2.90		2.90
21	C206	ACSC09	ExEEd - Prototype / Design Building	.00	3.00	3.00	3.00	3.00				3.00	3.00		3.00	3.00	3.00	3.00
22	C207	ACSC10	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	3.00	3.00
23	C208	ACSC11	Advanced Python Programming Laboratory	3.00	3.00	3.00	3.00	3.00				3.00		3.00	3.00	3.00		3.00
24	C209	AITC03	Programming with Objects Laboratory	3.00		3.00		3.00					3.00		3.00		3.00	3.00
25	C210	ACDC03	Data Management and Representation	1.30	1.30	1.30	1.30	1.30					1.30		1.30	1.30	1.40	1.40
26	C211	AITC05	Database Management Systems	1.10	1.10	1.10	1.10	1.10					1.10		1.10	1.10	1.10	
27	C212	ACSC13	Design and Analysis of Algorithms	2.00	1.90	1.10	2.10	1.70					2.00		2.00	2.00	2.10	2.10
28	C213	AITC09	Web Application Development	2.90	2.90	2.90	2.90	2.90							2.90			2.90
29	C214	AHSC13	Business Economics and Financial Analysis	2.80	2.80						2.50	2.50		2.80				

30	C215	ACSC14	Experiential Engineering Education (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	3.00	3.00	3.00	3.00
31	C216	AITC07	Database Management Systems Laboratory		3.00	3.00		3.00					3.00		3.00		3.00	
32	C217	AITC10	Web Application Development Laboratory	3.00	3.00	3.00		3.00					3.00		3.00	3.00	3.00	3.00
33	C218	ACSC16	Linux Programming Laboratory	3.00	3.00	3.00										3.00	3.00	
34	C301	AITC04	Theory of Computation	2.80	2.80	2.90	2.90						2.80		2.80		2.80	2.90
35	C302	AITC06	Computer Networks	1.10	1.10	1.20	1.20						1.00		1.00	1.70	1.20	1.20
36	C303	ACDC04	Software Engineering	1.60	2.00	1.40	1.70	1.80	1.70		1.30	1.80	1.80	1.30	1.70	1.90	1.80	1.80
37	C304	ACDC05	Data Wrangling with Python	2.80	2.80	1.70	2.20	2.50					2.30			2.50	2.80	1.70
38	C305	ACDC08	Image Processing and Analysis	1.10	1.10	1.10	1.10	1.10							1.10	1.10		
39	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	3.00
40	C307	ACSC21	Object Oriented Software Design Laboratory		3.00	3.00	3.00	3.00							3.00		3.00	3.00
41	C308	ACDC09	Data Wrangling and Visualization Laboratory	3.00	3.00	3.00		3.00					3.00			3.00	3.00	3.00
42	C309	ACSC40	Compiler Design	2.80	2.80	2.80		2.80					2.80		2.80		2.80	2.80
43	C310	ACAC13	Natural Language Processing	2.30	2.30	2.30	2.30	2.30					2.30			2.30	2.30	
44	C311	ACAC03	Foundations of Machine Learning	1.40	1.40	1.20	1.30	1.20							1.20	1.20		1.2
45	C312	ACIC10	Principles Of IOT	2.70	2.70	2.70	2.60									2.70		
46	C313	AHSC15	Soft Skills and Interpersonal Communication								2.50	2.30	2.40					

