INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad -500 043

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

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

Course Code	Course	Threshold %	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
AHSC02	Linear Algebra and Calculus	50	2.50	2.30													
AHSC06	Chemistry	50	2.80	2.90					2.90								
AEEC01	Basic Electrical Engineering	50	2.20	2.60											2.50		
ACSC01	Python Programming	50	2.30	2.10	2.20		2.30					2.30		2.30	2.30		2.40
ACSC06	Experiential Engineering Education (ExEEd)-Academic Success	70	3.00		3.00	3.00		3.00	3.00	3.00	3.00	3.00	3.00		3.00	3.00	3.00
AEEC04	Basic Electrical Engineering Laboratory	70	3.00							3.00	3.00	3.00		3.00	3.00		
ACSC02	Python Programming Laboratory	70	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
AMEC04	Engineering Workshop Practice	70	3.00		3.00			3.00	3.00		3.00		3.00				3.00
AHSC01	English	50										2.90					
AHSC08	Probability and Statistics	50	2.30	2.30		2.30	2.90										
AHSC09	Applied Physics	50	2.50	2.40		2.30											2.90
ACSC04	Programming for Problem-Solving using C	50	1.90	1.90	1.90		1.90					1.80		1.80	1.90		1.90
AHSC04	English Language and Communication Skills Laboratory	70									3.00	3.00					
AHSC05	Physics Laboratory	70	3.00	3.00		3.00											3.00
ACSC05	Programming for Problem Solving using C Laboratory	70	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
AITC01	Discrete Mathematical Structures	50	1.40	1.30	1.50										1.40		
ACSC07	Computer Organization and Architecture	50	1.60	1.60	2.20	1.60						1.50		1.50	1.60		2.10
ACSC08	Data Structures	50	2.10	2.20	2.20	1.90	2.20					2.30		2.20	2.30	2.30	2.30
AITC02	Programming with Objects	50	2.50	2.30		2.40	2.40					2.60		2.40	2.20		2.70
AECC08	Analog and Digital Electronics	50	1.20	1.10	1.10							1.20			1.10		

ACSC09	Experiential Engineering Education (ExEEd) - Prototype / Design Building	70	3.00	3.00	3.00	3.00	3.00				3.00	3.00		3.00	3.00	3.00	3.00
ACSC10	Data Structures Laboratory	70	3.00	3.00	3.00	3.00	3.00					3.00		3.00	3.00	3.00	3.00
AITC03	Programming with Objects Laboratory	70	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
ACSC11	Advanced Python Programming Laboratory	70	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
AITC04	Theory of Computation	50	2.50	2.40	2.50	2.80						2.20			2.40		2.60
ACSC12	Operating Systems	50	2.40	2.50	2.30	2.60						2.40		2.70	2.30	2.50	2.80
AITC05	Database Management Systems	50	2.00	2.10	1.90	2.00	1.00					2.20		1.80	1.80	1.90	2.00
ACSC13	Design and Analysis of Algorithms	50	2.30	2.20	1.70	2.20						2.30		2.30	2.40		2.40
AHSC13	Business Economics and Financial Analysis	50	1.50	1.30						1.30	1.30		1.30				
AITC07	Database Management Systems Laboratory	70		3.00	3.00		3.00					3.00		3.00		3.00	
ACSC15	Design and Analysis of Algorithms Laboratory	70		3.00	3.00		3.00					3.00		3.00		3.00	
ACSC16	Linux Programming Laboratory	70	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
AHSC15	Soft Skills and Interpersonal Communication	50								2.80	2.80	2.80					
AITC06	Computer Networks	50	1.10	1.10	1.10	1.10						1.10		1.10	1.10	1.10	1.10
ACSC40	Compiler Design	50	2.30	2.30	2.30		2.30					1.70			2.40	2.80	1.70
ACSC19	Object Oriented Software Engineering	50	2.40	2.60	2.30		2.50					2.60		2.60	2.80		2.40
AITC09	Web Application Development	50	2.40	2.30	2.30	2.80	2.40					2.40		2.40	2.40		2.30
AECC26	Image Processing	50	1.50	1.40	1.40	1.10						1.50		1.40			1.40
ACSC21	Object Oriented Software Design Laboratory	70	3.00	3.00	3.00	3.00	3.00					3.00	3.00	3.00	3.00	3.00	3.00
AITC10	Web Application Development Laboratory	70	3.00	3.00	3.00	3.00	3.00							3.00	3.00	3.00	3.00
AECC40	Embedded Systems	50	2.30	1.90	1.90		1.90					2.30			2.80		
ACIC01	Data Mining and Knowledge Discovery	50	2.00	2.10	2.30	2.20	2.10					2.10	2.60	1.70	2.00	2.10	2.10
ACIC02	Software Quality Assurance and Testing	50	1.10	0.80	0.70	0.60	0.60					0.60		0.60	1.30	1.00	0.80
ACIC03	Network and Web Security	50	1.00	0.90	1.20	1.70	0.70					0.80		0.70	1.30	0.80	1.10
ACIC05	Software Project Management	50	2.80	2.80	2.80		2.60					2.60		2.60	2.80		2.70
ACIC08	Data Mining and Knowledge Discovery Laboratory	70	3.00	3.00	3.00		3.00								3.00		3.00
ACIC09	Software Testing Laboratory	70	3.00		3.00	3.00		3.00	3.00	3.00	3.00	3.00		3.00	3.00	3.00	3.00

