M. Tech. in Aerospace Engineering (Guided Missiles)

Semester I

Sl. No.	Course Code	Course	Credits		Total Credits (*)
			L	T/P	
1	AM 607	Mathematics for Engineers	3	1	4
2	AE 601	Aerospace Propulsion	3	1	4
3	AE 602	Aerodynamics	3	1	4
4	AE 603	Navigation, Guidance & Control	3	1	4
5	AE 604	Introduction to Missiles & UAVs	3	1	4
6	AE 605	Flight Mechanics	3	1	4
		Total	**18**	**6**	**24**

Semester II

Sl. No.	Course Code	Course	Credits		Total Credits (*)
			L	T/P	
1	AE 606	Aerospace Structures	3	1	4
2	AE 607	Flight Instrumentation	3	1	4
3	AE 608	Missile Guidance & Control	3	1	4
4	AE 610	Missile Propulsion	3	1	4
5		Elective – I	3	1	4
6		Elective – II	3	1	4
		Total	**18**	**6**	**24**

Note: 04 weeks Practice school during summer vacation for scholarship students.

Semester III

Sl. No.	Course Code	Course	Credits		Total Credits (*)
			L	T/P	
1		Elective – III(Regular /Self study/ MOOC)	3	0	3
2		Elective – IV(Regular /Self study/ MOOC)	3	0	3
3	AE 651	M.Tech. Dissertation Phase I			10
		Total			**16**

Semester IV

Sl. No.	Course Code	Course	Credits		Total Credits (*)
			L	**T/P**	
1	AE 652	M.Tech. Dissertation Phase II			14
		Total			**14**

List of Electives

Sl. No.	Course Code	Course
		Elective I, II, III &IV
1	AE 612	Experimental Aerodynamics
2	AE 613	Structural Dynamics and Aero-elasticity
3	AE 614	Computational Aerodynamics
4	AE 615	Estimation with Applications to Tracking and Navigation
5	AE 616	Nonlinear and Robust Control
6	AE 617	Avionics
7	AE 618	Ducted Rocket & Combustion
8	AE 619	Robotic Control
9	AE 620	Advanced Missile Guidance
10	AE 621	Mini-Project
11	AC 611	Technology of Energetic Compounds: Explosives, Propellants & Pyrotechniques
12	AC618	Rocket & Gun Propellants
13	EE636	Navigation & Avionic Systems
14	EE 635	Satellite Communication
15	EE 610	Electronic Warfare
16	EE 622	Inertial Navigation Systems
17	EE661	Global Navigational Satellite Systems
18	EE 664	Inertial Sensors and system
19	ME 607	Computational Fluid Dynamics (CFD)
20	ME 608	Finite Element Methods
21	ME 609	Mechanical Vibrations
22	ME 618	Composite Structures

23	ME 629	Design of Experiments
24	ME 636	MEMS- Design, Fabrication, and Characterization
25	ME 634	Experimental Stress Analysis
26	ME 627	Fatigue, Fracture and Failure Analysis
27	ME 635	CAD/CAM
28	AM 602	Mathematical Modelling and System Analysis
29	AM 621	Advanced Modelling Techniques
30	AM 622	Simulation of Linear and Non-linear Systems
31	AM 624	Advanced Numerical Methods
32	AM 625	Digital Image Processing
33	TM 603	Project Management
34	TM 609	System Engineering

* 1 Credit in Theory/Tutorial means 1 contact hour and 1 credit in practice/Project Thesis means 2 contact hours ina week.

M. Tech. in Aerospace Engineering (UAVs)

Semester I

Sl. No.	Course Code	Course	Credits		Total Credits (*)
			L	T/P	
1	AM 607	Mathematics for Engineers	3	1	4
2	AE 601	Aerospace Propulsion	3	1	4
3	AE 602	Aerodynamics	3	1	4
4	AE 603	Navigation, Guidance & Control	3	1	4
5	AE 604	Introduction to Missiles & UAVs	3	1	4
6	AE 605	Flight Mechanics	3	1	4
		Total	**18**	**6**	**24**

Semester II

Sl. No.	Course Code	Course	Credits		Total Credits (*)
			L	T/P	
1	AE 606	Aerospace Structures	3	1	4
2	AE 607	Flight Instrumentation	3	1	4
3	AE 609	UAV Guidance & Control	3	1	4
4	AE 611	UAV Design	3	1	4
5		Elective – I	3	1	4
6		Elective – II	3	1	4
		Total	**18**	**6**	**24**

Note: 04 weeks Practice school during summer vacation for scholarship students.

Semester III

Sl. No.	Course Code	Course	Credits		Total Credits (*)
			L	T/P	
1		Elective – III (Regular /Self study/ MOOC)	3	0	3
2		Elective – IV (Regular /Self study/ MOOC)	3	0	3
3	AE 651	M.Tech. Dissertation Phase I			10
		Total			**16**

Semester IV

Sl. No.	Course Code	Course	Credits		Total Credits (*)
			L	T/P	
1	AE 652	M.Tech. Dissertation Phase II			14
		Total			**14**

List of Electives

Sl. No.	Course Code	Course
1	AE 612	Experimental Aerodynamics
2	AE 613	Structural Dynamics and Aero-elasticity
3	AE 614	Computational Aerodynamics
4	AE 615	Estimation with Applications to Tracking and Navigation
5	AE 616	Nonlinear and Robust Control
6	AE 617	Avionics
7	AE 619	Robotic Control
8	AE 620	Mini-Project
9	EE636	Navigation & Avionic Systems
10	EE 635	Satellite Communication
11	EE 610	Electronic Warfare
12	EE 622	Inertial Navigation Systems
13	EE661	Global Navigational Satellite Systems
14	EE 664	Inertial Sensors and system
15	ME 607	Computational Fluid Dynamics (CFD)
16	ME 608	Finite Element Methods
17	ME 609	Mechanical Vibrations
18	ME 618	Composite Structures
19	ME 629	Design of Experiments
20	ME 636	MEMS- Design, Fabrication, and Characterization
21	ME 634	Experimental Stress Analysis

22	ME 627	Fatigue, Fracture and Failure Analysis
23	ME 635	CAD/CAM
24	AM 602	Mathematical Modelling and System Analysis
25	AM 621	Advanced Modelling Techniques
26	AM 622	Simulation of Linear and Nonlinear Systems
27	AM 624	Advanced Numerical Methods
28	AM 625	Digital Image Processing
29	TM 603	Project Management
30	TM 609	System Engineering

* 1 Credit in Theory/Tutorial means 1 contact hour and 1 credit in practice/Project Thesis means 2 contact hours ina week.

M.Tech. in Aerospace Engineering (Air Armaments)

Semester I

Sl. No.	Course Code	Course	Credits		Total Credits (*)
			L	T/P	
1	AM 607	Mathematics for Engineers	3	1	4
2	AFW 601	Ballistics of Bombs & Projectiles	3	1	4
3	AFW 602	Design of Air Armament - I	3	1	4
4	AE 601	Aerospace Propulsion	3	1	4
5	AE 602	Aerodynamics	3	1	4
6	AE 605	Flight Mechanics	3	1	4
		Total	**18**	**6**	**24**

Semester II

Sl. No.	Course Code	Course	Credits		Total Credits (*)
			L	T/P	
1	AFW 603	Air Armament Control & Guidance	3	1	4
2	AFW 604	Airborne Weapon System Effectiveness	3	1	4
3	AFW 605	Warhead Design and Mechanics	3	1	4
4		Elective-I [From Department]	3	1	4
5		Elective-II	3	1	4
6		Elective-III	3	1	4
		Total	**18**	**6**	**24**

Note: 04 weeks Practice school during summer vacation for scholarship students.

