



Graphic Era
Deemed to be University

NAAC 'A+' Accredited



**CURRICULUM
for
UNDERGRADUATE DEGREE PROGRAM**

**BACHELOR OF TECHNOLOGY
IN
AEROSPACE ENGINEERING**

In accordance with NEP 2020

**DEPARTMENT OF AEROSPACE ENGINEERING
GRAPHIC ERA (DEEMED TO BE UNIVERSITY)**

566/6, Bell Road, Society Area, Clement Town,
Dehradun, Uttarakhand 248002 INDIA
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Vision

To impart aerospace and allied engineering education, producing world class professionals competent in the emerging technologies, research, and innovation for sustainable growth of the nation and society by ethically driven endeavours.

Mission

M1. To create an ecosystem for aerospace education and research in the fundamental and emerging domains.

M2. To implement the recent methods and cutting-edge computational, analytical, and simulation tools.

M3. To engage with all stakeholders for technology, knowledge transfers, entrepreneurship and to ensure meaningful impact of our research and education.

M4. To inculcate ethics, social harmony, to preserve and protect the environment.

Program offered by the department

B.Tech - Aerospace Engineering

B.Tech - Aerospace Engineering – Lateral Entry

Specializations

- 1. Drone Technology*
- 2. Space Engineering*
- 3. Aerodynamics*
- 4. Aerospace Structures*



Curriculum for B.Tech Aerospace Engineering

Semester I		B.Tech Aerospace Engineering-Physics Group (I Semester)/Chemistry Group (II Semester)										
S.No	Course Code	Course Name	Component	Credit	L	T	P	Contact Hr.	MTE	Sessional	ESE	Total
1	THU101/201	Professional Communication/Advanced Professional Communication	HSMC	2	2	0	0	2	25	25	50	100
2	TPH101	Engineering Physics	BSC	3	3	0	0	3	25	25	50	100
3	TMA101/201	Engineering Mathematics-I	BSC	4	3	1	0	4	25	25	50	100
4	TEE101/201	Basic Electrical Engineering	ESC	2	2	0	0	4	25	25	50	100
	TCE101	Basic Civil Engineering	ESC	2	2	0	0	4	25	25	50	100
5	TCS101/201	Fundamental of Computer & Introduction to Programming	ESC	3	3	0	0	3	25	25	50	100
6	THF101/201	Healthy Living & Fitness	MC	0	1	0	0	2	0	50	50	100
7	PEE151/251	Basic Electrical Engineering Lab	ESC	1	0	0	2	2	25	25	50	100
8	PPH151/251	Physics Lab	BSC	1	0	0	2	2	25	25	50	100
9	PME151/251	Workshop And Manufacturing Practices	ESC	3	1	0	4	5	25	25	50	100
10	PCS151/251	Computer Lab-I	ESC	2	0	0	4	4	25	25	50	100
11	GP101/201	General Proficiency	II	1	0	0	0	2	0	0	100	100
Total				24	17	1	12	37	250	300	650	1200



Curriculum for B.Tech Aerospace Engineering

Semester II		B.Tech Aerospace Engineering-Chemistry Group (I Semester)/Physics Group (II Semester)										
S.No	Course Code	Course Name	Component	Credit	L	T	P	Contact Hr.	MTE	Sessional	ESE	Total
1	THU101/201	Professional Communication/Advanced Professional Communication	HSMC	2	2	0	0	2	25	25	50	100
2	TCH101/201	Engineering Chemistry	BSC	3	3	0	0	3	25	25	50	100
3	TMA101/201	Engineering Mathematics-II	BSC	4	3	1	0	4	25	25	50	100
4	TEC101/201	Basic Electronics Engineering	ESC	3	3	0	0	3	25	25	50	100
5	TEV101/201	Environmental Science	MC	0	2	0	0	2	25	25	50	100
6	TCS101/201	Programing for problem solving	ESC	3	3	0	0	3	25	25	50	100
7	PEC151/251	Basic Electronics Engineering Lab	ESC	1	0	0	2	2	25	25	50	100
8	PCH151/251	Chemistry Lab	BSC	1	0	0	2	2	25	25	50	100
9	PME153/253	Engineering Graphics and Design Lab	ESC	3	1	0	4	5	25	25	50	100
10	PCS151/251	Computer Lab - I	ESC	2	0	0	4	4	25	25	50	100
11	GP101/201	General Proficiency	II	1	0	0	0	2	0	0	100	100
Total				23	17	1	12	32	250	250	600	1100