ACEC31	Disaster Management	50	2.60					2.80	2.80		2.20						
ACSC30	Cloud Application Development	50	2.80	2.80	2.80		2.80					2.80		2.80	2.80	2.80	2.80
ACSC31	Big Data and Analytics	50	2.80	2.80	2.80		2.80					2.80		2.80	2.80	2.80	2.80
AITC27	Machine Learning	50	2.80	2.80	2.80	2.80						2.80		2.80	2.80	2.80	2.80
ACIC12	Cyber Security	50	2.70	2.80	2.70	2.80	2.80					2.80		2.80	2.70	2.80	2.80
ACSC33	Cloud Application Development Laboratory	70	3.00	3.00	3.00	3.00	3.00					3.00	3.00	3.00	3.00	3.00	3.00
ACSC34	Big Data and Analytics Laboratory	70	3.00	3.00	3.00		3.00									3.00	
ACSC35	Project Work (Phase - I)	70	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
ACDC12	Human-Computer Interaction (UI & UX)	50	2.80	2.80	2.80	2.80	2.80								2.80		2.80
ACCC20	High-Performance Computing	50	2.80	2.80	2.80	2.70	2.80								2.80	2.80	2.70
ACSC39	Project Work (Phase - II)	70	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	2.4	2.5	2.5	2.6	3	3	2.8	2.8	2.5	2.8	2.5	2.5	2.7	2.6

PO / PSO Attainment Overall

Regulation		R20														
Branch		Computer Science and Engineering														
Batch		2020-2024														
S. No	Assessment Components (Direct + Indirect)	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
		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	PSO 3
1	Direct Assessment (CIA + SEE + Course End Survey) (a)	2.5	2.4	2.5	2.5	2.6	3	3	2.8	2.8	2.5	2.8	2.5	2.5	2.7	2.6
2	Program Exit Survey (b)	2.1	2.2	2.1	2.2	2.1	1.9	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.2
3	Alumni Survey (c)	2.5	2.5	2.6	2.6	2.6	2.6	2.6	2.5	2.6	2.5	2.5	2.7	2.3	2.3	2.3
4	Employer Survey (d)	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
Final attainment = a*0.8 + b*0.1 + c*0.05 + d*0.05		2.5	2.4	2.5	2.5	2.5	2.8	2.9	2.7	2.7	2.5	2.7	2.5	2.5	2.6	2.5

POs & PSOs Attainment Levels and Actions for improvement:

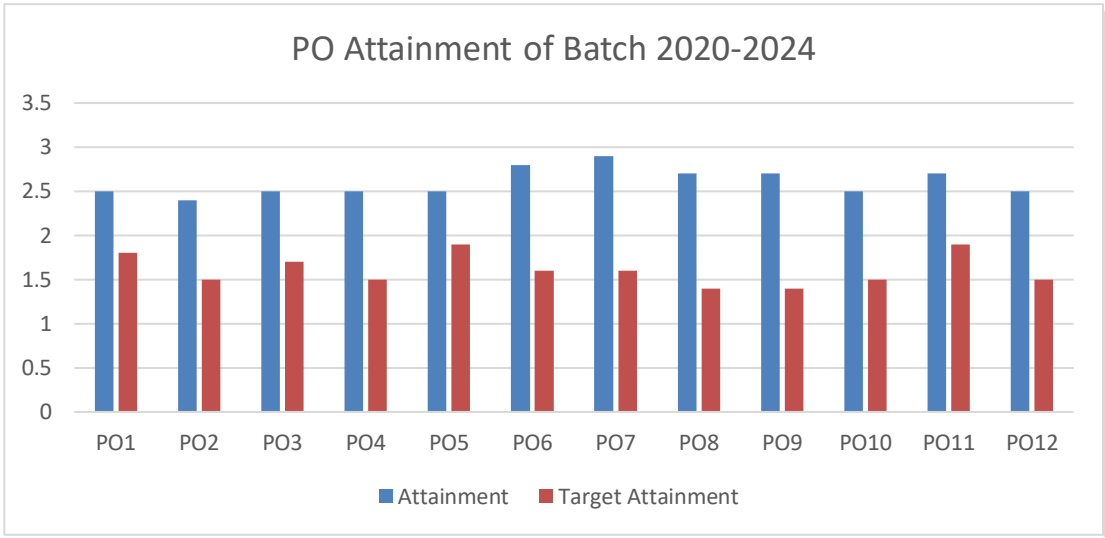
Sustained efforts are made to ensure continuous attainment by monitoring the resources and processes. The following actions were taken to enhance the target level. The attainment of POs / PSOs and action taken for improvements in attainments for 2019-2020 is illustrated in table

