IAA/AU/1189/MAE

Director Academics

Curriculum Review MS/PhD Aerospace Engineering

1. Curriculum review of MS/PhD Aerospace Engineering was carried out by DMAE Faculty and external members on 11th July, 2023. The changes suggested was primary related to shuffling of some core and elective courses. The minutes of meetings is attached as Appendix "B".

2. The curriculum along with suggested changes was presented in Academic Council on 15th August, 2023. Some additional changes were suggested by the members along with the previous proposed changes. The additional changes proposed along with action taken are as follows:

Proposed	Action taken
AE 869 and AE 868 Special Topics in Aerospace Vehicle Design are identical with same course code and title. Needs to be reviewed.	AE 868 Special Topics in Aerospace Vehicle Design has been deleted
Some course related to AI, Machine Learning or Computer Vision may also be added in the curriculum.	Courses related to AI and Machine Learning has been added. AE 828 Artificial Intelligence with Python AE 829 Machine Learning with Applications
AE 611 Advanced Compressible Fluid Dynamics may be replaced with the suitable code of 800 level.	Advanced Compressible Fluid Dynamics code is changed to AE 813.
Curriculum is being followed for MS and PhD programs, however, for PhD 50% of the course work should be of 800 level. Some courses need to be of 800 level in the curriculum	Some Advance 800 level courses has been added in various streams.

3. The revised MS Aerospace Engineering curriculum after incorporating aforementioned changes is attached as Appendix "A" and PhD Aerospace Engineering as Appendix "B"

4. In comparison to the Aerospace Curriculum of DMAE with Institute of Space and Technology, The DMAE offers more streams and have comprehensive list of elective courses of each individual stream, instead just an overall list of elective courses.

5. In comparison to the Aerospace Curriculum of DMAE with CAE Risalpur, The DMAE offers specific streams with core specialization and have comprehensive list of elective courses of each individual stream. Apparently, no specific stream of Aerospace Engineering is listed on the CAE Risalpur website, instead overall list of elective courses.

6. Submitted for your kind information and necessary action, please.

Scheme of Studies for Masters of Science in Aerospace Engineering

MSAE Program (Solid Mechanics/Structures)

SEMESTER # 1

S1	Code	Subject	Pre-Requisite	Course Cr Hrs
1	AE XXX	Core-I	-	3-0-3
2	AE XXX	Core-II	-	3-0-3
3	AE XXX	Elective-I	-	3-0-3
4	AE 798	Research Methodology	-	1-0-1
		Semester Credit Hours		**10-0-10**
		Cumulative Credit Hours		**10-0-10**

SEMESTER # 2

S2	Code	Subject	Pre-Requisite	Course Cr Hrs
1	AE XXX	Core-III	-	3-0-3
2	AE XXX	Core-IV	-	3-0-3
3	AE XXX	Elective-II	-	3-0-3
		Semester Credit Hours		**9-0-9**
		Cumulative Credit Hours		**19-0-19**

SEMESTER # 3

S3	Code	Subject	Pre-Requisite	Course Cr Hrs
1	AE XXX	Elective-III	-	3-0-3
2	AE XXX	Elective-IV	-	3-0-3
3	AE 799	MS Thesis	-	6-0-6
		Semester Credit Hours		**12-0-12**
		Cumulative Credit Hours		**31-0-31**

SEMESTER # 4

S4	Code	Subject	Pre-Requisite	Course Cr Hrs
1	AE 799	MS Thesis	Continued from Previous	6-0-6
		Cumulative Credit Hours		**31-0-31**

Course Requirements: At least four courses from the following.

List of Core Courses (Solid Mechanics/Structures)			
S. No.	**Course Code**	**Course Title**	**Cr Hrs**
1	AE 601	Theory of Elasticity	3-0-3
2	AE 749	Advanced Theory of Vibrations	3-0-3
3	AE 640	Finite Element Methods	3-0-3
4	AE 746	Advanced Mechanics of Composites	3-0-3
5	AE 811	Experimental Techniques in Solid Mechanics	3-0-3
6	AE 602	Design and Analysis of Aerospace Structures	3-0-3

Note: The sequence of the core and elective courses can be varied depending upon the faculty availability and PG students' course requirement.