Semester III

Sl. No.	Course Code	Course	Credits		Total Credits (*)
			L	T/P	
1		Elective – III (Regular /Self study/ MOOC)	3	0	3
2		Elective – IV (Regular /Self study/ MOOC)	3	0	3
3	AFW 651	M.Tech Dissertation Phase I			10
		Total			**16**

Semester IV

Sl. No.	Course Code	Course	Credits		Total Credits (*)
			L	T/P	
1	AFW 652	M.Tech Dissertation Phase II			14
		Total			**14**

List of Electives

Sl. No.	Course Code	Course
1	AFW 606	Design of Air Armament - II
2	AFW 607	Testing and Certification of Air Armament Stores
3	AFW 608	Fire Control Systems
4	AE 606	Aerospace Structures
5	AE 607	Flight Instrumentation
6	AE 608	Missile Guidance & Control
7	AE 609	UAV Guidance & Control
8	AE 610	Missile Propulsion
9	AE 611	UAV Design
10	AE 612	Experimental Aerodynamics
11	AE 613	Structural Dynamics and Aero-elasticity
12	AE 614	Computational Aerodynamics
13	AE 615	Estimation with Applications to Tracking and Navigation
14	AE 616	Nonlinear and Robust Control
15	AE 617	Avionics
16	AE 618	Ducted Rocket & Combustion
17	AE 619	Robotic Control
18	AE 620	Advanced Missile Guidance
19	AE 621	Mini Porject
20	AC 611	Technology of Energetic Compounds: Explosives, Propellants & Pyrotechniques
21	AC618	Rocket & Gun Propellants
22	EE636	Navigation & Avionic Systems
23	EE 635	Satellite Communication

24	EE 610	Electronic Warfare
25	EE 622	Inertial Navigation Systems
26	EE661	Global Navigational Satellite Systems
27	EE 664	Inertial Sensors and system
28	ME 607	Computational Fluid Dynamics (CFD)
29	ME 608	Finite Element Methods
30	ME 609	Mechanical Vibrations
31	ME 618	Composite Structures
32	ME 629	Design of Experiments
33	ME 636	MEMS- Design, Fabrication, and Characterization
34	ME 634	Experimental Stress Analysis
35	ME 627	Fatigue, Fracture and Failure Analysis
36	ME 635	CAD/CAM
37	AM 602	Mathematical Modelling and System Analysis
38	AM 621	Advanced Modelling Techniques
39	AM 622	Simulation of Linear and Nonlinear Systems
40	AM 624	Advanced Numerical Methods
41	AM 625	Digital Image Processing
42	TM 603	Project Management
43	TM 609	System Engineering

* 1 Credit in Theory/Tutorial means 1 contact hour and 1 credit in practice/Project Thesis means 2 contact hours ina week.

M. Tech. in Computer Science and Engineering (Cyber Security)

Semester I

Sl. No.	Course Code	Course	Credits		Total Credits (*)
			L	**T/P**	
1	CE660	Advanced Computer Networks	3	1	4
2	CE662	Operating System Security	3	1	4
3	CE663	Applied Cryptography	3	1	4
4	CE665	Security Standards & Audits	3	1	4
5	CE680	Data Mining Techniques	3	1	4
6	AM607	Mathematics for Engineers	3	0	3
		Total	**18**	**5**	**23**

Semester II

Sl. No.	Course Code	Course	Credits		Total Credits (*)
			L	**T/P**	
1	CE664	Network Security	3	1	4
2	CE682	Secure Software Engineering	3	1	4
3		Elective - I [From Department]	3	1	4
4		Elective - II [From Department]	3	1	4
5		Elective - III	3	0	3
6		Elective - IV	3	0	3
7	TM649	Scientific/Engg. Practices and Skills	3	0	3
		Total	**21**	**4**	**25**

Note: 04 weeks Practice school during summer vacation for scholarship students.

Semester III

Sl. No.	Course Code	Course	Credits		Total Credits (*)
			L	**T/P**	
1		Elective - V	3	0	3
2		Elective – VI	3	0	3
3	CE651	M.Tech. Dissertation Phase I			8
		Total			**14**

Semester IV

Sl. No.	Course Code	Course	Credits		Total Credits (*)
			L	L	
1	CE652	M.Tech. Dissertation Phase II			14
		Total			**14**

List of Electives

Sl. No.	Course Code	Course
1	CE669	Reverse Engineering & Malware Analysis
2	CE681	Mobile Computing
3	CE683	Information Warfare
4	CE684	Digital Forensics
5	CE689	Fault Tolerant Computing Systems
6	CE690	Parallel & Distributed Systems
7	CE691	Secure Wireless Sensor Networks
8	CE650	Mini Project#
9	AM625	Digital Image Processing
10	AM628	Computational Number Theory and Cryptography
11	EE612	Advanced Wireless Communication
12	EE613	Electronic Warfare
13	EE618	DSP System Design
14	TM609	System Engineering
15	TM611	Software Projects Management
16	CE667	Trustworthy Computing
17	CE668	Ethical Hacking & Cyber Laws
18	CE688	Game Theory
19	CE692	Computational Geometry & Applications
20	CE694	Big data Analysis & Algorithms
21	CE695	Cyber-Physical & Self-Organising Systems

*1Credit in Theory/Tutorial means 1 contact hour and 1 credit in practice/Project Thesis means 2 contact hours in a week.

M. Tech. in Computer Science and Engineering (Software Engineering & Intelligent Systems)

Semester I

Sl. No.	Course Code	Course	Credits		Total Credits (*)
			L	T/P	
1	CE601	Advanced Software Engineering	3	1	4
2	CE602	Cyber Security & Cryptography	3	1	4
3	CE603	Software Verification, Validation & Reliability Standards	3	1	4
4	CE604	Computational Intelligence	3	1	4
5	CE680	Data Mining Techniques	3	1	4
6	AM607	Mathematics for Engineers	3	0	3
		Total	**18**	**5**	**23**

Semester II

Sl. No.	Course Code	Course	Credits		Total Credits (*)
			L	T/P	
1	CE605	Evolving Intelligent Systems	3	1	4
2	CE682	Secure Software Engineering	3	1	4
3	CE664	Network Security	3	1	4
4	CE606	Object Oriented Modelling & Design	3	1	4
5		Elective - III	3	0	3
6		Elective - IV	3	0	3
7	TM649	Scientific/Engg. Practices and Skills	3	0	3
		Total	**21**	**4**	**25**

Note: 04 weeks Practice school during summer vacation for scholarship students.

Semester III

Sl. No.	Course Code	Course	Credits		Total Credits (*)
			L	T/P	
1		Elective - V	3	0	3
2		Elective - VI	3	0	3
3	CE651	M.Tech. Dissertation Phase I	16		8
		Total	**22**		**14**

Semester IV

Sl. No.	Course Code	Course	Credits		Total Credits (*)
			L	L	
1	CE652	M.Tech. Dissertation Phase II	28		14
		Total	**28**		**14**

List of Electives

Sl. No.	Course Code	Course
1	CE607	Decision Support Systems
2	CE681	Mobile Computing
3	CE608	Semantic based System & Web Intelligence
4	CE609	Principle of Compiler Design & OS
5	CE689	Fault Tolerant Computing Systems
6	CE690	Parallel & Distributed Systems
7	CE691	Secure Wireless Sensor Networks
8	CE610	Information Retrieval Systems
9	AM625	Digital Image Processing
10	AM628	Computational Number Theory and Cryptography
11	EE607	Advanced Wireless Communication
12	EE613	Electronic Warfare
13	EE618	DSP System Design
14	TM609	System Engineering
15	TM611	Software Projects Management
16	EE609	SoC and Embedded Systems
17	CE667	Trustworthy Computing
18	CE611	Genetic Algorithm & Artificial Neural Networks
19	CE688	Game Theory
20	CE612	Soft Computing
21	CE689	Fault Tolerant Computing Systems
22	CE692	Computational Geometry & Applications
23	CE694	Big data Analysis & Algorithms
24	CE695	Cyber-Physical & Self-Organising Systems
25	CE662	Operating System Security

26	CE613	Software Architecture & Design Patterns
27	CE614	Principles of Programming Languages
28	CE615	Advanced Algorithms

*1Credit in Theory/Tutorial means 1 contact hour and 1 credit in practice/Project Thesis means 2 contact hours in a week

M. Tech. in Electronics and Communication Engineering (Signal Processing and Communication)

Semester I

Sl. No	Course Code	Course Title	Contact Hours/Week		Credits
			L	T/P	
1	EE601	Digital Communication	3	1	4
2	EE602	Digital Signal Processing	3	1	4
3	EE603	Microwave Engineering	3	1	4
4	EE604	Mobile and Wireless Communication	3	1	4
5	EE605	Navigation System Concepts	3	1	4
6	AM607	Mathematics for Engineers	3	1	4
		Total	18	6	24

Semester II

Sl. No	Course Code	Course Title	Contact hours/Week		Credits
			L	T/P	
1	EE612	Statistical Signal Processing	3	1	4
2	EE658	Detection and Estimation Theory	3	1	4
3		Elective- I	3	1	4
4		Elective-II	3	1	4
5		Elective-III[inter Dept]	3	1	4
6		Elective-IV[inter Dept]	3	1	4
		Total	18	6	24

* 04 week industrial practice school during summer vacation for scholarship students (optional).