Curriculum for B.Tech Aerospace Engineering

Semester III		B.Tech B.Tech Aerospace Engineering												
S.No	Course Code	Course Name	Component NEP	AICTE Nomenclature	Course Category	Credit	L	T	P	Contact Hr.	MTE	Sessional	ESE	Total
1	XCS 301	Career Skills-I	SEC	HSC	Skill / Employability Enhancement Skill	2	2	0	0	2	25	25	50	100
2	TAS 303	Entrepreneurship	AEC	HSC	Ability Enhancement Skill	1	1	0	0	1	25	25	50	100
3	TAS 304	Gender Equality and Empowerment	VAC		Value Added Course	2	2	0	0	2	25	25	50	100
4	UHV 301	Universal Human Value -II				2	2	0	0	2	25	25	50	100
5	TMA 303	Mathematics III	DSC	BSC	Major Core / Discipline Core	3	3	0	0	3	25	25	50	100
6	TAS 307	Aero Fluid Mechanics	DSC	ESC/PCC	Major Core / Discipline Core	4	4	2	0	6	25	25	50	100
7	TAS 306	Aero Thermodynamics	DSC	ESC/PCC	Major Core / Discipline Core	3	2	1	0	3	25	25	50	100
8	TAS 305	Introduction to Aerospace Engineering	DSC	ESC/PCC	Major Core / Discipline Core	3	2	1	0	3	25	25	50	100
9	TAS 308	Engineering Mechanics	DSC	ESC/PCC	Major Core / Discipline Core	3	2	1	0	3	25	25	50	100
10	PAS 311	Aero Fluid Mechanics Lab	DSC	LC	Major Core / Discipline Core	1	0	0	2	2	25	25	50	100
11	PAS 312	Aeromodelling Lab	DSC	LC	Major Core/ Discipline Core	1	0	0	2	2	25	25	50	100
			Total			25	20	5	4	29	275	275	550	1100



Curriculum for B.Tech Aerospace Engineering

Mandatory Non Graded (MNG) Courses											
13	MAS 301	Python for Aerospace Application	SEC		Skill Enhancement Skill	1	0	0	2	2	Qualified/Non Qualified
14	MAS 302	Advance Aero Drawing	SEC		Skill Enhancement Skill	1	0	0	2	2	
15	ASI 301	Social Internship	SEC		Skill / Employability Enhancement Skill	1	0	0	0	1	
Note: Minimum One MNG Course needs to be done in a semester											
Value Added Course (VAC)											
16	VAS 3XX	Value added course 1	VAC		VAC	2	2	0	0	2	



Curriculum for B.Tech Aerospace Engineering

Semester IV		B.Tech B.Tech Aerospace Engineering													
S.No	Course Code	Course Name	Component NEP	AICTE Nomenclature	Course Category	Credit	L	T	P	Contact Hr.	MTE	Sessional	ESE	Total	
1	TAS 408	Academic Report writing and IPR	SEC	PW	Project	1	0	0	2	2	25	25	50	100	
2	XCS 401	Career Skills-II	SEC	HSC	Skill / Employability Enhancement Skill	2	2	0	0	2	25	25	50	100	
3	TAS 403	Aerodynamics I	DSC	PCC	Major Core/ Discipline Core	3	2	1	0	3	25	25	50	100	
4	TAS 404	Propulsion I	DSC	PCC	Major Core/ Discipline Core	3	2	1	0	3	25	25	50	100	
5	TAS 405	Aircraft Performance	DSC	PCC	Major Core/ Discipline Core	3	4	0	0	4	25	25	50	100	
6	TAS 406	Aerospace Material and Manufacturing Technology	DSC	PCC	Major Core/ Discipline Core	3	3	1	0	4	25	25	50	100	
7	TAS 407	Mechanics of Solid	DSC	PCC	Major Core/ Discipline Core	3	3	0	0	3	25	25	50	100	
8		Discipline Electives-1	DSE	PEC	Discipline Electives	3	3	0	0	3	25	25	50	100	
9	PAS 411	Advance Manufacturing Lab	DSC	LC	Major Core // Discipline Core	1	0	0	2	2	25	25	50	100	
10	PAS 412	Mechanics of Material Lab	DSC	LC	Major Core/ Discipline Core	1	0	0	2	2	25	25	50	100	
11	GP 401	General Proficiency -II	AEC	HSC	Ability Enhancement Skill	1	0	0	0	0	25	25	50	100	
			Total			24	19	3	6	28	275	275	550	1100	