Course Requirements: One mathematics course and any three elective courses from the following list of elective/mathematics courses.

List of Elective Courses (Solid Mechanics/Structures)			
S. No.	**Course Code**	**Course Title**	**Cr Hrs**
1	AE 645	Advanced Materials in Engineering	3-0-3
2	AE 744	Advanced Mechanics of Materials	3-0-3
3	AE 747	Theory of Plasticity	3-0-3
4	AE 814	Computational Fracture Mechanics	3-0-3
5	AE 742	MEMS Sensors & Actuators	3-0-3
6	AE 641	Behavior of Materials Under Impact Loading	3-0-3
7	AE 606	Impact Engineering	3-0-3
8	AE 607	Fundamentals of Adhesives, Sealants and Coatings	3-0-3
9	AE 608	Systems Engineering and Analysis	3-0-3
10	AE 741	MEMS Devices and Applications	3-0-3
11	AE 605	Micro-Fabrication	3-0-3
12	AE 812	MEMS Materials and Processes	3-0-3
13	AE 810	MEMS Micro-System Design	3-0-3
14	AE 815	Advanced CAD/CAM	3-0-3
15	AE 713	Computer Integrated Manufacturing	3-0-3
16	AE 814	Advanced Manufacturing	3-0-3
17	AE 703	Advanced Strength of Materials	3-0-3
18	AE 705	Advanced Aircraft Structural Analysis	3-0-3
19	AE 748	Fracture Mechanics	3-0-3
20	AE 617	Design of Aerospace Vehicle	3-0-3
21	AE 618	Product and Process Design	3-0-3
22	AE 828	Artificial Intelligence with Python	3-0-3
23	AE 829	Machine Learning with Applications	3-0-3
24	AE 811	Experimental Techniques in Solid Mechanics	3-0-3
25	AE 818	Aerospace Structural Analysis	3-0-3
26	AE 808	Special Topics in Solid Mechanics/Structures	3-0-3
27	AE 809	Special Topics in Aerospace Engineering	3-0-3
Mathematics Courses			
28	MA 645	Advanced Numerical Techniques	3-0-3
29	MA 680	Applied Partial Differential Equations	3-0-3
30	MA 644	Advanced Engineering Mathematics	3-0-3

Notes:

1. Post-graduate elective courses of Aerospace Engineering program of other streams can also be taken as elective courses.
2. Post-graduate students can take up to two elective courses relevant to their research thesis/domain from any other department/faculty with prior permission from their Supervisor, GEC members, Chair DMAE, DG IAA and Dean of Graduate Studies.
3. Courses from the above-mentioned list (Core and Elective) can be taken as elective courses in PhD Aerospace Program for completion of course work requirements.

MSAE Program (Fluid/Aero Dynamics)

SEMESTER # 1

S1	Code	Subject	Pre-Requisite	Course Cr Hrs
1	AE XXX	Core-I	-	3-0-3
2	AE XXX	Core-II	-	3-0-3
3	AE XXX	Elective-I	-	3-0-3
4	AE 798	Research Methodology	-	1-0-1
		Semester Credit Hours		**10-0-10**
		Cumulative Credit Hours		**10-0-10**

SEMESTER # 2

S2	Code	Subject	Pre-Requisite	Course Cr Hrs
1	AE XXX	Core-III	-	3-0-3
2	AE XXX	Core-IV	-	3-0-3
3	AE XXX	Elective-II	-	3-0-3
		Semester Credit Hours		**9-0-9**
		Cumulative Credit Hours		**19-0-19**

SEMESTER # 3

S3	Code	Subject	Pre-Requisite	Course Cr Hrs
1	AE XXX	Elective-III	-	3-0-3
2	AE XXX	Elective-IV	-	3-0-3
3	AE 799	MS Thesis	-	6-0-6
		Semester Credit Hours		**12-0-12**
		Cumulative Credit Hours		**31-0-31**

SEMESTER # 4

S4	Code	Subject	Pre-Requisite	Course Cr Hrs
1	AE 799	MS Thesis	Continued from Previous	6-0-6
		Cumulative Credit Hours		**31-0-31**

Course Requirements: At least four courses from the following.