Semester III

Sl. No	Course Code	Course Title	Contact Hours /week		Credits
			L	T/P	
1		Elective – V	3	0	3
2		Elective – VI	3	0	3
3	EE651	M.Tech. Dissertation Phase I			10
		Total			16

Semester IV

Sl. No.	Course Code	Course Title	Contact Hours /week		Credits
			L	T/P	
1.	EE652	M.Tech. Dissertation Phase II			14
		Total			14

M. Tech. in Electronics and Communication Engineering (Radar and Communication)

Semester I

Sl. No	Course Code	Course Title	Contact Hours/Week		Credits
			L	T/P	
1	EE601	Digital Communication	3	1	4
2	EE602	Digital Signal Processing	3	1	4
3	EE603	Microwave Engineering	3	1	4
4	EE604	Mobile and Wireless Communication	3	1	4
5	EE605	Navigation System Concepts	3	1	4
6	AM607	Mathematics for Engineers	3	1	4
		Total	18	6	24

Semester II

Sl. No	Course Code	Course Title	Contact hours/Week		Credits
			L	T/P	
1	EE650	Radar System Design	3	1	4
2	EE653	Radar Signal Processing	3	1	4
3		Elective- I	3	1	4
4		Elective-II	3	1	4
5		Elective-III	3	1	4
6		Elective-IV	3	1	4
		Total	18	6	24

* 04 week industrial practice school during summer vacation for scholarship students (optional).

Semester III

Sl. No.	Course Code	Course Title	Contact Hours /week		Credits
			L	T/P	
1		Elective – V	3	0	3
2		Elective – VI	3	0	3
3	EE651	M.Tech. Dissertation Phase I			10
		Total			16

Semester IV

Sl. No.	Course Code	Course Title	Contact Hours /week		Credits
			L	T/P	
1.	EE652	M.Tech. Dissertation Phase II			14
		Total			14

M. Tech. in Electronics and Communication Engineering (Defence Electronics Systems)

Semester I

Sl No	Course Code	Course Title	Contact Hours/ Week		Credits
			L	T/P	
1	EE601	Digital Communication	3	1	4
2	EE602	Digital Signal Processing	3	1	4
3	EE603	Microwave Engineering	3	1	4
4	EE604	Mobile and Wireless Communication	3	1	4
5	EE605	Navigation System Concepts	3	1	4
6	AM607	Mathematics for Engineers	3	1	4
		Total	18	6	24

Semester II

Sl No	Course Code	Course Title	Contact Hours/ Week		Credits
			L	T/P	
1	EE654	Antenna for Communication	3	1	4
2	EE615	SoC and Embedded Systems	3	1	4
3		Elective-I	3	1	4
4		Elective-II	3	1	4
5		Elective-III	3	1	4
6		Elective-IV	3	1	4
		Total	18	6	24

* 04 week industrial practice school during summer vacation for scholarship students (optional).

Semester III

Sl. No.	Course Code	Course Title	Contact Hours /week		Credits
			L	T/P	
1		Elective – V	3	0	3
2		Elective – VI	3	0	3
3	EE651	M.Tech. Dissertation Phase I			10
		Total			16

Semester IV

Sl. No.	Course Code	Course Title	Contact Hours /week		Credits
			L	T/P	
1.	EE652	M.Tech. Dissertation Phase II			14
		Total			14

M. Tech. in Electronics and Communication Engineering (Navigation Systems)

Semester I

Sl. No	Course Code	Course Title	Contact Hours/ Week		Credits
			L	T/P	
1	EE601	Digital Communication	3	1	4
2	EE602	Digital Signal Processing	3	1	4
3	EE603	Microwave Engineering	3	1	4
4	EE604	Mobile and Wireless Communication	3	1	4
5	EE605	Navigation System Concepts	3	1	4
6	AM607	Mathematics for Engineers	3	1	4
		Total	18	6	24

Semester II

Sl. No	Course Code	Course Title	Contact hours/ Week		Credits
			L	T/P	
1	EE675	GNSS Applications	3	1	4
2	EE671	Multi Sensor Integrated Navigation	3	1	4
3		Elective- I	3	1	4
4		Elective-II	3	1	4
5		Elective-III	3	1	4
6		Elective-IV	3	1	4
		Total	18	6	24

* 04 week industrial practice school during summer vacation for scholarship students (optional).

Semester III

Sl. No.	Course Code	Course Title	Contact Hours /week		Credits
			L	T/P	
1		Elective – V	3	0	3
2		Elective – VI	3	0	3
3	EE 651	M.Tech. Dissertation Phase I			10
		Total			16

Semester IV

Sl. No.	Course Code	Course Title	Contact Hours /week		Credits
			L	T/P	
1.	EE652	M.Tech. Dissertation Phase II			14
		Total			14

M. Tech. in Electronics and Communication Engineering (Wireless Networks and Applications)

Semester I

Sl. No	Course Code	Course Title	Contact Hours/ Week		Credits
			L	T/P	
1	EE601	Digital Communication	3	1	4
2	EE602	Digital Signal Processing	3	1	4
3	CE663	Applied Cryptography	3	1	4
4	EE604	Mobile and Wireless Communication	3	1	4
5	CE660	Computer Networks	3	1	4
6	AM607	Mathematics for Engineers	3	1	4
		Total	18	6	24

Semester II

Sl. No	Course Code	Course Title	Contact hours/ Week		Credits
			L	T/P	
1	CE 691	Secured Wireless Sensor Networks	3	1	4
2	EE631	Software Defined Radio	3	1	4
3		Elective- I	3	1	4
4		Elective-II	3	1	4
5		Elective-III	3	1	4
6		Elective-IV	3	1	4
		Total	18	6	24

* 04 week industrial practice school during summer vacation for scholarship students (optional).

Semester III

Sl. No.	Course Code	Course Title	Contact Hours /week		Credits
			L	T/P	
1		Elective – V	3	0	3
2		Elective – VI	3	0	3
3	EE651	M.Tech. Dissertation Phase I			10
		Total			16

Semester IV

Sl. No.	Course Code	Course Title	Contact Hours /week		Credits
			L	T/P	
1.	EE652	M.Tech. Dissertation Phase II			14
		Total			14

M. Tech. in Electronics and Communication Engineering (VLSI and Embedded Systems)

Semester I (@DIAT, Pune)

Sl. No.	Course Code	Course	Contact Hours/week		Credits
			L	T/P	
1.	EE602	Digital Signal Processing	3	1	4
2.	EE690	Digital IC Design	3	1	4
3.	EE691	RF IC Design	3	1	4
4.	EE692	Semiconductor Devices	3	1	4
5.	EE693	Digital System Design using FPGA	3	1	4
6.	AM607	Mathematics for Engineers	3	1	4
		Total	18	6	24

Semester II (@DIAT, Pune)

Sl. No.	Course Code	Course	Contact hours/week		Credits
			L	T/P	
1.	EE614	DSP System Design	3	1	4
2.	EE615	SoC and Embedded Systems	3	1	4
3.	EE656	EMI,EMC/EMP	3	1	4
4.	EE694	ASIC Verification using System Verilog	3	1	4
5.		Elective-I	3	1	4
6.		Elective-II	3	1	4
		Total	18	6	24

Semester III (@NIELIT, Calicut)

Sl. No	Course Code	Course Title	Contact Hours /week		Credits
			L	T/P	
1.	EE695	Analog and Mixed mode VLSI Design	3	0	3
2.	EE696	Computer Aided Design for VLSI Circuits	3	0	3
3.	EE651	M.Tech. Dissertation Phase I			10
		Total			16

Semester IV (@NIELIT, Calicut)

Sl. No.	Course Code	Course Title	Contact Hours /week		Credits
			L	T/P	
1.	EE652	M.Tech. Dissertation Phase II			14
		Total			14

Semester III and Semester IV [Project work and VLSI related Courses @ NIELIT CALICUT].

