

M. TECH. BULLETIN

2024 – 2025

**AEROSPACE ENGINEERING
DEPARTMENT**

IIT BOMBAY

(Updated 5th July, 2024)

COURSE CURRICULUM

The two-year M. Tech. programme in Aerospace Engineering has the following four specializations:

1. Aerodynamics (AE 1)
2. Dynamics & Control (AE 2)
3. Aerospace Propulsion (AE 3)
4. Aerospace Structures (AE 4)

The course curriculum for the first two semesters of M. Tech. programme is specific to each specialization, the details of which are given in the following pages. The third and fourth semesters are common to all specializations.

The core courses prescribed for the AE 1, AE 2, AE 3 and AE 4 specializations are listed in the Tables I(a)-(d), respectively.

Students have to take several elective courses as specified in Table I (viz. 6 for AE1, AE2 and AE3, but 4 for AE4), subject to the following rules (with none of the electives being repeated). The set of courses available for this appear in the separate ‘AE Electives’ document.

- Students may take all the requisite electives from the set of their specialization-specific options.
- However, students may choose to fulfil up to two of these elective requirements from the courses listed under any other M. Tech. specialization of the Aerospace Department (core or elective).
 - As a further flexibility, one of the two electives mentioned in the previous point can be chosen from any other course within the Institute in consultation with the Faculty Adviser.

All elective courses must be at least at the 400-level.

Apart from the above electives, students have to choose one “Institute elective” from the list provided by the institute at the beginning of the semester.

Moreover, students have to take a “Communication Skills” course that inculcates comprehension and articulation of technical material, and instils ethical practices in academia. A further compulsory “Seminar” course offers students the opportunity to practice these skills by undertaking a survey of a relevant topic under the guidance of a faculty member of the department. The seminar involves preparing a report and a presentation on the chosen topic.

The available elective courses as well as the contents of the departmental courses appear in separate documents.

Overview of Number of Courses and Credit Structure

Specializations: Aerodynamics (AE 1), Dynamics and Control (AE 2), Aerospace Propulsion (AE 3), Aerospace Structures (AE 4)

Item	Number of Courses in Semesters				Total Credits
	I	II	III	IV	
Core Courses	3 (AE1, AE2, AE3), 4 (AE4)	1 (AE1, AE2, AE3), 2 (AE4)	–	–	24 (AE1, AE2, AE3), 36 (AE4)
Dept Electives	2 (AE1, AE2, AE3), 0 (AE4)	1 (AE1, AE2, AE3), 1 (AE4)	2	1	36 (AE1, AE2, AE3), 24 (AE4)
Institute Elective	–	1	–	–	6
Lab. Course	0 (AE1, AE2, AE3), 1 (AE4)	1 (AE1, AE2, AE3), 0 (AE4)	–	–	4
Seminar	–	1	–	–	4
Communication	–	(+ 1)	–	–	(+ 6) ^{\$}
Total	5	5 (+ 1)	2	1	74 (+ 6)
M. Tech. Project	–	–	Stage I* (42 credits)	Stage II (42 credits)	84
Total Credits	30 (AE1, AE2, AE3), 28 (AE4)	26 (+ 6) (AE1, AE2, AE3), 28 (+6) (AE4)	54	48	158 (+ 6)

^{\$}P/NP (Credits only for load purposes)

*Students must register for Stage I of M. Tech. project in second semester (January)

Table I(a) – Course Curriculum for M. Tech. Degree in Aerodynamics, AE 1											
Semester I					Semester II						
Course Code	Course Name	Credit Structure				Course Code	Course Name	Credit Structure			
		L	T	P	C			L	T	P	C
AE 705	Introduction to Flight	3	0	0	6	AE 706	Computational Fluid Dynamics	3	0	0	6
AE 707	Aerodynamics of Aerospace Vehicles	3	0	0	6	AE 899	Communication Skills*	1	2	0	6*
AE 616	Gas Dynamics	3	0	0	6	AE 694	Seminar	0	0	4	4
	Elective I	3	0	0	6	AE 611	Aerodynamics Lab	0	0	4	4
	Elective II	3	0	0	6		Elective III	3	0	0	6
							Institute Elective	3	0	0	6
	Total				30		Total				32
Semester III					Semester IV						
Course Code	Course Name	Credit Structure				Course Code	Course Name	Credit Structure			
		L	T	P	C			L	T	P	C
AE 796	M. Tech. Project - I				42	AE 798	M. Tech. Project - II				42
	Elective IV	3	0	0	6		Elective VI	3	0	0	6
	Elective V	3	0	0	6						
	Total				54		Total				48