List of Core Courses (Fluid/Aero Dynamics)			
S. No.	**Course Code**	**Course Title**	**Cr Hrs**
1	AE 758	Advanced Incompressible Fluid Dynamics	3-0-3
2	AE 630	Computational Fluid Dynamics I	3-0-3
3	AE 753	Advanced Heat Transfer	3-0-3
4	AE 813	Advanced Compressible Fluid Dynamics	3-0-3
5	AE 752	Experimental Techniques in Fluid and Thermal Sciences	3-0-3
6	AE 738	Advanced Thermodynamics	3-0-3

Note: The sequence of the core and elective courses can be varied depending upon the faculty availability and PG students' course requirement.

Course Requirements: One mathematics course and any three elective courses from the following list of elective/mathematics courses.

List of Elective Courses (Fluid/Aero Dynamics)			
S. No.	**Course Code**	**Course Title**	**Cr Hrs**
1	AE 650	Turbo Machinery	3-0-3
2	AE 654	Computational Gas Dynamics	3-0-3
3	AE 730	Computational Fluid Dynamics II	3-0-3
4	AE 731	Gas Turbine Combustion	3-0-3
5	AE 732	Propulsion System Performance and Integration	3-0-3
6	AE 633	Potential Flow and Panel Methods	3-0-3
7	AE 634	Applied Computational Fluid Dynamics	3-0-3
8	AE 735	Advanced Aerospace Propulsion	3-0-3
9	AE 815	Hypersonic/High Temperature Gas Dynamics	3-0-3
10	AE 655	Waves and Compressible Flow	3-0-3
11	AE 859	Turbulent Fluid Flow	3-0-3
12	AE 635	Gas Turbine Theory and Performance	3-0-3
13	AE 754	Conduction Heat Transfer	3-0-3
14	AE 755	Convection Heat Transfer	3-0-3
15	AE 756	Radiation Heat Transfer	3-0-3
16	AE 757	Advance Aircraft Dynamics and Control	3-0-3
17	AE 751	Unsteady Aerodynamics	3-0-3
18	AE 816	Multi-Phase Fluid Dynamics	3-0-3
19	AE 817	Advanced Aerothermodynamics	3-0-3
20	AE 860	Computational Fluid Turbulence	3-0-3
21	AE 857	Hydrodynamic Stability	3-0-3
22	AE 838	Special Topics in Fluid/Aerodynamics	3-0-3
Mathematics Courses			
23	MA 645	Advanced Numerical Techniques	3-0-3
24	MA 680	Applied Partial Differential Equations	3-0-3
25	MA 644	Advanced Engineering Mathematics	3-0-3

Notes:

1. Post-graduate elective courses of Aerospace Engineering program of other streams can also be taken as elective courses.
2. Post-graduate students can take up to two elective courses relevant to their research thesis/domain from any other department/faculty with prior permission from their Supervisor, GEC members, Chair DMAE, DG IAA and Dean of Graduate Studies.
3. Courses from the above-mentioned list (Core and Elective) can be taken as elective courses in PhD Aerospace Program for completion of course work requirements.

MSAE Program (Aerospace Vehicle Design)

SEMESTER # 1

S1	Code	Subject	Pre-Requisite	Course Cr Hrs
1	AE XXX	Core-I	-	3-0-3
2	AE XXX	Core-II	-	3-0-3
3	AE XXX	Elective-I	-	3-0-3
4	AE 798	Research Methodology	-	1-0-1
		Semester Credit Hours		**10-0-10**
		Cumulative Credit Hours		**10-0-10**