List of Electives

Sl. No.	Course Code	Course Title	Contact hours/week		Credits
			L	T/P	
1.	EE610	Array Signal Processing	3	1	4
2.	EE611	Compressed Sensing & Sparse Signal Processing	3	1	4
3.	EE612	Statistical Signal Processing	3	1	4
4.	EE613	Signal Theory, Linear Algebra & Transform Techniques	3	1	4
5.	EE614	DSP System Design	3	1	4
6.	EE617	Sonar Signal Processing	3	1	4
7.	EE618	Sonar System Engineering	3	1	4
8.	EE630	Satellite Communication	3	1	4
9.	EE631	Software Defined Radio	3	1	4
10.	EE632	Advance Communication Systems	3	1	4
11.	EE633	Advanced Wireless Communication	3	1	4
12.	EE634	Underwater Communications	3	1	4
13.	EE650	Radar System Design	3	1	4
14.	EE653	Radar Signal Processing	3	1	4
15.	EE654	Antenna for Communication	3	1	4
16.	EE655	Electronic Warfare	3	1	4
17.	EE656	EMI/EMC/EMP	3	1	4
18.	EE657	High Power Microwaves Systems and DEW	3	1	4
19.	EE658	Detection and Estimation Theory	3	1	4
20.	EE659	Microwave Receiver (for Radar & EW Systems)	3	1	4
21.	EE660	Monolithic Microwave Integrated Circuit	3	1	4
22.	EE661	Antenna Simulation Practices	3	1	4
23.	EE670	Inertial Navigation Systems	3	1	4
24.	EE671	Multi Sensor Integrated Navigation	3	1	4
25.	EE672	Indoor Navigation	3	1	4
26.	EE673	Inertial Sensors and Systems	3	1	4
27.	EE674	Navigation & Avionic Systems	3	1	4
28.	EE675	GNSS Applications	3	1	4
29.	EE697	FPGA Architecture and Applications	3	1	4
30.	EE698	VLSI Signal Processing	3	1	4
31.	EE699	SoC Design and Verification	3	1	4
32.	EE615	SoC and Embedded Systems	3	1	4
33.	EE616	Advanced Electronics Systems	3	1	4

M. Tech. in Mechanical Engineering (Mechanical System Design)

Semester- I

S. No.	Course Code	Course	Credits		Total Credits(*)
			L	T/P	
1	ME 602	Advanced Mechanics of Materials	3	1	4
2	ME 603	Advanced Fluid Mechanics	3	1	4
3	ME 609	Mechanical Vibrations	3	1	4
4	AM607	Mathematics for Engineers	3	1	4
5	ME 631	Product Design and Development	3	1	4
6	ME 619	Tribology for Design	3	1	4
		Total	**18**	**06**	**24**

Semester- II

S. No.	Course Code	Course	Credits		Total Credits(*)
			L	T/P	
1	ME 607	Computational Fluid Dynamics	3	1	4
2	ME 630	Design of Machinery	3	1	4
3	ME 608	Finite Element Methods	3	1	4
4	ME 627	Fatigue, Fracture and Failure Analysis	3	1	4
5		Elective – I	3	1	4
6		Elective – II	3	1	4
		Total	**18**	**06**	**24**

Note: 04 weeks industrial practice school during summer vacation for scholarship students.

Semester- III

S. No.	Course Code	Course	Credits		Total Credits(*)
			L	T/P	
1	--	Elective – III (Regular / Self study/ MOOC#)	3	0	3
2	--	Elective – IV (Regular / Self study/ MOOC)	3	0	3
3	ME 651	M.Tech. Dissertation Phase I			10
		Total			16

Massive Online Open Courses

Semester-IV

S. No.	Course Code	Course	Credits			Total Credits(*)
			L	T	P	
1	ME 652	M.Tech. Dissertation Phase II				14
		Total				**14**

M. Tech. in Robotics - Course Structure

Semester I

S. No.	Course Code	Course	Credits		Total Credits(*)
			L	T/P	
1	AM 607	Mathematics for Engineers	3	1	4
2	CE 696	Artificial Intelligence and Expert Systems	3	1	4
3	*EE 611 / **ME 639	Introduction to Electronic System/ Introduction to Mechanisms	3	1	4
4	AM 602	Mathematical Modelling and System Analysis	3	1	4
5	ME 626	Introduction to Robotics	3	1	4
6	ME 627	Mechatronics	3	1	4
		Total	**18**	**06**	**24**

Note: *EE 611 for (Non- Electronics) & **ME 639 for (Non – Mechanical)

Semester II

S. No.	Course Code	Course	Credits		Total Credits (*)
			L	T/P	
1	AE 619	Robotic Path Planning and Control	3	1	4
2	ME 628	Robot Kinematics and Dynamics	3	1	4
3	EE 671	Microcontrollers and Embedded systems	3	1	4
4	EE 617	Robot Sensors and Instrumentation	3	1	4
5		Elective – I	3	1	4
6		Elective – II	3	1	4
		Total	**18**	**06**	**24**

Note: 04 weeks industrial practice school during summer vacation for scholarship students.

Semester III

S. No	Course Code	Course	Credits		Total Credits (*)
			L	T/P	
1	---	Elective – III (Regular / Self study/ MOOC#)	3	0	3
2	ME 631	Product Design and Development	3	0	3

3	ME 651	M.Tech. Dissertation Phase I		10
		Total		**16**

Massive Online Open Courses

Semester IV

S. No.			Credits		Total Credits (*)
			L	**T/P**	
1	ME 652	M.Tech. Dissertation Phase II			14

* 1 credit in Theory/ Tutorial means one contact hour and 1 credit in Practice/Project Thesis means two contact hours.

DEPARTMENT OF MECHANICAL ENGINEERING
M. Tech. in Mechanical Engineering
[Armament and Combat Vehicles]

Semester I

S. No.	Course Code	Course	Contact Hours/week		Credits
			L	**T / P**	
1	AM 607	Mathematics for Engineers	3	1	4
2	ME 601	Armament & Combat vehicles-I	3	1	4
3	ME 602	Advanced Mechanics of Materials	3	1	4
4	ME 609	Mechanical Vibrations	3	1	4
5	ME 604	Advanced Materials and Processing	3	1	4
6	ME 605	Introduction to Combat Systems	3	1	4
		Total	**18**	**06**	**24**

Semester II

S. No.	Course Code	Course	Contact hours/week		Credits
			L	**T / P**	
1	ME 607	Computational Fluid Dynamics	3	1	4
2	ME 608	Finite Element Methods	3	1	4
3	ME 613	Armour Protection Systems	3	1	4

4	ME 610	Armament & Combat Vehicles-II	3	1	4
5		Elective – I	3	1	4
6		Elective – II	3	1	4
		Total	**18**	**06**	**24**

Semester III

S. No.	Course Code	Course	Contact Hours /week		Credits
			L	T / P	
1		Elective – III (Regular / Self study/ MOOC#)	3	0	3
2		Elective – IV (Regular / Self study/ MOOC#)	3	0	3
3	ME 651	M.Tech. Dissertation Phase I	20**		10
		Total	**26**		**16**

Contact Hours/ week, # MOOC: Massive Online Open Courses

Semester IV

S. No.	Course Code	Course	Contact Hours /week		Credits
			L	T / P	
1	ME 652	M.Tech. Dissertation Phase II	28**		14
		Total	**28**		**14**

* 1 credit in Theory/ Tutorial implies one contact hour and 1 credit in Practice/ Thesis implies two contact hours.

List of Electives

S. No.	Course Code	Course Name
	Elective I, II, III and IV	
1.	ME 603	Advanced Fluid Mechanics
2.	ME 611	Design for Manufacturability
3.	ME 612	Modeling and Simulation of Military vehicles
4.	ME 654	Advanced Heat and Mass Transfer
5.	ME 614	Unmanned Ground Vehicles
6.	ME 615	Trials & Evaluation of Weapon Systems

7.	ME 616	Thermal Management of Defence Equipment
8.	ME 617	Kinematics and Dynamics of Machinery
9.	ME 618	Composite Structures
10.	ME 619	Tribology for Design
11.	ME 620	High Energy Material Technology
12.	ME 621	Dynamics & Armament Mechanisms
13.	ME 622	Ballistics of bombs and projectiles
14.	ME 623	Design of ordnance, basic structure and super structure
15.	ME 624	Small arms and cannons
16.	ME 625	Combat Vehicle Technology
17.	ME 626	Vehicle Dynamics
18.	ME 627	Fatigue, Fracture and Failure Analysis
19.	ME 628	Design of Hydraulic and Pneumatic Systems
20.	ME 629	Design of Experiments
21.	ME 630	Design of Machinery
22.	ME 642	Automatic Control System
23.		MOOC courses/Self study
24.	AE 607	Missile Structures
25.	AM 602	Mathematical Modelling and System Analysis
26.	AM 603	Advanced Optimization Techniques
27.	TM 649	Scientific/Engg. Practices and Skills

Notes:

1. Department has to decide which subjects should be offered as (i) Elective I, II in Semester II and (ii) Elective III in Semester III.

2. Core stands for compulsory subjects.

3. Practice school (Optional) of 4 weeks duration during Summer Vacation for scholarship students.

4. Contact Hours for M Tech Dissertation Phase I (ME 651) and M.Tech. Dissertation Phase II (ME 652) is 20 Hrs and 28 Hrs respectively.