47	C314	ACSC27	Experiential Engineering Education (ExEEd) Research Based Learning	3.00			3.00						3.00					
48	C315	ACAC04	Foundations of Machine Learning Laboratory	2.30	2.30	2.30	2.30	2.30		2.30	2.30				2.30	2.30		2.30
49	C316	ACAC15	Natural Language Processing Laboratory	3.00		3.00		3.00										3.00
50	C401	ACSC31	Big Data and Analytics	2.40	2.40	2.40		2.40					2.40		2.40	2.40	2.30	2.60
51	C402	ACDC24	Mathematical Logic in Artificial Intelligence	.80	2.70	2.80	2.70	2.80	2.80						2.80	2.70	2.60	2.80
52	C403	ACDC12	Human Computer Interaction (UI & UX)	2.80	2.50	2.30		2.60					2.80			2.30	2.60	2.30
53	C404	ACDC13	Data Mining	2.80	2.80	2.80	2.80	2.80					2.80		2.80	2.80	2.80	2.80
54	C405	AECC40	Embedded Systems	2.80	2.80	2.80		2.80					2.80			2.80		
55	C406	ACSC34	Big Data and Analytics Laboratory	3.00	3.00	3.00		3.00					3.00		3.00	3.00	3.00	3.00
56	C407	ACDC25	Artificial Intelligence Laboratory	3.00	3.00	3.00		3.00								3.00	3.00	
57	C408	ACDC17	Project Work (Phase – 1)	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
58	C409	ACDC18	Cloud Computing Tools and Techniques	1.20	1.20	1.20							1.20			1.20	1.20	
59	C410	ACDC21	Computer Vision	2.90	2.90	2.90	2.90	2.90							2.90	2.90	2.90	
60	C411	ACEC31	Disaster Management	2.90					2.90	2.90		2.90						
61	C412	ACDC23	Project Work (Phase-2) / Full Semester Internship	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
Attainment Value				2.5	2.5	2.5	2.4	2.5	2.8	2.7	2.7	2.8	2.5	2.6	2.5	2.4	2.6	2.6

PO/PSO Attainment Indirect:

Survey	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
Student exit surveys(b)	2.8	2.6	2.7	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.8	2.6	2.7
Alumni Survey (c)	2.8	2.6	2.7	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.7	2.6	2.7
Employer surveys(d)	2.7	2.3	2.5	2.6	2.4	2.4	2.6	2.3	2.5	2.6	2.3	2.5	2.5	2.4	2.5
Indirect Attainment	2.7	2.5	2.6	2.6	2.5	2.5	2.6	2.5	2.5	2.6	2.5	2.5	2.6	2.5	2.6

PO/PSO Attainment

PO/PSO Overall Attainment																
Regulation			R20													
Branch			Computer Science and Engineering (Data Science)													
Batch			2021-2025													
S.No	Assessment Components (Direct + Indirect)	Program Outcomes (POs)												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)	2.5	2.5	2.5	2.4	2.5	2.8	2.7	2.7	2.8	2.5	2.6	2.5	2.4	2.6	2.6
2	Program Exit Survey (b)	2.8	2.6	2.7	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.8	2.6	2.7
3	Alumni Survey (c)	2.8	2.6	2.7	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.7	2.6	2.7
4	Employer Survey (d)	2.7	2.3	2.5	2.6	2.4	2.4	2.6	2.3	2.5	2.6	2.3	2.5	2.5	2.4	2.5
Final attainment = a*0.8 + b*0.1 + c*0.05 + d*0.05		2.5	2.6	2.6	2.5	2.5	2.4	2.5	2.8	2.7	2.7	2.8	2.5	2.6	2.5	2.5

PO/PSO Attainment Level:(From Uploaded Document)

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
Indirect Attainment	2.7	2.5	2.6	2.6	2.5	2.5	2.6	2.5	2.5	2.6	2.5	2.5	2.6	2.5	2.6
Direct Attainment	2.5	2.5	2.5	2.4	2.5	2.8	2.7	2.7	2.8	2.5	2.6	2.5	2.4	2.6	2.6