SEMESTER # 2

S2	Code	Subject	Pre-Requisite	Course Cr Hrs
1	AE XXX	Core-III	-	3-0-3
2	AE XXX	Core-IV	-	3-0-3
3	AE XXX	Elective-II	-	3-0-3
		Semester Credit Hours		**9-0-9**
		Cumulative Credit Hours		**19-0-19**

SEMESTER # 3

S3	Code	Subject	Pre-Requisite	Course Cr Hrs
1	AE XXX	Elective-III	-	3-0-3
2	AE XXX	Elective-IV	-	3-0-3
3	AE 799	MS Thesis	-	6-0-6
		Semester Credit Hours		**12-0-12**
		Cumulative Credit Hours		**31-0-31**

SEMESTER # 4

S4	Code	Subject	Pre-Requisite	Course Cr Hrs
1	AE 799	MS Thesis	Continued from Previous	6-0-6
		Cumulative Credit Hours		**31-0-31**

Course Requirements: At least four courses from the following.

List of Core Courses (Aerospace Vehicle Design)			
S. No.	**Course Code**	**Course Title**	**Cr Hrs**
1	AE 617	Design of Aerospace Vehicle	3-0-3
2	AE 757	Advanced Aircraft Dynamics and Control	3-0-3
3	AE 861	Multidisciplinary Design Optimization for Aerospace Vehicles	3-0-3
4	AE 758	Advanced Incompressible Fluid Dynamics	3-0-3
5	AE 630	Computational Fluid Dynamics I	3-0-3
6	AE 640	Finite Element Methods	3-0-3

Note: The sequence of the core and elective courses can be varied depending upon the faculty availability and PG students' course requirement.

MSAE Program (Propulsion)

SEMESTER # 1

S1	Code	Subject	Pre-Requisite	Course Cr Hrs
1	AE XXX	Core-I	-	3-0-3
2	AE XXX	Core-II	-	3-0-3
3	AE XXX	Elective-I	-	3-0-3
4	AE 798	Research Methodology	-	1-0-1
		Semester Credit Hours		**10-0-10**
		Cumulative Credit Hours		**10-0-10**

SEMESTER # 2

S2	Code	Subject	Pre-Requisite	Course Cr Hrs
1	AE XXX	Core-III	-	3-0-3
2	AE XXX	Core-IV	-	3-0-3
3	AE XXX	Elective-II	-	3-0-3
		Semester Credit Hours		**9-0-9**
		Cumulative Credit Hours		**19-0-19**

Course Requirements: One mathematics course and any three elective courses from the following list of elective/mathematics courses.

List of Elective Courses (Aerospace Vehicle Design)			
S. No.	**Course Code**	**Course Title**	**Cr Hrs**
1	AE 767	Advanced Aero Thermodynamics	3-0-3
2	AE 666	Aircraft Preliminary Design and Performance	3-0-3
3	AE 665	Flight Vehicle Guidance, Control and Navigation	3-0-3
4	AE 762	Flight and Trajectory Optimization	3-0-3
5	AE 869	Special Topics in Aerospace Vehicle Design	3-0-3
Mathematics Courses			
7	MA 645	Advanced Numerical Techniques	3-0-3
8	MA 680	Applied Partial Differential Equations	3-0-3
9	MA 644	Advanced Engineering Mathematics	3-0-3

Notes:

1. Post-graduate elective courses of Aerospace Engineering program of other streams can also be taken as elective courses.
2. Post-graduate students can take up to two elective courses relevant to their research thesis/domain from any other department/faculty with prior permission from their Supervisor, GEC members, Chair DMAE, DG IAA and Dean of Graduate Studies.
3. Courses from the above-mentioned list (Core and Elective) can be taken as elective courses in PhD Aerospace Program for completion of course work requirements.

SEMESTER # 3

S3	Code	Subject	Pre-Requisite	Course Cr Hrs
1	AE XXX	Elective-III	-	3-0-3
2	AE XXX	Elective- IV	-	3-0-3
3	AE 799	MS Thesis	-	6-0-6
		Semester Credit Hours		**12-0-12**
		Cumulative Credit Hours		**31-0-31**

SEMESTER # 4

S4	Code	Subject	Pre-Requisite	Course Cr Hrs
1	AE 799	MS Thesis	Continued from Previous	6-0-6
		Cumulative Credit Hours		**31-0-31**

Course Requirements: At least four courses from the following.