Note: Department(s) to offer Minor (MI) Course to those willing students in addition to 24 credits



Curriculum for B.Tech Aerospace Engineering

Mandatory Non Graded (MNG) Courses														
12	MAS 401	Indian knowledge System	SEC		Skill / Employability Enhancement Skill	2	0	0	2	Qualified/Non Qualified				
13	MAS 402	Matlab for Aerospace Engineer	SEC		Skill / Employability Enhancement Skill	1	0	0	2					
14	SAS 401	Seminar-I	AEC		Ability Enhancement Skill / Value Education	1	0	0	0					
Note: Minimum One MNG Course needs to be done in a semester														
Value Added Course (VAC)														
15	VAS 4XX	Value added course 2	VAC		VAC	2	2	0	0	2				

Discipline Electives -1 (Student has to Choose any one Course)														
16	TAS 411	Introduction to UAV and Its functionalities	DSE		Discipline Electives	3	3	0	0	3	25	25	50	100
17	TAS 412	Space Science and Space Environment	DSE		Discipline Electives	3	3	0	0	3	25	25	50	100
18	TAS 413	Wind tunnel Techniques	DSE		Discipline Electives	3	3	0	0	3	25	25	50	100
19	TAS 414	Composites Materials	DSE		Discipline Electives	3	3	0	0	3	25	25	50	100



Curriculum for B.Tech Aerospace Engineering

Semester V		B.Tech Aerospace Engineering												
S.No	Course Code	Course Name	Component NEP	Course Category	AICTE Nomenclature	Credit	L	T	P	Contact Hr.	MTE	Sessional	ESE	Total
1	XCS 501	Career Skills-III	SEC	Skill / Employability Enhancement Skill	HSC	2	2	0	0	2	25	25	50	100
2	TAS 503	Aircraft Structure I	DSC	Major Core/ Discipline Core	PCC	3	3	1	0	4	25	25	50	100
3	TAS 504	Aerodynamics II	DSC	Major Core/ Discipline Core	PCC	3	2	1	0	3	25	25	50	100
4	TAS 505	Propulsion II	DSC	Major Core/ Discipline Core	PCC	3	2	1	0	3	25	25	50	100
5	TAS 506	Orbital Mechanics	DSC	Major Core/ Discipline Core	PCC	3	2	1	0	3	25	25	50	100
6	TAS 507	Aircraft System and Instruments	DSC	Major Core/ Discipline Core	PCC	3	3	0	0	3	25	25	50	100
7	ASP 501	Mini-Project-I (Research, Innovation & Entrepreneurship)	PROJ	Project	PW	1	0	0	2	2	25	25	50	100
8		Discipline Electives -2	DSE	Discipline Electives	PEC	3	3	0	0	3	25	25	50	100
9	PAS 513	Aerodynamics Lab	DSC	Major Core / Discipline Core	LC	1	0	0	2	2	25	25	50	100
10	PAS 514	Propulsion Lab	DSC	Major Core / Discipline Core	LC	1	0	0	2	2	25	25	50	100
			Total			23	17	4	6	27	250	250	500	1000

Note: Department(s) to offer Minor (MI) Course to those willing students in addition to 23 credits



Curriculum for B.Tech Aerospace Engineering

Mandatory Non Graded (MNG) Courses													
11	MAS 501	Total Quality Management	AEC	Ability Enhancement Skill		2	0	0	2	Qualified/Non Qualified			
12	MAS 502	Advance Matlab for Aerospace Application	SEC	Skill / Employbility EnhancmentSkill		1	0	0	2				
13	SAS 501	Seminar-II	AEC	Ability Enhancement Skill / Value Education		1	0	0	0				
Note: Minimum One MNG Course needs to be done in a semester													
Value Added Course (VAC)													
14	VAS 5XX	Value added course 3	VAC	VAC		2	2	0	0	2			