POs Attainment Levels and Actions for Improvement

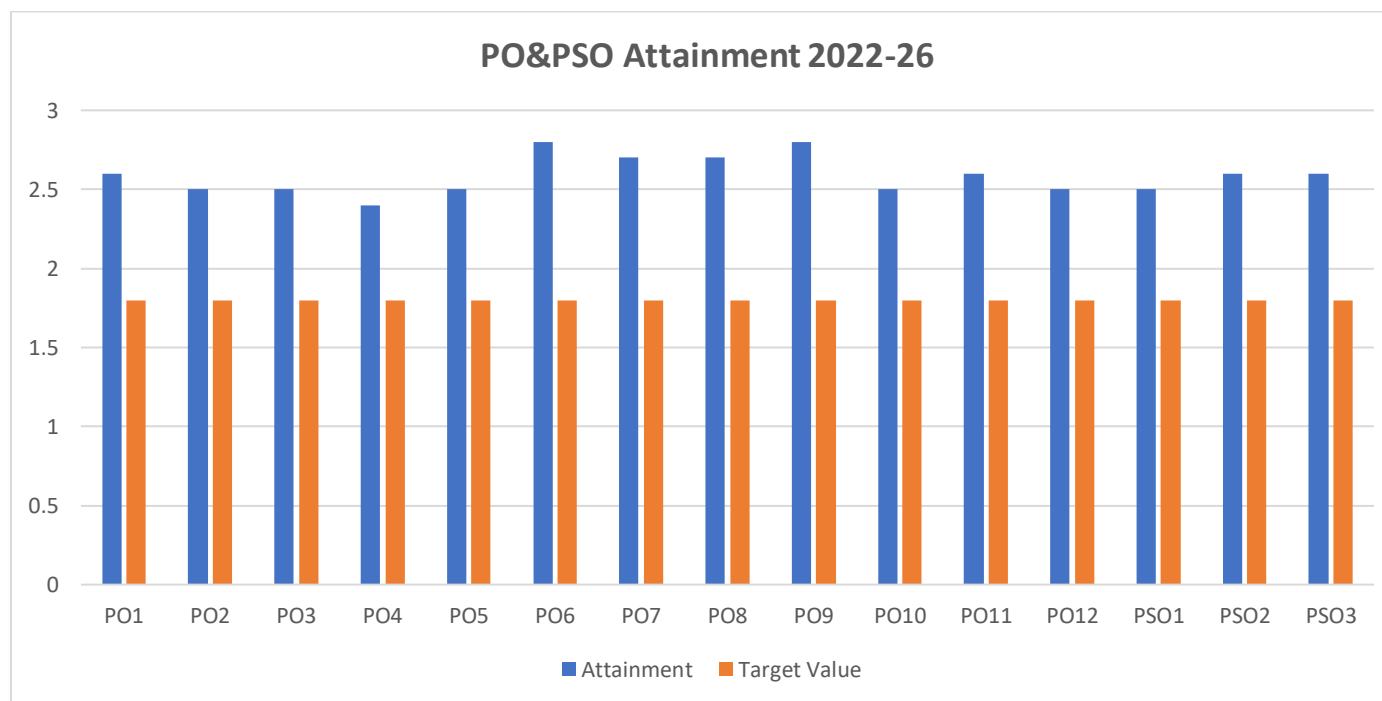
POs	Target Level	Attainment Level	Observation
PO1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.			
PO1	1.8	2.5	PO1 is attained, indicating that students demonstrate satisfactory ability to apply mathematics, science, and engineering fundamentals to solve complex engineering problems..
Action 1: Continue emphasizing real-world problem-solving in lectures and laboratories. Action 2: Introduce mini-projects and case studies to strengthen the application of engineering knowledge. Action 3: Conduct periodic quizzes and assignments to reinforce conceptual understanding. Action 4: Provide additional mentoring and guided learning support to students requiring 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.			
PO2	1.8	2.6	PO2 is attained, indicating that students demonstrate effective analytical and problem-solving abilities in identifying, formulating, and analyzing complex engineering problems
Action1: Strengthen problem-based learning using real-world case studies. Action2: Assign literature review and research-oriented tasks to improve analytical ability. Action3: Conduct modelling, simulation, and problem-analysis activities for complex engineering problems.			
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	1.8	2.6	PO3 is attained, indicating that students are able to design appropriate engineering solutions while considering functional, societal, safety, and environmental requirements.
Action1: Conduct more design-oriented projects incorporating real-world constraints. Action2: Encourage innovative and sustainable solution development through project work. Action3: Promote team-based design activities to strengthen decision-making and practical design skills.			
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	1.8	2.5	PO4 is attained, indicating that students demonstrate satisfactory ability to investigate engineering problems through experimentation, data analysis, interpretation, and valid conclusion development.
Action1: Increase research-oriented laboratory and project activities. Action2. Conduct training on statistical, analytical, and computational tools. Action3. Encourage critical interpretation of experimental results and research literature.			
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	1.8	2.5	PO5 is attained, indicating that students are able to apply appropriate modern engineering and IT tools for modelling, analysis, and problem-solving activities.
Action1: Conduct additional hands-on training using relevant modern engineering and IT tools. Action2: Assign projects requiring the use of software, simulation, and modelling tools. Action3: Organize workshops on emerging technologies and industry-relevant tools.			
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	1.8	2.4	PO6 is attained; however, it has comparatively lower attainment among the POs, indicating the need for further strengthening students' understanding of societal, health, safety, legal, and cultural responsibilities.
Action1: Include more case studies addressing societal, health, safety, and legal issues. Action2: Organize seminars and awareness programmes on professional engineering responsibilities. Action3: Encourage community-oriented and socially relevant engineering projects. 4. Integrate contextual and societal impact analysis into project evaluations.			
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	1.8	2.5	PO7 is attained, indicating that students demonstrate satisfactory awareness of environmental impacts and the importance of sustainable engineering practices.
Action1: Integrate sustainability considerations into project-based learning. Action2: Conduct activities on environmental impact assessment and green technologies. Action3: Encourage students to undertake projects addressing environmental and sustainability challenges.			
PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.			
PO8	1.8	2.8	PO8 is strongly attained, indicating that students demonstrate good awareness and application of professional ethics and responsibilities in engineering practice.
Action1: Continue conducting sessions on engineering ethics and ethical decision-making. Action2: Use case studies involving professional and ethical dilemmas. Action3: Reinforce awareness of professional responsibilities and codes of conduct through curricular and co-curricular activities.			
PO9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings			
PO9	1.8	2.7	PO9 is strongly attained, indicating that students are able to function effectively as individuals and as members or leaders of diverse teams.
Action1: Continue assigning collaborative projects and team-based activities. Action2: Provide opportunities for students to undertake multidisciplinary team assignments. Action3: Use peer assessment and reflection to improve individual contribution and team performance.			
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	2.7	PO10 is strongly attained, indicating that students demonstrate effective technical communication skills through reports, presentations, and interaction.
Action1: Continue technical writing and presentation skill development activities. Action2: Encourage students to prepare structured technical reports and project documentation. Action3: Conduct peer review and feedback sessions to further improve communication effectiveness.			
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.			
PO11	1.8	2.8	PO11 is strongly attained, indicating that students demonstrate good understanding of project planning, management, resource utilization, and teamwork.
Action1: Continue project-based learning with clearly defined planning and management responsibilities.			