List of Core Courses (Propulsion)			
S. No.	**Course Code**	**Course Title**	**Cr Hrs**
1	AE 630	Computational Fluid Dynamics I	3-0-3
2	AE 753	Advanced Heat Transfer	3-0-3
3	AE 650	Turbo Machinery	3-0-3
4	AE 813	Advanced Compressible Fluid Dynamics	3-0-3
5	AE 779	Advanced Aerospace Propulsion	3-0-3
6	AE 767	Advanced Aero Thermodynamics	3-0-3

Note: The sequence of the core and elective courses can be varied depending upon the faculty availability and PG students' course requirement.

Course Requirements: One mathematics course and any three elective courses from the following list of elective/mathematics courses.

List of Elective Courses (Propulsion)			
S. No.	**Course Code**	**Course Title**	**Cr Hrs**
1	AE 670	Mech. and Thermodynamics of Aerospace Propulsion	3-0-3
2	AE 732	Propulsion system performance and Integration	3-0-3
3	AE 775	Advanced Combustion	3-0-3
4	AE 674	Rocket Propulsion	3-0-3
5	AE 676	Experimental Techniques in Aerospace Propulsion	3-0-3
6	AE 879	Special Topics in Aerospace Propulsion	3-0-3
7	AE 673	Artificial Intelligence	3-0-3
8	AE 674	Machine Learning	3-0-3
9	AE 615	Aircraft Engine Design	3-0-3
10	AE 858	Rarefied Gas Dynamics/ Kinetic Theory	3-0-3
11	AE 888	Special Topics in Propulsion	3-0-3
Mathematics Courses			
12	MA 645	Advanced Numerical Techniques	3-0-3
13	MA 680	Applied Partial Differential Equations	3-0-3
14	MA 644	Advanced Engineering Mathematics	3-0-3

Note:

1. Post-graduate elective courses of Aerospace Engineering program of other streams can also be taken as elective courses.
2. Post-graduate students can take up to two elective courses relevant to their research thesis/domain from any other department/faculty with prior permission from their Supervisor, GEC members, Chair DMAE, DG IAA and Dean of Graduate Studies.
3. Courses from the above-mentioned list (Core and Elective) can be taken as elective courses in PhD Aerospace Program for completion of course work requirements.

MSAE Program (Flight Dynamics and Control)

SEMESTER # 1

S1	Code	Subject	Pre-Requisite	Course Cr Hrs
1	AE XXX	Core-I	-	3-0-3
2	AE XXX	Core-II	-	3-0-3
3	AE XXX	Elective-I	-	3-0-3
4	AE 798	Research Methodology	-	1-0-1
		Semester Credit Hours		**10-0-10**
		Cumulative Credit Hours		**10-0-10**

SEMESTER # 2

S2	Code	Subject	Pre-Requisite	Course Cr Hrs
1	AE XXX	Core-III	-	3-0-3
2	AE XXX	Core-IV	-	3-0-3
3	AE XXX	Elective-II	-	3-0-3
		Semester Credit Hours		**9-0-9**
		Cumulative Credit Hours		**19-0-19**

SEMESTER # 3

S3	Code	Subject	Pre-Requisite	Course Cr Hrs
1	AE XXX	Elective-III	-	3-0-3
2	AE XXX	Elective- IV	-	3-0-3
3	AE 799	MS Thesis	-	6-0-6
		Semester Credit Hours		**12-0-12**
		Cumulative Credit Hours		**31-0-31**

SEMESTER # 4

S4	Code	Subject	Pre-Requisite	Course Cr Hrs
1	AE 799	MS Thesis	Continued from Previous	6-0-6
		Cumulative Credit Hours		**31-0-31**

Course Requirements: At least four courses from the following.

