AEROSPACE ENGINEERING

B.Tech. (Aerospace Engineering) – 2024 Batch
COURSE COMPONENTS AND CURRICULUM
PROGRAM STRUCTURE

S.No	Category	Credits
1	Humanities, Social Sciences including Management Courses [HSMC]	13
2	Basic Science Courses [BSC]	15
3	Engineering Science courses [ESC]	18
4	Professional Core Courses [PCC]	66
5	Professional Elective Courses relevant to chosen specialization/branch [PEC]	18/24
6	Open Electives Courses from other technical and /or emerging Courses [OEC]	6
7	Project	14/8
8	Internship/ Product Development/ Pre-incubation/ Incubation	4
9	Mandatory Courses [MC]	0
10	Skill based Courses [SBC]	6
11	Online Courses	5
	Total Credits	**160+5***

*The students shall earn 5 credits through online courses between 2nd and 7th semester (both inclusive)

COURSE COMPONENTS
Category 1
HUMANITIES AND SOCIAL SCIENCES, MANAGEMENT AND ENTREPRENEURSHIP COURSES

Sl. No	Code No.	Course Title	Credits			
			L	T	P	C
1		Technical Communication / Other Languages • A Stream - Foreign Languages • B Stream - Online Course • C Stream - Classroom teaching including lab	2	0	0	2
2	23MS2001	Concepts and Application in Entrepreneurship	3	0	0	3
3	23AE2076	Industrial Management	3	0	0	3
4	23AE1001	Professional Ethics in Engineering and Aviation Industry	2	0	0	2
5		UHV - II	3	0	0	3
		Total Credits	**13**			

Category 2
BASIC SCIENCES COURSES

Sl. No	Code No.	Course Title	Credits			
			L	T	P	C
1	23CH1002	Essentials of Chemistry for Aerospace Engineers	3	0	0	3
2	23PH1001	Applied Physics for Aerospace Engineering	3	0	0	3
3	23MA1008	Analytic Geometry, Calculus and Linear Algebra	2	0	2	3
4	23MA1009	Differential Equations and Complex Variables	2	0	2	3
5	23MA2009	Numerical Mathematics and Statistics	2	0	2	3
		Total Credits	**15**			

Category 3
ENGINEERING SCIENCES COURSES

	Code No.	Course Title	Credits

Sl. No			L	T	P	C
1	23AE2001	Introduction to Aerospace Engineering	3	0	0	3
2	23AE2002	Engineering Mechanics	3	1	0	4
3	23AE2003	CAD for Aerospace Engineers	0	0	4	2
4	23CS1017	Coding for Problem Solving - Python	3	0	0	3
5	23CS1018	Coding for Problem Solving - Python Laboratory	0	0	2	1
6	23EC2015	Basics of Electronics for Aerospace Engineers	3	0	0	3
7	23CS1015	C Programming and Applications	2	0	0	2
		Total Credits		**18**		

Category 4
PROFESSIONAL CORE COURSES

Sl. No.	Code No.	Course Title	Credits			
			L	T	P	C
1	23AE2004	Basics of Fluid Mechanics	3	0	0	3
2	23AE2005	Fluid Mechanics Laboratory	0	0	2	1
3	23AE2006	Strength of Materials	3	0	0	3
4	23AE2007	Strength of Materials Laboratory	0	0	2	1
5	23AE2008	Engineering Thermodynamics	3	0	0	3
6	23AE2009	Thermodynamics Laboratory	0	0	2	1
7	23AE2010	Introduction to Aerospace Materials	3	0	0	3
8	23AE2011	Aerospace Structures-I	3	0	0	3
9	23AE2012	Propulsion-I	3	0	0	3
10	23AE2013	Aircraft Instrumentation and Avionics	3	0	0	3
11	23AE2014	Aerodynamics	3	0	0	3
12	23AE2015	Aerodynamics Laboratory	0	0	2	1
13	23AE2016	Airplane Performance	3	0	0	3
14	23AE2017	CAD/CAM Laboratory	0	0	4	2
15	23AE2018	Aircraft Instrumentation and Avionics Laboratory	0	0	2	1
16	23AE2019	Gas Dynamics	3	0	0	3
17	23AE2020	Aerospace Structures-II	3	0	0	3
18	23AE2021	Aerospace Structures and Composite Laboratory	0	0	2	1
19	23AE2022	Propulsion-II	3	0	0	3
20	23AE2023	Heat and Mass Transfer	3	0	0	3
21	23AE2024	Propulsion Laboratory	0	0	2	1
22	23AE2025	Heat and Mass Transfer Laboratory	0	0	2	1
23	23AE2026	Aircraft Stability and Control	3	0	0	3
24	23AE2027	Computational Fluid Dynamics	3	0	0	3
25	23AE2028	Computational Fluid Dynamics Laboratory	0	0	2	1
26	23AE2029	Finite Element Analysis	3	0	0	3
27	23AE2030	Finite Element Analysis Laboratory	0	0	2	1
28	23AE2031	Space Dynamics	3	0	0	3
29	23AE2032	Aircraft Design Project	0	0	6	3
		Total Credits		**66**		