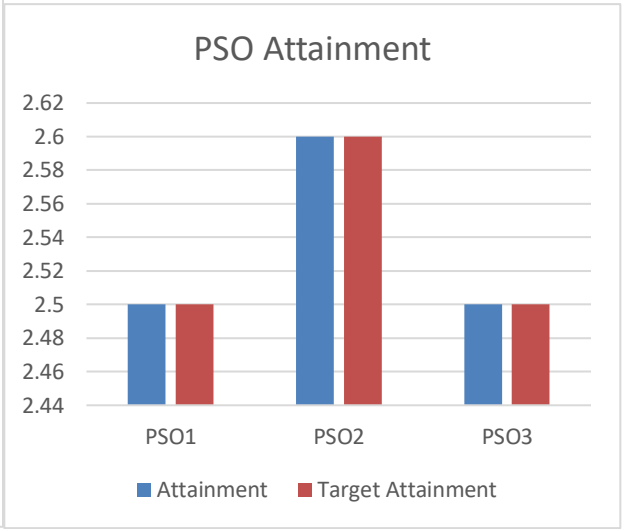
POs/ PSOs	Target Level	Attainment Level	Observations
PO1: Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.			
PO1	**1.8**	**2.5**	Overall attainment of PO1 Target is Achieved. Computer Science and Engineering curriculum has a strong foundation of practical and theoretical knowledge of science, mathematics and own engineering principles. However, students need to know in correlating the theoretical concepts with practical applications in the subjects includes Programming and problem solving using C, computer Networks, data mining and knowledge discovery and Software quality Assurance and testing and Network and Web Security.
Action 1: Critical thinking exercises incorporated to understand the complex engineering problems easier. **Action 2:** Tutorial classes are conducted for improving the students' performance.			
PO2: Problem Analysis: Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.			
PO2	**1.5**	**2.4**	Overall attainment of PO2 reached to the target level. It is observed that Discrete Mathematical structures, Analog and Digital Electronics, Computer Organization and Architecture, Analog and Digital Electronics, Computer Networks and Image Processing courses are moderately attained target level. Need to improve the analytical skills in view of problem identification, model translation and interpretation of results.
Action 1: Students are encouraged to take part in implementation of real-time applications through hackathons, project based learning and case study.			
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	**1.7**	**2.5**	Overall attainment of PO3 reached to the target level in most of the core courses. It is observed that, few of the courses; Network and Web Security, Software quality assurance and testing, Embedded Systems, Design and analysis of Algorithms, Database Management Systems and Computer Networks nearer to target level. The focus on design / development of solution for complex engineering problems are need to be improve.
Action 1: Students are motivated to solve the real-time case studies through designing approaches in related courses of the curriculum for further improvement.			