DEPARTMENT OF MECHANICAL ENGINEERING

M. Tech. in Mechanical Engineering   [Marine Engg]

Semester I

Sl. No.	Course Code	Course	Credits		Total Credits
			L	T/P	
1	ME 602	Advanced Mechanics of Materials	3	1	4
2	ME 603	Advanced Fluid Mechanics	3	1	4
3	ME 641	Warship Transmission & Tribology	3	1	4
4	ME 609	Mechanical Vibrations	3	1	4
5	ME 643	Ship Dynamics & Marine Systems	3	1	4
6	AM 607	Mathematics for Engineers	3	1	4
		Total	**18**	**6**	**24**

Semester II

Sl. No.	Course Code	Course	Credits		Total Credits
			L	T/P	
1	ME 608	Finite Element Methods	3	1	4
2	ME 644	Marine Diesel & Steam Engines	3	1	4
3	ME 645	Marine Gas Turbines	3	1	4
4	ME 646	Nuclear Reactor Engg	3	1	4
5	--	Elective I	3	1	4
6	--	Elective II	3	1	4
		Total	**18**	**6**	**24**

Semester III

Sl. No.	Course Code	Course	Credits		Total Credits
			L	T/P	
1	--	Elective – III (Regular / Self study/ MOOC#)	3	0	3
2	--	Elective – IV (Regular / Self study/ MOOC#)	3	0	3
3	ME 651	M.Tech. Dissertation Phase I			10
		Total			**16**

**Contact Hours/ week,   # MOOC: Massive Online Open Courses

Semester IV

Sl. No.	Course Code	Course	Credits		Total Credits
			L	T/P	
1	ME 652	M.Tech. Dissertation Phase II			14
		Total			**14**

**Contact Hours/week

List of Electives

Sl. No.	Course Code	Course Name
		Elective I, II, III, IV
1.	ME 604	Advanced Materials and Processing
2.	ME 607	Computational Fluid Dynamics
3.	ME 608	Finite Element methods
4.	ME 611	Design for Manufacturability
5.	ME 615	Trials & Evaluation of Weapon Systems
6.	ME 616	Thermal Management of Defence Equipment
7.	ME 617	Kinematics and Dynamics of Machinery

8.	ME 618	Composite Structures
9.	ME 619	Tribology for Design
10.	ME 627	Fatigue, Fracture and Failure Analysis
11.	ME 628	Design of Hydraulic and Pneumatic Systems
12.	ME 629	Design of Experiments
13.	ME 630	Design of Machinery
14.	ME 631	Product Design and Development
15.	ME 632	Design Optimization
16.	ME 633	Mechanical behavior of materials
17.	ME 634	Experimental Stress Analysis
18.	ME 635	CAD/CAM
19.	ME 636	MEMS: Design, Fabrication and Characterization
20.	ME 637	Design of Pressure Vessels
21.	ME 642	Automatic Control Systems
22.	ME 654	Advanced Heat & Mass Transfer
23.	ME 655	Performance Testing and Instrumentation
24.	AM 602	Mathematical Modeling & System Analysis
25.	AM 603	Adv Optimization Techniques
26.	AM 604	Advanced Statistical Techniques
27.	AM 624	Advanced Numerical Methods
28.	TM 602	R&D Management
29.	TM 603	Project Management
30.	TM 604	Strategic Management
31.	TM 609	System Engineering
32.	TM 649	Scientific/Engg. Practices and Skills
33.	MS 601	Introduction to Materials
34.	MS 607	Design of Materials
35.	MS 606	Advanced Physical and Mechanical Metallurgy

36.	MS 612	Non Destructive Evaluations
37.	MS 611	Advanced Functional Materials
38.	MS 613	Advanced Steel Technology
39.	AC 603	Thermodynamics and Combustion Process
40.	AP 610	Nanotechnology

Notes:

1. Department has to decide which subjects should be offered as (i) Elective I, II in Semester II and (ii) Elective III & IV in Semester III.

2. Practice school (Optional) of 4 weeks duration during Summer Vacation is included

3. 1 credit in Theory/Tutorial means one contact hour and 1 credit in Practice/Project Thesis means two contact hours.

M. Tech. in Optical Communication and Photonics

No	Course Code	Course Name	Credits			Total Credits
			L	P	T	
		SEMESTER I				
1	AP 631	Optics and Lasers	3	0	1	4
2	AP 633	Semiconductor Photonic Devices	3	0	1	4
3	AP 643	Introduction to Fiber Optics	3	0	1	4
4	AP 635	Laboratory – I	0	4	0	4
5	EE 602	Digital Communication	3	0	1	4
6	AM 607	Mathematics for Engineers	3	0	1	4
		SEMESTER II				
1	AP 644	Broadband Communication Systems	3	0	1	4
2	AP 645	Optical Communication Systems	3	0	1	4
3	AP 638	Laboratory – II	0	4	0	4
4	Elect-I	Elective – I	3	0	1	4
5	Elect-II	Elective-II	3	0	1	4
6	Elect-III	Elective-III	3	0	1	4
		SEMESTER III				
1	Elect-IV	Regular/ Self-study /MOOC/NPTEL	3	-	-	3
2	Elect-V	Regular/Self-study /MOOC/NPTEL	3	-	-	3
3	AP 651	M. Tech. Dissertation - 1		-		10
		SEMESTER-IV				
1	AP 652	M. Tech. Dissertation - 2		-		14

LIST OF ELECTIVES		
No.	Course Code	Course
	SEMESTER II	
1	AP 646	Free Space Optical Communication
2	AP 647	Optical Networks
3	AP 640	Micro-Optics and Nanophotonics
4	AP 641	Non-linear Optics
5	AP 642	Guided Wave Optical Components & Devices
6	AP 636	Laser Systems and Applications
7	AP 637	High Power Lasers
8	EE 667	Wireless and Mobile Communications
9	EE 671	Underwater communication
	*	Open Electives from other departments
	SEMESTER III	

1	AP 632	Optical Electronics
2	AP 634	Integrated Optics and Silicon Photonics
	*	Open Electives from other departments

M. Tech in Lasers & Electro-optics

No	Course Code	Course Name	Credits			Total Credits
			L	P	T	
		SEMESTER I				
1	AM 607	Mathematics for Engineers	3	0	1	4
2	AP 631	Optics and Lasers	3	0	1	4
3	AP 632	Optical Electronics	3	0	1	4
4	AP 633	Semiconductor Photonic Devices	3	0	1	4
5	AP 634	Integrated Optics and Silicon Photonics	3	0	1	4
6	AP 635	Laboratory – I	0	4	0	4
		SEMESTER II				
1	AP 636	Laser Systems and Applications	3	0	1	4
2	AP 637	High Power Lasers	3	0	1	4
3	AP 638	Laboratory – II	0	4	0	4
4	Elect-I	Elective – I	3	0	1	4
5	Elect-II	Elective – II	3	0	1	4
6	Elect-III	Elective – III	3	0	1	4
		SEMESTER III				
1	Elect-IV	Regular/ Self-study /MOOC/NPTEL	3	-		3
2	Elect-V	Regular/Self-study /MOOC/NPTEL	3	-		3
3	AP 651	M. Tech. Dissertation - 1		10		
		SEMESTER-IV				
1	AP 652	M. Tech. Dissertation - 2	-	14		

LIST OF ELECTIVES		
Sr. No.	Course Code	Course
	SEMESTER-II	
1	AP 639	Computational Laser and Photonics
3	AP 640	Micro-Optics and Nanophotonics
4	AP 641	Non-linear Optics
5	AP 642	Guided Wave Optical Components and Devices

6	AP 644	Broadband Communication Systems
7	AP 645	Optical Communication Systems
8	AP 646	Free Space Optical Communication
9	AP 647	Optical Networks
10	EE671	Underwater Communication
11	*	Open Electives from other departments
SEMESTER-III		
1	AP 643	Introduction to Fiber Optics
2	EE 603	Digital Communication
3	*	Open Electives from other departments