List of Core Courses (Flight Dynamics and Control)			
S. No.	**Course Code**	**Course Title**	**Cr Hrs**
1	AE 757	Advanced Aircraft Dynamics and Control	3-0-3
2	AE 690	Guidance and Navigation of Aerospace Vehicles	3-0-3
3	AE 691	Modern Feedback Control	3-0-3
4	AE 692	Linear Systems	3-0-3
5	AE 695	Intermediate Dynamics	3-0-3

Note: The sequence of the core and elective courses can be varied depending upon the faculty availability and PG students' course requirement.

Course Requirements: One mathematics course and any three elective courses from the following list of elective/mathematics courses.

List of Elective Courses (Flight Dynamics and Control)			
S. No.	**Course Code**	**Course Title**	**Cr Hrs**
1	AE 694	Optimal Control	3-0-3
2	AE 693	Non-Linear Systems	3-0-3
3	AE 796	Machine Learning	3-0-3
4	AE 697	Design and Analysis of Algorithm	3-0-3
5	AE 698	Principle of Real Time Computing	3-0-3
6	AE 699	Adaptive Filter Theory	3-0-3
7	AE 792	Model Based Software Testing	3-0-3
8	AE 791	Array Signal Processing	3-0-3
9	AE 795	Robust Control	3-0-3
10	AE 898	Special Topics in Flight Dynamics and Control	3-0-3
Mathematics Courses			
11	MA 645	Advanced Numerical Techniques	3-0-3
12	MA 680	Applied Partial Differential Equations	3-0-3
13	MA 644	Advanced Engineering Mathematics	3-0-3

Note:

1. Post-graduate elective courses of Aerospace Engineering program of other streams can also be taken as elective courses.
2. Post-graduate students can take up to two elective courses relevant to their research thesis/domain from any other department/faculty with prior permission from their Supervisor, GEC members, Chair DMAE, DG IAA and Dean of Graduate Studies.
3. Courses from the above-mentioned list (Core and Elective) can be taken as elective courses in PhD Aerospace Program for completion of course work requirements.

MSAE Program (Astronautics & Space Engineering)

SEMESTER # 1

S1	Code	Subject	Pre-Requisite	Course Cr Hrs
1	AE XXX	Core-I	-	3-0-3
2	AE XXX	Core-II	-	3-0-3
3	AE XXX	Elective-I	-	3-0-3
4	AE 798	Research Methodology	-	1-0-1
		Semester Credit Hours		**10-0-10**
		Cumulative Credit Hours		**10-0-10**

SEMESTER # 2

S2	Code	Subject	Pre-Requisite	Course Cr Hrs
1	AE XXX	Core-III	-	3-0-3
2	AE XXX	Core-IV	-	3-0-3
3	AE XXX	Elective-II	-	3-0-3
		Semester Credit Hours		**9-0-9**
		Cumulative Credit Hours		**19-0-19**

SEMESTER # 3

S3	Code	Subject	Pre-Requisite	Course Cr Hrs
1	AE XXX	Elective-III	-	3-0-3
2	AE XXX	Elective- IV	-	3-0-3
3	AE 799	MS Thesis	-	6-0-6
		Semester Credit Hours		**12-0-12**
		Cumulative Credit Hours		**31-0-31**

SEMESTER # 4

S4	Code	Subject	Pre-Requisite	Course Cr Hrs
1	AE 799	MS Thesis	Continued from Previous	6-0-6
		Cumulative Credit Hours		**31-0-31**

Course Requirements: At least four courses from the following.

List of Core Courses (Astronautics & Space Engineering)			
S. No.	**Course Code**	**Course Title**	**Cr Hrs**
1	AE 680	Spacecraft Propulsion	3-0-3
2	AE 681	Spacecraft System Design	3-0-3
3	AE 682	Space Environments and Spacecraft Interactions	3-0-3
4	AE 683	Orbital Mechanics I	3-0-3
5	AE 684	Space Communications	3-0-3

Note: The sequence of the core and elective courses can be varied depending upon the faculty availability and PG students' course requirement.