Discipline Electives-2 (Student has to Choose any one Course)														
15	TAS 511	Control Engineering	DSE	Discipline Electives		3	3	0	0	3	25	25	50	100
16	TAS 512	Rocket Propulsion	DSE	Discipline Electives		3	3	0	0	3	25	25	50	100
17	TAS 513	Heat and Mass Transfer	DSE	Discipline Electives		3	3	0	0	3	25	25	50	100
18	TAS 514	Finite Element Method	DSE	Discipline Electives		3	3	0	0	3	25	25	50	100



Curriculum for B.Tech Aerospace Engineering

Semester VI		B.Tech Aerospace Engineering												
S.No	Course Code	Course Name	Component NEP	Course Category	AICTE Nomenclature	Credit	L	T	P	Contact Hr.	MTE	Sessional	ESE	Total
1	XCS 601	Career Skills-IV	SEC	Skill /Employability Enhancement Skill	HSC	2	2	0	0	2	25	25	50	100
2	TAS 602	Aircraft Structure II	DSC	Major Core/ Discipline Core	PCC	3	2	1	0	3	25	25	50	100
3	TAS 603	Flight Stability and Control	DSC	Major Core/ Discipline Core	PCC	3	2	1	0	3	25	25	50	100
4	TAS 604	Computational Fluid Dynamics	DSC	Major Core/ Discipline Core	PCC	4	3	1	0	3	25	25	50	100
5		Discipline Electives -3	DSE	Discipline Electives	PEC	3	3	0	0	3	25	25	50	100
6		Discipline Electives -4	DSE	Discipline Electives	PEC	3	3	0	0	3	25	25	50	100
7		University Open Elective* / Generic Elective-I	GE	Generic Elective / University Open Elective	OEC	3	3	0	0	3	25	25	50	100
8	ASP 601	Mini-Project-II (Research, Innovation & Entrepreneurship)	PROJ	Project	PW	2	0	0	4	4	25	25	50	100
9	GP 601	General Proficiency-III	AEC	Ability Enhancement Skill	HSC	1	0	0	0	2	0	100	0	100
10	PAS 611	Aircraft Structures Lab	DSC	Major Core/ Discipline Core	LC	1	0	0	2	2	25	25	50	100
Total						25	18	3	6	28	225	325	450	1000

Note: Department(s) to offer Minor (MI) Course to those willing students in addition to 25 credits

* University Open Elective may be run through MOOCS

Industrial summer training	Proj./Intern	To be held at the end of VI semester and evaluated at the end of VII semester
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Curriculum for B.Tech Aerospace Engineering

Discipline Elective -3 (Student has to Choose any one Course)													
11	TAS 611	Sensor Actuators and Data Acquisition	DSE	Specialization/ Minor / Multidisciplinary	3	3	0	0	3	25	25	50	100
12	TAS 612	Space Dynamics and Attitude Control	DSE	Specialization/ Minor / Multidisciplinary	3	3	0	0	3	25	25	50	100
13	TAS 613	Boundary Layer Theory	DSE	Specialization/ Minor / Multidisciplinary	3	3	0	0	3	25	25	50	100
14	TAS 614	Fatigue and Fracture Mechanics	DSE	Specialization/ Minor / Multidisciplinary	3	3	0	0	3	25	25	50	100
Discipline Electives-4 (Student has to Choose any one Course)													
15	TAS 621	Navigation Guidance and Control	DSE	Specialization/ Minor / Multidisciplinary	3	3	0	0	3	25	25	50	100
16	TAS 622	Satellite Technology	DSE	Specialization/ Minor / Multidisciplinary	3	3	0	0	3	25	25	50	100
17	TAS 623	High Speed Aerodynamics	DSE	Specialization/ Minor / Multidisciplinary	3	3	0	0	3	25	25	50	100
18	TAS 624	Theory of Plates and Shells	DSE	Specialization/ Minor / Multidisciplinary	3	3	0	0	3	25	25	50	100
Mandatory Non Graded (MNG) Courses													
19	MAS 601	Flight Lab in collaboration with (IIT Kanpur)	SEC	Skill / Employability Enhancement Skill	2	0	0	2	2	Qualified/Non Qualified			
20	MAS 602	AI ML for Aerospace Application	SEC	Skill / Employability Enhancement Skill	1	0	0	2	2				
21	SAS 601	Seminar-III	AEC	Ability Enhancement Skill / Value Education	1	0	0	0					
Note: Minimum One MNG Course needs to be done in a semester													
Value Added Course (VAC)													
22	VAC 6XX	Value added course 4	VAC	VAC	2	2	0	0					