M. Tech in Sensor Technology

SI No	Course Code	Course Name	Credits			Total Credits
			L	P	T	
SEMESTER I						
1	AP 601	Physics of Transducers, Sensors & Actuators	3	1	0	4
2	AP 602	Sensor Materials	3	1	0	4
3	AP 603	Sensor Data Acquisition and Signal Conditioning	3	1	0	4
4	AP 604	Fabrication Technology & Packaging	3	1	0	4
5	AP 605	Control Systems	3	1	0	4
6	AM 602	Mathematics for Engineers	3	0	1	4
SEMESTER II						
1	AP 606	Sensors and Actuators	3	0	1	4
2	AP 607	Micro and Smart Sensors	3	1	0	4
3	AP 608	Signal Processing and Machine learning techniques for sensor data analytics	3	0	1	4
4	AP/CE 691	Wireless Sensor Network	3	0	1	4
5	Elect-I	Elective I	3	0	1	4
6	Elect-II	Elective – II	3	0	1	4
SEMESTER III						
1	Elect. III	Regular /Self study/ MOOC/NPTL	3	0	0	3
2	Elect. IV	Regular /Self study/ MOOC/NPTL	3	0	0	3
3	AP 651	M. Tech. Dissertation – 1				10
SEMESTER IV						
1	AP 652	M. Tech. Dissertation – 2				14

LIST OF ELECTIVES		
Sr. No.	**Course Code**	**Course**
SEMESTER II		
1	AP 609	Applications of Sensor
2	EE 609	SOC and embedded system
3	EE 664	Inertial sensors and systems
4	AP 610	Embedded Programming

5	AP 611	Microwave, RF and THz Sensors
6	*	Open Electives from other departments
SEMESTER III		
1	AP 612	Nanotechnology for Advanced Sensors
2	AP 613	Energy Conversion Systems
3	*	Open Electives from other departments

M. Tech. in MATERIALS SCIENCE & CHEMICAL TECHNOLOGY
(ENERGETIC MATERIALS AND POLYMERS)

Semester I

Sl. No.	Course Code	Course	Contact Hours/week		Credits
			L	T/P	
1	AC-601	Chemistry for Chemical Technology	3	1	4
2	AC-602	Polymer Science and Technology	3	1	4
3	AC-603	Thermodynamics and Combustion Process	3	1	4
4	AC-604	Chemical Process Design	3	1	4
5	AC-605	Advanced Analytical Techniques	3	1	4
6	AM-607	Mathematics for Engineers	3	0	3
7.	AC-642	Laboratory Practical	0	8	4
		Total	**18**	**13**	**27**

Semester II

Sl. No.	Course Code	Course	Contact hours/week		Credits
			L	T/P	
1	AC-617	Explosives, and Pyrotechniques	3	0	3
2	AC-618	Rocket & Gun Propellants	3	0	3
3		Elective – I [From Dept. of Applied Chemistry]	3	0	3
4		Elective – II [From Dept. of Applied Chemistry]	3	0	3
5		Elective – III	3	0	3
6		Elective – IV	3	0	3
7	TM - 649	Scientific/Engg. Practices and skills	3	0	3
		Total	**21**	**0**	**21**

- 04 weeks of industrial practice school during summer vacation for scholarship students (optional)

Semester III

Sl. No.	Course Code	Course	Contact Hours /week		Credits
			L	T/P	
1		Elective – V	3	0	3
2		Elective – VI	3	0	3
3	AC-651	M. Tech. Dissertation Phase I	16		8
		Total	**22**		**14**

Semester IV

Sl. No.	Course Code	Course	Contact Hours /week		Credits
			L	T/P	
1	AC-652	M.Tech. Dissertation Phase II	28		14
		Total	**28**		**14**

List of Electives

Sl. No.	Course Code	Course Name
1	AC-608	Safety, Health and Hazard Management
2	AC-609	NBC Warfare (Concepts & remediation)
3	AC-611	Technology of Energetic Materials: Explosives, Propellants and Pyrotechniques
4	AC-612	Catalytic Processes
5	AC-613	Online/e-learning courses through NPTEL
6	AC-614	Green and sustainable chemical processes
7	AC-619	Computational techniques of HEMs
8	AC-620	Inorganic and solid state chemistry
9	AC-650	Self Study[#]
List of Courses for Self Study		
10	AC-615	Technology of Propellants
11	AC-616	Technology of paints, pigments and varnishes
12	AC-621	Nuclear and Radiation chemistry, Photochemistry
13	AC-652	Seminar
ELECTIVES FROM OTHER DEPARTMENTS		
9	AP-610	Nanotechnology
10	AM -621	Advanced Modelling Technology
11	MS-611	Advanced Functional Materials
12	MS-605	Modern Materials for Defence Applications
13	MS-618	Magnetism &Magnetic Materials
14	AE-601	Aerospace Propulsion
15	ME- 609	Computational Fluid Dynamic
16	ME-646	Nuclear Radiation engineering

17	AFW-601	Ballistics of Bombs and Projectiles

will be offered in 3rd semester only

M. Tech. in Materials Science and Chemical Technology (Materials Science and Technology)

Semester I

Sl. No.	Course Code	Course	Credits		Total Credits (*)
			L	T/P	
1	AM 607	Mathematics for Engineers	3	1	4
2	MS 601	Introduction to Materials	3	1	4
3	MS 602	Materials Characterization	3	1	4
4	MS 603	Materials Processing	3	1	4
5	MS 604	Thermodynamics of Materials	3	1	4
6	MS 605	Modern Materials for Defence Applications	3	1	4
		Total	**18**	**6**	**24**

Semester II

Sl. No.	Course Code	Course	Credits		Total Credits (*)
			L	T/P	
1	MS 606	Advanced Physical and Mechanical Metallurgy	3	1	4
2	MS 607	Design of Materials	3	1	4
3		Elective I (By Department)	3	1	4
4		Elective-I (By Department)	3	1	4
5		Elective-II (Open Elective)	3	1	4
6		Elective-III (Open Elective)	3	1	4
		Total	**18**	**6**	**24**

Note: 04 weeks Practice school during summer vacation for scholarship students.

Semester III

Sl. No.	Course Code	Course	Credits		Total Credits (*)
			L	T/P	
1		Elective-IV (Regular /Self study/ MOOC)	3	0	3
2		Elective-V (Regular /Self study/	3	0	3

		MOOC)			
3	MS651	M.Tech. Dissertation Phase I	10		10
		Total			**16**

Semester IV

Sl. No.	Course Code	Course	Credits		Total Credits (*)
			L	L	
1	MS652	M.Tech. Dissertation Phase II	14		14
		Total			**14**

* **1 Credit in Theory/Tutorial means 1 contact hour and 1 credit in practice/Project Thesis means 2 contact hours in a week.**

List of Electives

SI. No.	Course Code	Course
		From the Department
1	MS 608	Fatigue, Fracture and Failure Analysis
2	MS 609	Electronic Materials
3	MS 610	Materials for High-Temperature Applications
4	MS 611	Advanced Functional Materials
5	MS 612	Non-Destructive Evaluations
6	MS613	Advanced Steel Technology
7	MS614	Electrical and Electronic Ceramics
8	MS 615	Heat-treatment
9	MS 616	Advanced Magnetic Materials
		Open Electives
10	ME 602	Advanced Mechanics of Materials

11	ME 603	Advanced Fluid and Thermal Science
12	ME 604	Advanced Materials and Processing
13	ME 607	Computational Fluid Dynamics
14	ME 608	Finite Element Methods
15	AP 610	Nanotechnology
16	AP 614	Sensors and Actuators
17	AM 621	Advanced Modeling Techniques
18	EE601	Microwave Engineering

M. Tech. in Materials Science and Chemical Technology

(CHEMICAL SCIENCE AND TECHNOLOGY)

Semester I

Sl. No.	Course Code	Course	Contact Hours/week		Credits
			L	T/P	
1	AC-601	Chemistry for Chemical Technology	3	1	4
2	AC-602	Polymer Science & Technology	3	1	4
3	AC-603	Thermodynamics and Combustion Process	3	1	4
4	AC-604	Chemical Process Design	3	1	4
5	AC-605	Advanced Analytical Techniques	3	1	4
6	AM-607	Mathematics for Engineers	3	0	3
7.	AC-642	Laboratory Practical	0	8	4
		Total	**18**	**13**	**27**

Semester II

Sl. No.	Course Code	Course	Contact hours/week		Credits
			L	T/P	

1	AC-606	Advanced Chemical Reaction Engineering	3	1	4
2	AC-607	Nano-chemical technology	3	1	4
3		Elective – I [From Dept. of Applied Chemistry]	3	0	3
4		Elective – II [From Dept. of Applied Chemistry]	3	0	3
5		Elective – III	3	0	3
6		Elective – IV	3	0	3
7	TM-649	Scientific/ Engg. Practices and skills	3	0	3
		Total	**21**	**4**	**23**

- 04 weeks of industrial practice school during summer vacation for scholarship students (optional)

Semester III

Sl. No.	Course Code	Course	Contact Hours /week		Credits
			L	**T/P**	
1		Elective – V	3	0	3
2		Elective – VI	3	0	3
3	AC-651	M.Tech. Dissertation Phase I	16		8
		Total	**22**		**14**

