

AEROSPACE ENGINEERING

**B.Tech. (Aerospace Engineering) – 2023 Batch
REVISED COURSE COMPONENTS AND CURRICULUM**

S.No	Category	Credits
1	Humanities, Social Sciences including Management Courses [HSMC]	10
2	Basic Science Courses [BSC]	15
3	Engineering Science courses [ESC]	18
4	Professional Core Courses [PCC]	69
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 <ul style="list-style-type: none"> • 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
Total Credits			10			

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
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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	8	4
30	23ME2054	3D Printing Laboratory	0	0	4	2
		Total Credits	69			

**Category 5
PROFESSIONAL ELECTIVES COURSES**

	Code No.	Course Title	Credits
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Sl. No.			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

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
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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 <ul style="list-style-type: none"> • 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	SBC	23AE2068	UAV Laboratory	0	0	2	1
10	PROJECT	ISP2921/ ITP2921	Internship / Industrial Training - I	15 Days			2
Total Credits							22

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	8	4
3	PCC	23ME2054	3D Printing Laboratory	0	0	4	2
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							18

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 to be offered to the B. Tech. Aerospace Engineering

The Aerospace Engineering programs offered with specialization is finalized as given below.

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