Category 5
PROFESSIONAL ELECTIVES COURSES

Sl. No.	Code No.	Course Title	Credits			
			L	T	P	C

1	23AE2033	Helicopter Aerodynamics	3	0	0	3
2	23AE2034	Theory of Elasticity	3	0	0	3
3	23AE2035	Design and Analysis of Composite Structures	3	0	0	3
4	23AE2036	Introduction to Non-Destructive Testing	3	0	0	3
5	23AE2037	Structural Vibration	3	0	0	3
6	23AE2038	Aeroelasticity	3	0	0	3
7	23AE2039	Cryogenic Propulsion	3	0	0	3
8	23AE2040	Rocket and Missiles	3	0	0	3
9	23AE2041	Advanced Space Dynamics	3	0	0	3
10	23AE2042	Air Traffic Control and Aerodrome Details	3	0	0	3
11	23AE2043	Aircraft Systems	3	0	0	3
12	23AE2044	Basics of Acoustics	3	0	0	3
13	23AE2045	Experimental Stress Analysis	3	0	0	3
14	23AE2046	Boundary Layer Theory	3	0	0	3
15	23AE2047	Introduction to Hypersonic Flows	3	0	0	3
16	23AE2048	Fatigue and Fracture Mechanics	3	0	0	3
17	23AE2049	Fundamental of Combustion	3	0	0	3
18	23AE2050	Unmanned Aircraft Systems	3	0	0	3
19	23AE2051	Industrial Aerodynamics	3	0	0	3
20	23AE2052	Navigation, Guidance and Control of Aerospace Vehicles	3	0	0	3
21	23AE2053	Advanced Computational Fluid Dynamics Laboratory	0	0	2	1
22	23AE2054	Wind Tunnel Techniques	3	0	0	3
23	23AE2055	Machine Learning and Artificial Intelligence in Aerospace Applications	3	0	0	3
24	23AE2056	Internet of Things in Aerospace Applications	3	0	0	3
25	23AE2057	Space Systems Engineering	3	0	0	3
26	23AE2058	Engineering Design and Cost Engineering	3	0	0	3
27	23ME2054	3D Printing Laboratory	0	0	4	2

Category 6
OPEN ELECTIVES COURSES FROM OTHER TECHNICAL AND /OR EMERGING COURSES

S.No	Code No.	Course Title	Credits			
			L	T	P	C
1	23AE2060	Basics of Aerospace Engineering	3	0	0	3
2	23AE2061	Road Vehicle Aerodynamics	3	0	0	3
3	23AE2062	Wind Turbine Design	3	0	0	3
4	23AE2063	Building Aerodynamics	3	0	0	3
5	23AE2064	Introduction to Unmanned Aircraft Systems	3	0	0	3
6	23AE2065	Foundations of Space Engineering	3	0	0	3

Category 7
PROJECTS, PATENT AND PRODUCTS

Sl. No.	Code No.	Course Title	Credits			
			L	T	P	C
1	23AE2998/ 23AE2999	Project	0	0	12/24	8/14
		Total Credits			**14**	