Curriculum for B.Tech Aerospace Engineering

Semester VII														B.Tech Aerospace Engineering													
S.No	Course Code	Course Name	Component NEP	Course Category	AICTE Nomenclature	Credit	L	T	P	Contact Hr.	MTE	Sessional	ESE	Total													
1	TAS 703	Theory of Vibration and Aeroelasticity	DSC	Major Core/ Discipline Core	PCC	3	3	0	0	3	25	25	50	100													
2		University Open Elective* / Generic Elective-II	GE	Generic Elective / University Open Elective	OEC	3	3	0	0	3	25	25	50	100													
3		Discipline Electives-5	DSE	Discipline Electives/	PEC	3	3	0	0	3	25	25	50	100													
4	ASI 701	Industrial summer training	SEC	Skill Enhancement	IV	1	0	0	3	3	0	0	100	100													
5	ASP 701	Major Project -I	Proj	Major Core	PW	4	0	0	0	2	25	25	50	100													
Total						14	9	0	3	14	100	100	300	500													
Note: Department(s) to offer Minor (MI) Course to those willing students in addition to 14 credits																											
* University Open Elective may be run through MOOCS																											
Mandatory Non Graded (MNG) Courses																											
6	MAS 701	Environmental Science and Waste Management	SEC	Skill/ Employability Enhancement		2	2	0	0	Qualified/Non Qualified																	
7	MAS 702	Research Methodology	SEC	Ability Enhancement		2	2	0	0																		
8	SAS 701	Seminar-IV	AEC	Ability Enhancement Skill / Value Education		1	0	0	0																		
Note: Minimum One MNG Course needs to be done in a semester																											
Discipline Electives -5 (Student has to Choose any one Course)																											
9	TAS 711	UAV Design	DSE	Specialization/ Minor / Multidisciplinary		3	3	0	0	3	25	25	50	100													
10	TAS 712	Space Communication	DSE	Specialization		3	3	0	0	3	25	25	50	100													
11	TAS 713	Helicopter Aerodynamics	DSE	Specialization/ Minor / Multidisciplinary		3	3	0	0	3	25	25	50	100													
12	TAS 714	Smart Structures	DSE	Specialization/ Minor / Multidisciplinary		3	3	0	0	3	25	25	50	100													
Value Added Course (VAC)																											
13	VAS 7XX	Value added course 5	VAC	VAC		2	0	0	0																		



Curriculum for B.Tech Aerospace Engineering

Semester VIII		B.Tech Aerospace Engineering												
S.No	Course Code	Course Name	Component NEP	Course Category	AICTE Nomenclature	Credit	L	T	P	Contact Hr.	MTE	Sessional	ESE	Total
1	TAS 803	Design of Aerospace Vehicle	DSC	Major Core/ Discipline Core	PCC	4	3	1	0	4	25	25	50	100
2	TAS 804	Professional Ethics	AEC	Ability Enhancement Skill / Value Education	HSS	2	2	0	0	2	25	25	50	100
3		University Open Elective* / Generic Elective-III	UOE	Generic Elective / University Open Elective	OEC	3	3	0	0	3	25	25	50	100
4	ASP 801	Major Project -II	Proj	Project	PW	4	0	0	8	8	25	25	50	100
5	GP 801	General Proficiency-IV	AEC	Ability Enhancement Skill	HSC	1	0	0	2	2	0	100	0	100
		* University Open Elelctive may be run through MOOCS												
MNG Courses														
6	MAS 801	Disaster Management	SEC	Skill / Employability EnhancementSkill		2	2	0	0	2	Qualified/Non Qualified			
Total						14	8	1	10	19	100	200	200	500



Specializations

1. Drone Technology	2. Space Engineering	3. Aerodynamics	4. Aerospace Structures
Introduction to UAV and Its functionalities	Space Science and Space Environment	Wind tunnel Techniques	Composites Materials
Control Engineering	Rocket Propulsion	Heat and Mass Transfer	Finite Element Method
Sensor Actuators and Data Acquisition	Space Dynamics and Attitude Control	Boundary Layer Theory	Fatigue and Fracture Mechanics
Navigation Guidance and Control	Satellite Technology	High Speed Aerodynamics	Theory of Plates and Shells
UAV Design	Space Communication	Helicopter Aerodynamics	Smart Structures