* P/NP Course, credits only for load purposes

Table I(b) – Course Curriculum for M. Tech. Degree in Dynamics & Control, AE 2											
Semester I					Semester II						
Course Code	Course Name	Credit Structure				Course Code	Course Name	Credit Structure			
		L	T	P	C			L	T	P	C
AE 705	Introduction to Flight	3	0	0	6	AE 717	Aircraft Flight Dynamics	3	0	0	6
AE 775	System Modelling, Dynamics and Control	3	0	0	6	AE 899	Communication Skills*	1	2	0	6*
AE 695	State Space Methods for Flight Vehicles	3	0	0	6	AE 694	Seminar	0	0	4	4
	Elective I	3	0	0	6	AE 699	Control System Lab	0	0	4	4
	Elective II	3	0	0	6		Elective III	3	0	0	6
							Institute Elective	3	0	0	6
	Total				30		Total				32
Semester III					Semester IV						
Course Code	Course Name	Credit Structure				Course Code	Course Name	Credit Structure			
		L	T	P	C			L	T	P	C
AE 796	M. Tech. Project - I				42	AE 798	M. Tech. Project - II				42
	Elective IV	3	0	0	6		Elective VI	3	0	0	6
	Elective V	3	0	0	6						
	Total				54		Total				48

* P/NP Course, credits only for load purposes

Table I(c) – Course Curriculum for M. Tech. Degree in Propulsion, AE 3											
Semester I					Semester II						
Course Code	Course Name	Credit Structure				Course Code	Course Name	Credit Structure			
		L	T	P	C			L	T	P	C
AE 705	Introduction to Flight	3	0	0	6	AE 708	Aerospace Propulsion	3	0	0	6
AE 683	Fluid Dynamics	3	0	0	6	AE 899	Communication Skills*	1	2	0	6*
AE 711	Aircraft Propulsion	3	0	0	6	AE 694	Seminar	0	0	4	4
	Elective I	3	0	0	6	AE 607	Aircraft Propulsion Lab	0	0	4	4
	Elective II	3	0	0	6		Elective III	3	0	0	6
							Institute Elective	3	0	0	6
	Total				30		Total				32
Semester III					Semester IV						
Course Code	Course Name	Credit Structure				Course Code	Course Name	Credit Structure			
		L	T	P	C			L	T	P	C
AE 796	M. Tech. Project - I				42	AE 798	M. Tech. Project - II				42
	Elective IV	3	0	0	6		Elective VI	3	0	0	6
	Elective V	3	0	0	6						
	Total				54		Total				48

* P/NP Course, credits only for load purposes

Table I(d) – Course Curriculum for M. Tech. Degree in Structures, AE 4											
Semester I					Semester II						
Course Code	Course Name	Credit Structure				Course Code	Course Name	Credit Structure			
		L	T	P	C			L	T	P	C
AE 705	Introduction to Flight	3	0	0	6	AE 673	Fibre Reinforced Composites	3	0	0	6
AE 709	Aerospace Structures	3	0	0	6	AE 678	Aero-elasticity	3	0	0	6
AE 715	Structural Dynamics	3	0	0	6	AE 899	Communication Skills*	1	2	0	6*
AE 649	Finite Element Method	3	0	0	6	AE 694	Seminar	0	0	4	4
AE 727	Aircraft Structural Mechanics Lab	0	0	4	4		Elective I	3	0	0	6
							Institute Elective	3	0	0	6
	Total				28		Total				34
Semester III					Semester IV						
Course Code	Course Name	Credit Structure				Course Code	Course Name	Credit Structure			
		L	T	P	C			L	T	P	C
AE 796	M. Tech. Project - I				42	AE 798	M. Tech. Project - II				42
	Elective II	3	0	0	6		Elective IV	3	0	0	6
	Elective III	3	0	0	6						
	Total				54		Total				48

* P/NP Course, credits only for load purposes

Document History

- 2024-07-05: AE 649 and AE 673 are swapped between the 1st and 2nd semesters for AE 4 (Table I(d)).
- 2024-03-13: Relative to previous year's curriculum: AE 683 replaces AE 707 as core course for AE 3; Lab moved from Sem I to Sem II for AE1, AE2 and AE3, and one elective moved from Sem II to Sem I to balance the total credits. Corrected typo in elective numbers for AE4.