Category 8
INTERNSHIP/ PRODUCT DEVELOPMENT/ PRE-INCUBATION/ INCUBATION

Sl. No.	Code No.	Course Title	Credits			
			L	T	P	C
1	ISP2921/ ISP2922/ ISP2923/ ISP2924/ ITP2921/ ITP2922/ ITP2923/ ITP2924/	Internship / Industrial Training	15 Days			1
2	ISP2911/ ISP2912/ ITP2911/ ITP2912/		30 Days			2
		Total Credits	**4**			

Category 9
MANDATORY COURSES

Sl. No	Course Code	Course Name	Category	Hours per week			Credits
				L	T	P	
THEORY							
1	18MS2014	Constitution of India	MC	2	0	0	0
2	18CH2001	Environmental Studies	MC	2	0	0	0
5	23MS2003	Indian Knowledge System	MC	2	0	0	0

Category 10
SKILL BASED COURSES

Sl. No	Course Code	Course Name	Hours per week			Credits
			L	T	P	
1	23AE2066	Engineering Computations using Spreadsheets	0	0	4	2
2	23AE2067	Engineering Computations using MATLAB	0	0	4	2
3	23AE2068	UAV Laboratory	0	0	2	1
4	23AE2069	Composite Materials Laboratory	0	0	2	1
		Total Credits	**6**			

SEMESTER-WISE CURRICULUM
Semester I

Sl. No	Category	Code No.	Course Title	L	T	P	Credits
1	BSC	23MA1008	Analytic Geometry, Calculus and Linear Algebra	2	0	2	3
2	BSC	23CH1002	Essentials of Chemistry for Aerospace Engineers	3	0	0	3
3	ESC	23AE2001	Introduction to Aerospace Engineering	3	0	0	3
4	ESC	23EC2015	Basics of Electronics for Aerospace Engineering	3	0	0	3
5	SBC	23AE2066	Engineering Computations using Spreadsheets	0	0	4	2
6	HSMC	23MS2001	Concepts and Application in Entrepreneurship	3	0	0	3
7	ESC	23CS1015	C Programming and Applications	2	0	0	2
8	MC		Mandatory Course I	2	0	0	0
			Total Contact Hours				19

Semester II

Sl. No	Category	Code No.	Course Title	L	T	P	Credits
1	HSMC		Technical Communication / Other Languages • A Stream – Foreign Languages • B Stream – Online Course • C Stream – Classroom teaching including lab	2	0	0	2
2	BSC	23MA1009	Differential Equations and complex Variables	2	0	2	3
3	ESC	23AE2002	Engineering Mechanics	3	1	0	4
4	ESC	23CS1017	Coding for Problem Solving - Python	3	0	0	3
5	BSC	23PH1001	Applied Physics for Aerospace Engineering	3	0	0	3
6	HSMC	23AE1001	Professional Ethics in Engineering and Aviation Industry	2	0	0	2
8	ESC	23CS1018	Coding for Problem Solving - Python Laboratory	0	0	2	1
9	SBC	23AE2067	Engineering Computations using MATLAB	0	0	4	2
10	MC		Mandatory Course II	2	0	0	0
			Internship / Industrial Training/ Certified Course/ NPTEL *				1
				Total Credits			20+1
*For exit students only							

Semester III

Sl. No	Category	Code No.	Course Title	L	T	P	Credits
1	BSC	23MA2009	Numerical Mathematics and Statistics	2	0	2	3
2	PCC	23AE2004	Basics of Fluid Mechanics	3	0	0	3
3	PCC	23AE2006	Strength of Materials	3	0	0	3
4	PCC	23AE2008	Engineering Thermodynamics	3	0	0	3
5	PCC	23AE2010	Introduction to Aerospace Materials	3	0	0	3
6	ESC	23AE2003	CAD for Aerospace Engineers	0	0	4	2
7	PCC	23AE2005	Fluid Mechanics Laboratory	0	0	2	1
8	PCC	23AE2007	Strength of Materials Laboratory	0	0	2	1
9	PCC	23AE2009	Thermodynamics Laboratory	0	0	2	1
				Total Credits			20

Semester IV

Sl. No	Category	Code No.	Course Title	L	T	P	Credits
1	PCC	23AE2011	Aerospace Structures-I	3	0	0	3
2	PCC	23AE2012	Propulsion-I	3	0	0	3
3	PCC	23AE2014	Aerodynamics	3	0	0	3