POs/ PSOs	Target Level	Attainment Level	Observations
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**	**2.5**	Overall attainment of PO4 reached the target level in most of the core courses. It is observed that Computer Organization and Architecture, Data Structures, Computer Networks, Image Processing, and Software Quality assurance and Testing courses attained nearer to the target. A focuson the usage of research-based methods in solutions for complex engineering problems with innovations is needed.
Action 1: Critical thinking problems/ query exercises are incorporated into all the core courses. **Action 2:** Students are encouraged to participate in coding challenges, Hackathons, and various online coding contests.			
PO5: Modern Tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.			
PO5	**1.9**	**2.5**	Overall attainment of PO5 reached the target level in all the courses. It is observed that the courses; Programming and Problem-Solving using C, laboratory courses, Data Base Management Systems, Object Oriented Analysis and Design, and Compiler Design are attained nearer to the target level.Students are encouraged to learn, practice, and make use of appropriate modern tools through training, workshops, and internships.
Action 1: Students are instructed to learn and use the open-source and modern tools in the implementation of projects and participation in hackathons. **Action 2:** Faculty are encouraged to identify course-specific modern tools and encouraged to use them in their regular course work.			
PO6: The Engineer and Society: Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal, and cultural issues and the consequent responsibilities relevant to the professional engineering practice.			
PO6	**1.6**	**2.8**	Overall attainment of PO6 reached the target level in all the relevant courses.
Action 1: Students are encouraged to develop applications in the corresponding laboratory courses and projects for the societal benefit. **Action 2**: Students are motivated to understand the safety concerns and social aspects to expand their practical knowledge.			
PO7: Environment and Sustainability: Understand the impact of professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.			
PO7	**1.6**	**2.9**	Overall attainment of PO7 achieved target level in relevant courses.
Action 1: Awareness camps are conducted on global and environmental issues among the students.			

POs/ PSOs	Target Level	Attainment Level	Observations
PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.			
PO8	**1.4**	**2.7**	Overall attainment of PO8 reached to target level. The students are lagging in real-life situations due to a lack of awareness on ethical principles and norms of the engineering practice.
Action 1: Students are encouraged to participate in professional ethics and security-relevant courses and workshops. **Action 2:** Faculty inculcate ethical values, principles, and professional responsibilities among students, wherever possible in their Teaching and learning practices.			
PO9: Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.			
PO9	**1.4**	**2.7**	Overall attainment of PO9 reached the target level. Consistent efforts are needed to inculcate the habit of individual and team contributions toward the development of multi-disciplinary projects.
Action 1: Flipped classroom practice is made mandatory for programming courses to enhance learning as an individual and among a team. **Action 2:** Students are advised to form multidisciplinary groups in the participation of hackathons and project expos.			
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	**1.5**	**2.5**	Overall attainment of PO10 reached the target level. The communication, presentation, and report writing skills need to be more focused on respective theory and laboratory tasks.
Action 1: More assessment methods are incorporated to enhance oral communication in theory courses through Alternative Assessment Tools (AAT) such asseminar and concept videos. **Action 2**: Demonstration of experiment and viva are incorporated in laboratory day-to-day assessment.			
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	**1.9**	**2.7**	Overall attainment of PO11 reached the target level.
Action 1: Students are encouraged to demonstrate their project work in Project Exhibitions and Hackathons. **Action 2:** Students are advised to develop solutions to address the societal needs.			
PO12: Life-long Learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the			

POs/ PSOs	Target Level	Attainment Level	Observations
broadest context of technological change**.**			
PO12	**1.5**	**2.5**	Overall attainment of PO12 reached the target level.
Action 1: Students are recognized the importance of self-learning and completed certifications and MOOC courses (NPTEL, CISCO, Udemy etc.) on the latest technologies.			
PSO1: Understand, design and analyze computer programs in the areas related to Algorithms, System Software, Web design, Big data, Artificial Intelligence, Machine Learning and Networking.			
PSO1	**2.5**	**2.5**	Overall attainment of PSO1 reached to the target level.
Action 1: Guest lectures are organized by industry experts to bridge the gap between theoretical aspects and real-time applications.			
PSO2: Focus on improving software reliability, network security or information retrieval systems.			
PSO2	**2.6**	**2.6**	Overall attainment of PSO2 reached to the target level. It is observed that, Object Oriented Analysis and Design Course is attained nearer to target.
Action 1: Students are encouraged to participate in workshops and certifications related to the application development with security and information retrieval. **Action 2:** More emphasis has given on usage of different data handling and information retrieval techniques to improve the performance of the system.			
PSO3: Make use of modern computer tools for creating innovative career paths, to be an entrepreneur and desire for higher studies.			
PSO3	**2.5**	**2.5**	Overall attainment of PSO3 reached to the target level. It is observed that Compiler Design Course is attained nearer to target.
Action 1: Guest lectures are organized by industry experts to get awareness on diversified career paths.			


PO Attainment of Batch 2020-2024
3.5
3
2.5
2
1.5
1
0.5
0
PO1
PO2
PO3
PO4
PO5
PO6
PO7
PO8
PO9
PO10
PO11
PO12
Attainment
Target Attainment


PSO Attainment
2.62
2.6
2.58
2.56
2.54
2.52
2.5
2.48
2.46
2.44
PSO1
PSO2
PSO3
Attainment
Target Attainment

HOD, CSE