Semester IV

Sl. No.	Course Code	Course	Contact Hours /week		Credits
			L	**T/P**	
1	AC-652	M.Tech. Dissertation Phase II	28		14
		Total	**28**		**14**

List of Electives

Sl. No.	Course Code	Course Name
1	AC-608	Safety, Health and Hazard Management
2	AC-609	NBC Warfare (Concepts & remediation)
3	AC-611	Technology of Energetic Materials: Explosives, Propellants and Pyrotechniques
4	AC-612	Catalytic Processes
5	AC-613	Online/e-learning courses through NPTEL

6	AC-614	Green and sustainable chemical processes
7	AC-619	Computational techniques of HEMs
8	AC-620	Inorganic and solid state chemistry
9	AC-650	Self Study[#]
List of Courses for Self Study		
10	AC-615	Technology of Propellants
11	AC-616	Technology of paints, pigments and varnishes
12	AC-621	Nuclear and Radiation chemistry, Photochemistry
13	AC-652	Seminar
ELECTIVES FROM OTHER DEPARTMENTS		
9	AP-610	Nanotechnology
10	AM -621	Advanced Modelling Technology
11	MS-611	Advanced Functional Materials
12	MS-605	Modern Materials for Defence Applications
13	MS-618	Magnetism &Magnetic Materials
14	AE-601	Aerospace Propulsion
15	ME- 609	Computational Fluid Dynamic
16	ME-646	Nuclear Radiation engineering
17	AFW-601	Ballistics of Bombs and Projectiles

will be offered in 3rd semester only

M. Tech. in Materials Engineering

Semester I

Sl. No.	Course Code	Course	Credits		Total Credits (*)
			L	**T/P**	
1	AM 607	Mathematics for Engineers	3	1	4
2	MS 617	Introduction to Materials for Combat	3	1	4
3	MS 618	Advanced Characterization Techniques	3	1	4
4	MS 619	Processing of Defence Components	3	1	4
5	MS 620	Metallurgical Thermodynamics	3	1	4
6	MS 622	Military Metallurgy-I	3	1	4
		Total	**18**	**6**	**24**

Semester II

Sl. No.	Course Code	Course	Credits		Total Credits (*)
			L	**T/P**	
1	MS 606	Advanced Physical and Mechanical Metallurgy	3	1	4

2	MS 607	Design of Materials	3	1	4
3	MS 623	Military Metallurgy-II	3	1	4
4		Elective-I (By Department)	3	1	4
5		Elective-II (Open Elective)	3	1	4
6		Elective-III (Open Elective)	3	1	4
		Total	**18**	**6**	**24**

Note: 04 weeks Practice school during summer vacation for scholarship students.

Semester III

Sl. No.	Course Code	Course	Credits		Total Credits (*)
			L	**T/P**	
1		Elective-IV (Regular /Self study/ MOOC)	3	0	3
2		Elective-V (Regular /Self study/ MOOC)	3	0	3
3	MS 651	M.Tech. Dissertation Phase I	10		10
		Total			**16**

Semester IV

Sl. No.	Course Code	Course	Credits		Total Credits (*)
			L	**L**	
1	MS 652	M.Tech. Dissertation Phase II	14		14
		Total			**14**

* 1 Credit in Theory/Tutorial means 1 contact hour and 1 credit in practice/Project Thesis means 2 contact hours in a week.

List of Electives

SI. No.	Course Code	Course
		From the Department
1	MS 608	Fatigue, Fracture and Failure Analysis
2	MS 610	Materials for Hostile Environments
3	MS 612	Non-Destructive Evaluations
4	MS 613	Physical Metallurgy of Alloy Steels

5	MS 605	Modern Materials for Defence Applications
6	MS624	Corrosion and Control of Defence Components
7	MS625	Welding Technology
8	MS 626	Computational Methods for Engineering Materials
9	MS 627	Nanomaterials and Their Applications in Defence
10	MS628	Heat-treatment of Metals and Alloys
Open Electives		
10	ME 602	Advanced Mechanics of Materials
11	ME 603	Advanced Fluid and Thermal Science
12	ME 604	Advanced Materials and Processing
13	ME 607	Computational Fluid Dynamics
14	ME 608	Finite Element Methods
15	AP 610	Nanotechnology
16	AP 614	Sensors and Actuators
17	AM 621	Advanced Modeling Techniques
18	EE 601	Microwave Engineering

M. Tech. in Corrosion Engineering
Semester I

Sl.No	Course Code	Course	Credits		Total Credits (*)
			L	T/P	
1	MS 601	Introduction to Materials	3	1	4
2	MCE 601	Advanced Corrosion Characterization	3	1	4
3	MCE	Materials for	3	1	4

	602	Defence Application			
4	MCE 603	Introduction to Corrosion	3	1	4
5	AM 607	Mathematics for Engineers	3	1	4
6		Processing of Defence Components	3	1	4
Total			18	6	24

Note: 04 weeks Practice school during summer vacation for scholarship students.

Semester II

Sl.No	Course Code	Course Name	Contact hours/week		Credits
			L	T/P	
1	MCE 604	Corrosion Prevention and Control	3	1	4
2	MCE 605	High Temperature Corrosion	3	1	4
3		Elective – I (from Department Electives)	3	1	4
4		Elective – II (from Department Electives)	3	1	4
5		Elective – III (from open Electives)	3	1	4
6		Elective – IV (from open Electives)	3	1	4
Total			18	6	24

Semester III

Sl.No	Course Code	Course Name	Contact hours/week	Credits

			L	T/P	
1		Elective V (from MOOC/NPTL courses)	3	0	3
2		Elective VI (from MOOC/NPTL courses)	3	0	3
	MS 631	M.Tech Dissertation Phase – I			10
Total					16

Semester IV

Sl.No	Course Code	Course Name	Contact hours/week		Credits
			L	T/P	
1	MS 631	M.Tech Dissertation Phase – II			14
Total					14

* 1 Credit in Theory/Tutorial means 1 contact hour and 1 credit in practical/Project Thesis means 2 contact hours in a week

List of Electives

	Course code	Name of the course
		Electives (I,II) from the Department
1	MS 606	Advanced Physical and Mechanical Metallurgy
2	MS607	Design of Materials
3	MS 608	Fatigue and Fracture, and Failure Analysis
4	MS 610	Materials for high temperature applications

4	MS 612	Non-destructive Evaluations (NDT)
5	MS 615	Heat treatment
6	MCE 606	Coating technology for defence applications
7	MCE 607	Surface Science and Engineering
8	MCE 608	Welding Science and Technology
9	MCE 609	High Temperature corrosion
Electives (III,IV) from the Department		
11	ME602	Advanced Mechanics of Materials
12	ME603	Advanced Fluid and Thermal Science
13	ME604	Advanced Materials and Processing
14	ME607	Computational Fluid Dynamics
15	ME608	Finite Element Methods
16	AP 610	Nanotechnology
17	AP614	Sensors and Actuators
18	AM621	Advanced Modelling Techniques
19	EE601	Microwave Engineering

MOOC Courses

S.No	Course Name
1	Materials data science and informatics
2	Nanotechnology and nano sensors - Part-1
3	Nanotechnology and nano sensors - Part-2
4	Introduction to High-Throughout Materials
5	Metals and Metalloids of the main groups: Basis and their role in the daily life
6	Introduction to solid state chemistry
7	Sustainable energy
NPTL Courses	
8	Industrial Engineering
9	Advanced Strength of Materials
10	Marine Construction and Welding
11	Strength and Vibration of Marine structures
12	Materials and Energy Balance
13	Process Control and Instrumentation
14	Mathematical Logic
15	Mathematical Methods Engineering and Science
16	Introduction to Crystallography Texture

DEPARTMENT OF TECHNOLOGY MANAGEMENT
<u>M. Tech in Technology Management</u>

Semester I

Sl. No.	Course Code	Course	Contact Hours/week		Credits
			L	T/P	
1	AM604	Advanced Statistical Techniques (Foundation Course)	3	1	4
2	TM601	Emerging Landscape of Technology Management	3	1	4
3	TM602	R&D Management	3	1	4
4	TM603	Project Management	3	1	4
5	TM604	Strategic Management	3	1	4
6	TM605	Management of Innovation and Intellectual Property	3	1	4
		Total	**18**	**6**	**24**

Semester II

Sl. No.	Course Code	Course	Contact hours/week		Credits
			L	T/P	
1	TM607	Management of Manufacturing and Integration	3	1	4
2	TM608	Knowledge Management	3	1	4
3		Core/ Elective – I [By Department]	3	1	4
4		Core / Elective – II [By Department]	3	1	4
5		Elective – III	3	1	4
6		Elective – IV	3	1	4
		Total	**18**	**6**	**24**

Note: 04 weeks Practice school during summer vacation for scholarship students.