Action2: Conduct training on project planning, scheduling, budgeting, and resource management.			
Action3: Encourage the use of appropriate project management tools for monitoring and reporting.			
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.			
PO12	1.8	2.5	PO12 is attained, indicating that students demonstrate satisfactory awareness of the importance of independent and continuous learning in the context of technological advancements.
Action1: Encourage self-directed learning through online courses and certifications.			
Action2: Promote participation in workshops, seminars, and webinars on emerging technologies.			
Action3: Assign research-based and self-learning activities to strengthen continuous learning and problem-solving skills.			

PSOs Attainment Levels and Actions for Improvement

PSOs	Target Level	Attainment Level	Observation
PSO1: Build suitable statistical models, tools and techniques to analyse large data sets for visualization and interpretation.			
PSO1	1.8	2.6	PSO1 is attained, indicating that students demonstrate satisfactory knowledge and ability in applying the programme-specific concepts and technical skills to solve relevant engineering problems.
Action 1: Strengthen programme-specific technical knowledge through advanced laboratory and practical sessions.			
Action 2: Encourage students to undertake application-oriented mini-projects and real-world problem-solving activities.			
Action 3: Organize workshops and hands-on training on relevant modern tools and technologies.			
Action 4: Promote participation in technical competitions, internships, and industry-oriented activities.			
PSO2: Focus on improving software reliability, network security or information retrieval systems.			
PSO2	1.8	2.5	PSO2 is attained, indicating that students are able to apply programme-specific knowledge and skills for analysing and developing solutions to practical engineering problems.
Action 1: Provide more application-oriented assignments and case studies to strengthen practical problem-solving skills.			
Action 2: Encourage students to develop solutions using relevant modern engineering and computational tools.			
Action 3: Conduct skill-development programmes focusing on industry-relevant technologies.			
Action 4: Promote interdisciplinary and collaborative projects to enhance practical and analytical abilities.			
PSO3: Make use of computing theory, mathematics, statistical methods and the principles of optimization techniques in data analytics for providing solutions.			
PSO3	1.8	2.5	PSO3 is attained, indicating that students demonstrate satisfactory ability to apply advanced programme-specific knowledge, engage in independent learning, and address emerging technological challenges.
Action 1: Encourage students to undertake advanced projects addressing real-world engineering challenges.			
Action 2: Promote research-oriented learning and independent problem-solving activities.			
Action 3: Conduct workshops, certification programmes, and training sessions on emerging technologies.			
Action 4: Encourage continuous self-learning and participation in professional development activities.			




HOD-CSE (DS)

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