

# **M. TECH. BULLETIN**

**2022 – 2023**

**AEROSPACE ENGINEERING  
DEPARTMENT**

**IIT BOMBAY**

**(Created 9<sup>th</sup> June, 2022)**

## 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.

## 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	
<b>Core Courses</b>	3 (AE1, AE2, AE3), 4 (AE4)	1 (AE1, AE2, AE3), 2 (AE4)	–	–	24 (AE1, AE2, AE3), 36 (AE4)
<b>Dept Electives</b>	1 (AE1, AE2, AE3), 0 (AE4)	2 (AE1, AE2, AE3), 1 (AE4)	2	1	36 (AE1, AE2, AE3), 24 (AE4)
<b>Institute Elective</b>	–	1	–	–	6
<b>Lab. Course</b>	1	–	–	–	4
<b>Seminar</b>	–	1	–	–	4
<b>Communication</b>	–	(+ 1)	–	–	(+ 6) <sup>s</sup>
<b>Total</b>	5	5 (+ 1)	2	1	74 (+ 6)
<b>M. Tech. Project</b>	–	–	Stage I* (42 credits)	Stage II (42 credits)	84
<b>Total Credits</b>	28	28 (+ 6)	54	48	158 (+ 6)

<sup>s</sup>P/NP (Credits only for load purposes)

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

<b>Table I(a) – Course Curriculum for M. Tech. Degree in Aerodynamics, AE 1</b>											
<b>Semester I</b>					<b>Semester II</b>						
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
AE 611	Aerodynamics Lab	0	0	4	4		Elective II	3	0	0	6
	Elective I	3	0	0	6		Elective III	3	0	0	6
							Institute Elective	3	0	0	6
	<b>Total</b>				<b>28</b>		<b>Total</b>				<b>34</b>
<b>Semester III</b>					<b>Semester IV</b>						
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						
	<b>Total</b>				<b>54</b>		<b>Total</b>				<b>48</b>
<b>Total Credit = 28 + 34 + 54 + 48 = 164</b>											

\* P/NP Course, credits only for load purposes

<b>Table I(b) – Course Curriculum for M. Tech. Degree in Dynamics &amp; Control, AE 2</b>											
<b>Semester I</b>					<b>Semester II</b>						
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
AE 699	Control System Lab	0	0	4	4		Elective II	3	0	0	6
	Elective I	3	0	0	6		Elective III	3	0	0	6
							Institute Elective	3	0	0	6
	<b>Total</b>				<b>28</b>		<b>Total</b>				<b>34</b>
<b>Semester III</b>					<b>Semester IV</b>						
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						
	<b>Total</b>				<b>54</b>		<b>Total</b>				<b>48</b>
<b>Total Credit = 28 + 34 + 54 + 48 = 164</b>											

\* P/NP Course, credits only for load purposes

<b>Table I(c) – Course Curriculum for M. Tech. Degree in Propulsion, AE 3</b>											
<b>Semester I</b>					<b>Semester II</b>						
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 899	Communication Skills*	1	2	0	6*
AE 711	Aircraft Propulsion	3	0	0	6	AE 694	Seminar	0	0	4	4
AE 607	Aircraft Propulsion Lab	0	0	4	4		Elective II	3	0	0	6
	Elective I	3	0	0	6		Elective III	3	0	0	6
							Institute Elective	3	0	0	6
	<b>Total</b>				<b>28</b>		<b>Total</b>				<b>34</b>
<b>Semester III</b>					<b>Semester IV</b>						
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						
	<b>Total</b>				<b>54</b>		<b>Total</b>				<b>48</b>
<b>Total Credit = 28 + 34 + 54 + 48 = 164</b>											

\* P/NP Course, credits only for load purposes

<b>Table I(d) – Course Curriculum for M. Tech. Degree in Structures, AE 4</b>											
<b>Semester I</b>					<b>Semester II</b>						
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 899	Communication Skills*	1	2	0	6*
AE 673	Fibre Reinforced Composites	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
	<b>Total</b>				<b>28</b>		<b>Total</b>				<b>34</b>
<b>Semester III</b>					<b>Semester IV</b>						
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				<b>42</b>	AE 798	M. Tech. Project - II				<b>42</b>
	Elective IV	3	0	0	6		Elective VI	3	0	0	6
	Elective V	3	0	0	6						
	<b>Total</b>				<b>54</b>		<b>Total</b>				<b>48</b>
<b>Total Credit = 28 + 34 + 54 + 48 = 164</b>											

\* P/NP Course, credits only for load purposes

### **Document History**

2022-12-13: Included missing AE4 curriculum (Table I(d))  
2022-06-09: First version