Semester III

Sl. No.	Course Code	Course	Contact Hours /week		Credits
			L	T/P	
1		Elective – V (Regular/Self Study/MOOC)	3	0	3
2		Elective – VI (Regular/Self Study/MOOC)	3	0	3
3	TM651	M.Tech. Dissertation Phase I			10
		Total			**16**

Semester IV

Sl. No.	Course Code	Course	Contact Hours /week		Credits
			L	T/P	
1	TM652	M.Tech. Dissertation Phase II			14
		Total			**14**

List of Electives

* 1

Sl. No.	Course Code	Course Name
		Elective I, II, III, IV, V & VI
		Electives for Sem II
1	TM610	Leadership & Organisational Behaviour
2	TM611	Software Projects Management
3	TM612	Quality Management
4	TM613	Value Engineering
5	TM650	Mini – Project #
6	TM609	System Engineering
7	TM614	Design Management
8	TM615	Planning and Management of Human Resources
9	TM649	Scientific / Engineering practices and skills
10	TM616	Introduction to variables of Nation Building
11	EE610	Electronic Warfare
12	AM621	Advanced Modelling Techniques
13	AM622	Discrete Event Simulation
14	AM623	Linear and Non Linear Systems
15	AM624	Advanced Numerical Methods
16	CE668	Ethical Hacking and Cyber Laws
17	CE664	Network Security
18	CE695	Cyber Physical & Self Organising Systems
19	CE 683	Information Warfare
20	AM 603	Operations Research
21	ME609	Design of Machinery
# Will be offered in 3rd Semester only.		

Credit in Theory/Tutorial means 1 contact hour and 1 credit in practice/Project Thesis means 2 contact hours in a week

M. Tech in Modelling and Simulation

Semester I:

Sl. No.	Course Code	Course Name	Credits		Total Credits (*)
			L	T / P	
1.	AM 601	Advanced Numerical Methods	3	1	4
2.	AM 602	Mathematical Modelling & System Analysis	3	1	4
3.	AM 603	Advanced Optimization Techniques	3	1	4
4.	AM 604	Advanced Statistical Techniques	3	1	4
5.	AM605	Computer Graphics	3	1	4
6.	AM 606	Mathematical Methods	3	1	4
		Total	18	6	24

Semester II:

Sl. No.	Course Code	Course Name	Credits		Total Credits (*)
			L	T / P	
1.	AM 621	Advanced Modelling Techniques	3	1	4
2.	AM 622	Simulation of Linear and Nonlinear Systems	3	1	4
3.		Elective II [From Department(AM)]	3	1	4
4.		Elective III [From Department(AM)]	3	1	4
5.		Elective IV	3	1	4
6.		Elective V	3	1	4
		Total	21	4	24

NOTE : 04 WEEKS PRACTICE SCHOOL DURING SUMMER VACATION FOR SCHOLARSHIP STUDENTS.

Semester III:

Sl. No.	Course Code	Course Name	Credits		Total Credits (*)
			L	T / P	
1.		Elective V	3	0	3
2.		Elective VI	3	0	3

3.	AM 651	M.Tech Dissertation Phase – I		10
		Total		16

Semester IV:

Sl. No.	Course Code	Course Name	Credits		Total Credits (*)
			L	T / P	
1.	AM 652	M.Tech Dissertation Phase - II			14
		Total			14

* 1 Credit in Theory/Tutorial means 1 contact hour and 1 credit practice/Project Thesis means 2 contact hours in a week.

List of Electives are given Below:

Sl. No.	Course Code	Course
		Elective I, II, III, IV, V, VI
	AM 623	Machine Learning
	AM 625	Digital Image Processing
	AM 626	Computational Heat and Mass Transfer
	AM 627	Introduction to Non Newtonian Fluids
	AM 628	Computational Number Theory and Cryptography
	AM 629	Calculus of Variations and Integral Equations
	AM 630	Domain Decomposition Methods
	AM 631	Multigrid Methods
	AM 632	Ballistics
	AM 633	Bio-Mechanics
	AM 634	Tensor Analysis and Engineering Applications
	AM 650	Mini Project (*will be offered 3rd Semester only*)
	AE 614	System Engineering
	AE 615	Estimation with Applications to Tracking and Navigation
	CE 667	Trustworthy Computing
	CE 681	Mobile Computing
	CE 685	High Performance Computing

	CE 686	Game Theory
	CE 687	Cloud Computing & Security
	ME 608	Finite Element Methods
	ME 609	Computational Fluid Dynamics
	ME 631	Compressible Fluid Flow
	EE 604	Embedded Systems
	EE 606	Radar Engineering
	EE 613	Electronics Warfare
	EE 619	Detection and Estimation Theory

Defence Institute of Advanced Technology (DU)
M.Sc. Food Technology
Department of Applied Chemistry
(In association with DFRL, Mysore)

S. No	Course No	Title of the Course	Credit
Semester I			
1	ACFT 501	Food Chemistry	5
2	ACFT 502	Food Microbiology	5
3	ACFT 503	Food and Nutrition	3
4	ACFT 504	Principles of food processing and preservation	5
5	ACFT 505	Food Analysis & Sensory Evaluation	5
Semester II			
1	ACFT 506	Technology of Fermented Foods	5
2	ACFT 507	Food Standards and Safety Management	3
3	ACFT 508	Technology of Milk & Dairy Products	5
4	ACFT 509	Food Packaging Technology	5
5	Elective I		5
Semester III			
1	ACFT 510	Technology of Fruits, Vegetables and Plantation Crops	5
2	ACFT 511	Technology of Cereals, Pulses and Oil Seeds	5
3	ACFT 512	Technology of Meat, Poultry & Fish Processing	5
4	ACFT 513	Seminar	3

5		Elective II				5

Semester IV

1	ACFT 541	Project work				25
			Total Credits			94

(Practical sessions for 02 weeks each in Semesters I & II will be conducted at DFRL, Mysore. All semester III courses will be conducted at DFRL, Mysore. As per requirements, project work in semester IV of some students will be conducted at DFRL Mysore)

Elective I

S. No.	Course Code	Course
1	AC-607	Nano chemical Technology
2	AC-610	Recent Advances in Chemistry
3	ACFT 514	Statistics and Research Methodology
4	MS 607	Design of Materials Metals and Alloys

Elective II

1	AC-605	Advanced Analytical Techniques
2	AC-614	Green & Sustainable chemical processes
3	MS-601	Introduction to materials
4	ACFT 515	Advanced Food Technology
5	ACFT 516	Online courses from NPTEL, MOOC

PG DIPLOMA IN INTEGRATED SAFETY ENGINEERING
I TO III SEMESTERS (TRIMESTER)
CURRICULUM AND SYLLABUS
Trimester I

SN	Course Code	Course Title	L	T	P	C
THEORY :						
1	AM -501	Probability, Statistical & Simulation techniques	3	-	-	3
2	ME -502	Combustion and Heat transfer	3	-	-	3
3	MS/CF -503	Industrial safety	3	-	-	3
4	EE/AP -504	Electrical Safety	3			3
5	MS/AC/AP-505	**Elective– I** A. Environment Safety OR	3			

		B. Nuclear and radiation safety				
PRACTICAL	Allotment of project topic					
7	MS -506	Industrial Safety Laboratory	-	-	4	2
		TOTAL				17

Trimester II

SN	Course Code	Course Title	L	T	P	C
THEORY :						
1	CF – 507	Fire safety	3			3
2	CF – 508	Disaster Management	3			3
3	CF – 509	SHE Legislation	3			3
4	CF – 510	Safety in Process Industries	3			3
5	CF – 511	Accident investigation and control measures	3			3
6	CF – 512	Elective II A. Human Factors and Behaviour based safety B. Aviation safety C. Explosive safety	3			3
PRACTICALS						
8	CF – 513	Fire Safety	-		4	2
TOTAL						17

Trimester III

SN	Course Code	Course Title	L	T	P	C
THEORY						
1	MS/CF – 514	Risk and hazard assessment	3			3
2	MS/CF – 515	Quality and Reliability Engineering	3			3
3	MS/CF- 516	Elective III A. Safety in Hydrocarbon Industry	3			3

		B. Powder Handling safety C. Safety in Marine systems				
4						
PRACTICALS						
5	MS/CF- 517	Project work – Phase II Final			16	8
TOTAL						17