

M. TECH. BULLETIN

2020 – 2021

**AEROSPACE ENGINEERING
DEPARTMENT**

IIT BOMBAY

(Updated 29th July, 2021)

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 must also take the requisite number of 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):

- Students may take all the requisite electives from the course lists given in Tables II(a)-(d) (appearing in a separate document) specific to their individual specialization.
- However, students may choose to fulfil up to two of these elective requirements from the courses listed under any other 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 contents of the departmental courses appear in a separate document.

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	1 (AE1, AE2, AE3), 0 (AE4)	2 (AE1, AE2, AE3), 1 (AE4)	2	1	36 (AE1, AE2, AE3), 24 (AE4)
Institute Elective	–	1	–	–	6
Lab. Course	–	1	–	–	4
Seminar	–	1	–	–	4
R & D Project	–	–	–	–	–
Communication	+ (1 + 1)	–	–	–	+ (2 + 4) ^S
Training (P/NP)	–	–	–	–	–
Total	4 + (1 + 1)	6	2	1	74 (+ 6)
M. Tech. Project	–	–	Stage I* (42 credits)	Stage II (42 credits)	84
Total Credits	24 (+ 6)	32	54	48	158 (+ 6)

^SP/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 611	Aerodynamics Lab	0	0	4	4
AE 616	Gas Dynamics	3	0	0	6		Institute Elective	3	0	0	6
	Elective I	3	0	0	6		Elective II	3	0	0	6
HS 791 + AE 792	Communication Skills				2* + 4*		Elective III	3	0	0	6
						AE 694	Seminar	0	0	4	4
	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
Total Credit = 30 + 32 + 54 + 48 = 164											

* 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 699	Control System Lab	0	0	4	4
AE 695	State Space Methods for Flight Vehicles	3	0	0	6		Institute Elective	3	0	0	6
	Elective I	3	0	0	6		Elective II	3	0	0	6
HS 791 + AE 792	Communication Skills				2* + 4*		Elective III	3	0	0	6
	Total				30	AE 694	Seminar	0	0	4	4
							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
Total Credit = 30 + 32 + 54 + 48 = 164											

* 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 707	Aerodynamics of Aerospace Vehicles	3	0	0	6	AE 607	Aircraft Propulsion Lab	0	0	4	4
AE 711	Aircraft Propulsion	3	0	0	6		Institute Elective	3	0	0	6
	Elective I		0	0	6		Elective II	3	0	0	6
HS 791 + AE 792	Communication Skills				2* + 4*		Elective III	3	0	0	6
	Total				30	AE 694	Seminar	0	0	4	4
							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
Total Credit = 30 + 32 + 54 + 48 = 164											

* 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 678	Aero-elasticity	3	0	0	6
AE 709	Aerospace Structures	3	0	0	6	AE 649	Finite Element Method	3	0	0	6
AE 715	Structural Dynamics	3	0	0	6	AE 727	Aircraft Structural Mechanics Lab	0	0	4	4
AE 673	Fibre Reinforced Composites	3	0	0	6		Institute Elective	3	0	0	6
HS 791 + AE 792	Communication Skills				2* + 4*		Elective I	3	0	0	6
	Total				30	AE 694	Seminar	0	0	4	4
							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 II	3	0	0	6		Elective IV	3	0	0	6
	Elective III	3	0	0	6						
	Total				54		Total				48
Total Credit = 30 + 32 + 54 + 48 = 164											

* P/NP Course, credits only for load purposes

Document History

- 2021-07-29: Removed specialization electives lists and course contents to separate documents
- 2021-07-22: ME 781 added to Tables II(a)-(d)
- 2021-07-08: Departmental elective rules rephrased for clarity; rules for AE4 relaxed; AE 720 has become a 6-credit course, with an updated syllabus
- 2020-07-21: First version