Course Requirements: One mathematics course and any three elective courses from the following list of elective/mathematics courses.

List of Elective Courses (Astronautics & Space Engineering)			
S. No.	**Course Code**	**Course Title**	**Cr Hrs**
1	AE 685	Physical Gas Dynamics	3-0-3
2	AE 784	Orbital Mechanics II	3-0-3
3	AE 686	Spacecraft Thermal Control	3-0-3
4	AE 687	System for Remote sensing from Space	3-0-3
5	AE 688	Spacecraft Sensors	3-0-3
6	AE 789	Spacecraft Structural Dynamics	3-0-3
7	AE 780	Spacecraft Structural Strength and Materials	3-0-3
8	AE 781	Liquid Rocket Propulsion	3-0-3
9	AE 783	Space Launch Vehicle Design	3-0-3
10	AE 782	Spacecraft Power Systems	3-0-3
11	AE 785	Space Craft Altitude Control	3-0-3
12	AE 786	Space Craft Altitude Dynamics	3-0-3
13	AE 787	Solar System Navigation	3-0-3
14	AE 889	Special Topics in Astronautics & Space Engineering	3-0-3
15	AE 788	Space Mission Analysis and Design	3-0-3
Mathematics Courses			
16	MA 645	Advanced Numerical Techniques	3-0-3
17	MA 680	Applied Partial Differential Equations	3-0-3
18	MA 644	Advanced Engineering Mathematics	3-0-3

Notes:

1. Post-graduate elective courses of Aerospace Engineering program of other streams can also be taken as elective courses.
2. Post-graduate students can take up to two elective courses relevant to their research thesis/domain from any other department/faculty with prior permission from their Supervisor, GEC members, Chair DMAE, and DG IAA.
3. Courses from the above-mentioned list (Core and Elective) can be taken as elective courses in PhD Aerospace Program for completion of course work requirements.

Course Codes Streams in MS Aerospace Engineering

Stream Center Digit	Code Range	Stream
0, 1 & 4	AE 600-619 AE 700-719 AE 800-819 AE 640-649 AE 740-749 AE 840-849	Solid Mechanics/Structures
2, 3 & 5	AE 620-639 AE 720-739 AE 820-839 AE 650-659 AE 750-759 AE 850-859	Fluid/Aero Dynamics
6	AE 660-669 AE 760-769 AE 860-869	Aerospace Vehicle Design
7	AE 670-679 AE 770-779 AE 870-879	Propulsion
9	AE 690-699 AE 790-799 AE 890-899	Flight Dynamics and Control
8	AE 680-689 AE 780-789 AE 880-889	Astronautics & Space Engineering

Scheme of Studies for PhD in Aerospace Engineering

SEMESTER # 1

S1	Code	Subject	Pre-Requisite	Course Cr Hrs
1	AE XXX	Elective-I	-	3-0-3
2	AE XXX	Elective-II	-	3-0-3
3	AE XXX	Elective-III	-	3-0-3
4	AE 798	Research Methodology*	-	1-0-1
		Semester Credit Hours		**10-0-10**
		Cumulative Credit Hours		**10-0-10**

SEMESTER # 2

S2	Code	Subject	Pre-Requisite	Course Cr Hrs
1	AE XXX	Elective-IV	-	3-0-3
2	AE XXX	Elective-V	-	3-0-3
3	AE XXX	Elective-VI	-	3-0-3
		Semester Credit Hours		**9-0-9**
		Cumulative Credit Hours		**19-0-19**

* Course is compulsory for student(s) who haven't taken it in their Master's Degree.

SEMESTER # 3

S4	Code	Subject	Pre-Requisite	Course Cr Hrs
1	AE 899	PhD Thesis/Dissertation	Continued from Previous	30-0-30
		Cumulative Credit Hours		**49-0-49**

Notes: The detailed list of courses stream wise is given with MS Aerospace Engineering Curriculum. Courses from the list (Core and Elective) of any stream can be taken as elective courses in PhD Aerospace Program for completion of PhD course work requirements. However, at least 50% of the courses should be of 800 level.