4	PCC	23AE2016	Airplane Performance	3	0	0	3
5	PCC	23AE2013	Aircraft Instrumentation and Avionics	3	0	0	3
6	PCC	23AE2018	Aircraft Instrumentation and Avionics Laboratory	0	0	2	1
7	PCC	23AE2015	Aerodynamics Laboratory	0	0	2	1
8	PCC	23AE2017	CAD/CAM Laboratory	0	0	4	2
9	HSMC		UHV - II	3	0	0	3
10	PROJECT	ISP2921/ ITP2921	Internship / Industrial Training - I	15 Days			2
				Total Credits			24

Semester V

Sl. No	Category	Code No.	Course Title	L	T	P	Credits
1	PCC	23AE2019	Gas Dynamics	3	0	0	3
	PCC	23AE2020	Aerospace Structures-II	3	0	0	3
2	PCC	23AE2022	Propulsion-II	3	0	0	3
3	PCC	23AE2023	Heat and Mass Transfer	3	0	0	3
4	PCC	23AE2024	Propulsion Laboratory	0	0	2	1
5	PCC	23AE2025	Heat and Mass Transfer Laboratory	0	0	2	1
6	PCC	23AE2021	Aerospace Structures and Composite Laboratory	0	0	2	1
7	PEC		Professional Elective Course – 1	3	0	0	3
8	OEC		Open Elective Course – 1	3	0	0	3
9	HSMC	23AE2076	Industrial Management	3	0	0	3
				Total Credits			24

Semester VI

Sl. No	Category	Code No.	Course Title	L	T	P	Credits
1	PCC	23AE2026	Aircraft Stability and Control	3	0	0	3
2	PCC	23AE2027	Computational Fluid Dynamics	3	0	0	3
3	PCC	23AE2029	Finite Element Analysis	3	0	0	3
4	PCC	23AE2028	Computational Fluid Dynamics Laboratory	0	0	2	1
5	PCC	23AE2030	Finite Element Analysis Laboratory	0	0	2	1
6	PEC		Professional Elective Course – 2	3	0	0	3
7	PEC		Professional Elective Course – 3	3	0	0	3
8	OEC		Open Elective Course – 2	3	0	0	3
9	SBC	23AE2069	Composite Materials Laboratory	0	0	2	1
10	Project	ISP2923/	Internship Industrial Training - II	15 Days			2

							Total Credits	23

Semester VII

Sl. No	Category	Code No.	Course Title	L	T	P	Credits
1	PCC	23AE2031	Space Dynamics	3	0	0	3
2	PCC	23AE2032	Aircraft Design Project	0	0	6	3
3	SBC	23AE2068	UAV Laboratory	0	0	2	1
4	PEC		Professional Elective Course – 4	3	0	0	3
5	PEC		Professional Elective Course – 5	3	0	0	3
6	PEC		Professional Elective Course – 6	3	0	0	3
						Total Credits	16

Semester: VIII

Sl. No	Category	Code No.	Course Title	L	T	P	Credits
1	ISP	23AE2999	Project (Full Semester)	-	-	-	14
2	ISP	23AE2998	Project (Part Semester)	-	-	-	8
3	PEC		Professional Elective Course – 7	3	0	0	3
4	PEC		Professional Elective Course – 8	3	0	0	3
						Total Credits	14

Specialization offered to the B. Tech. Aerospace Engineering

B. Tech. (Hons.) Aerospace Engineering with specialization in Wind Power Engineering

Code No.	Course Title	Credits			
		L	T	P	C
23AE2070	Wind Turbine Design and Performance	3	0	0	3
23AE2071	Wind Energy Laboratory	0	0	4	2
23AE2077	Project for Wind Power Engineering	0	0	16	6
23AE2073	Industry Certification	0	0	12	4

B. Tech. (Hons.) Aerospace Engineering with specialization in Unmanned Aerial Vehicles

Code No.	Course Title	Credits			
		L	T	P	C
23AE2074	UAV Operations	3	0	0	3
23CS2055	Drones and IoT Laboratory	0	0	4	2
23AE2075	Project for Unmanned Aerial Vehicles	0	0	16	6
23AE2073	Industry Certification	0	0	12	4