

**Five Year Plan Update**

|                 |                                                         |                                                 | Fall 2017 | Spring 2018 | Fall 2018 | Spring 2019 | Fall 2019 | Spring 2020 | Fall 2020 | Spring 2021 | Fall 2021 | Spring 2022 |
|-----------------|---------------------------------------------------------|-------------------------------------------------|-----------|-------------|-----------|-------------|-----------|-------------|-----------|-------------|-----------|-------------|
|                 | <b>Rotorcraft</b>                                       |                                                 |           |             |           |             |           |             |           |             |           |             |
| Staff           | 631                                                     | Helicopter Aerodynamics I                       | X         |             | X         |             | X         |             | X         |             | X         |             |
| Chopra          | 633                                                     | Helicopter Dynamics                             |           | X           |           | X           |           | X           |           | X           |           | X           |
| Datta           | 636                                                     | Helicopter Dynamics II                          | X         |             | X         |             | X         |             | X         |             | X         |             |
| Chopra          | 634                                                     | Helicopter Design                               |           | X           |           | X           |           | X           |           | X           |           | X           |
| Celi            | 635                                                     | Helicopter Stability & Control                  |           |             |           | X           |           |             |           | X           |           |             |
|                 | <b>Flight Dynamics &amp; Control</b>                    |                                                 |           |             |           |             |           |             |           |             |           |             |
| Sanner          | 641                                                     | Linear System Dynamics                          | X         |             | X         |             | X         |             | X         |             | X         |             |
| Faruque         | 642                                                     | Atmospheric Flight Control                      |           | X           |           |             |           | X           |           |             |           | X           |
| Paley/Bauchau   | 646*                                                    | Advanced Dynamics of Aero Systems               |           | X           |           | X           |           | X           |           | X           |           | X           |
| Bauchau         | 647                                                     | Flexible Multibody Dynamics                     |           |             | X         |             |           |             | X         |             |           |             |
| Faruque         | 742                                                     | Robust Multivariable Control                    |           |             |           | X           |           |             |           | X           |           |             |
| Paley           | 743                                                     | App. NL Control of Aerospace Vehicles           |           | X           |           |             |           | X           |           |             |           | X           |
| Staff           | 788B                                                    | Aircraft System Identification                  |           |             | X         |             |           |             | X         |             |           |             |
| Sanner          | 788K                                                    | Est. & Control of Stochastic Systems            | X         |             | X         |             | X         |             | X         |             | X         |             |
|                 | <b>Structures</b>                                       |                                                 |           |             |           |             |           |             |           |             |           |             |
| Chopra          | 651                                                     | Smart Structures                                | X         |             | X         |             | X         |             | X         |             | X         |             |
| Lee             | 652                                                     | Computational Structural Mechanics              |           | X           |           | X           |           | X           |           | X           |           | X           |
| Lee             | 653                                                     | Nonlinear Finite Element Analysis               |           |             | X         |             |           |             | X         |             |           |             |
| Wereley/Bauchau | 654                                                     | Mechanics of Composite Structures               |           | X           |           | X           |           | X           |           | X           |           | X           |
| Bauchau         | 655                                                     | Structural Dynamics                             | X         |             | X         |             | X         |             | X         |             | X         |             |
| Haas            | 656                                                     | Aeroelasticity                                  |           |             |           | X           |           |             |           | X           |           |             |
| Hubbard/Bauchau | 757                                                     | Advanced Structural Dynamics                    |           | X           |           |             |           | X           |           |             |           | X           |
| Flatau          | 788E                                                    | Electro-Mechanical System Modeling              |           | X           |           |             |           | X           |           |             |           | X           |
| Hubbard         | 788M                                                    | Introduction to Morphing Aircraft               |           |             | X         |             |           |             | X         |             |           |             |
| Wereley         | 788W                                                    | Smart Fluids and Applications                   |           | X           |           |             |           | X           |           |             |           | X           |
| Bauchau         | 788P                                                    | Analysis of Structural Elements                 | X         |             | X         |             | X         |             | X         |             | X         |             |
|                 | <b>Aerodynamics &amp; Propulsion</b>                    |                                                 |           |             |           |             |           |             |           |             |           |             |
| Sedwick         | 663                                                     | Intro to Plasmas for Space Prop/Power           |           | X           |           |             |           | X           |           |             |           | X           |
| Yu              | 665                                                     | Advanced Airbreathing Propulsion                |           | X           |           | X           |           | X           |           | X           |           | X           |
| Sedwick         | 667                                                     | Adv. Space Propulsion and Power                 |           |             | X         |             |           |             | X         |             |           |             |
| Cadou           | 673                                                     | Aerodynamics of Incompressible Fluids           | X         |             | X         |             | X         |             | X         |             | X         |             |
| Cadou           | 674                                                     | Aerodynamics of Compressible Fluids             |           | X           |           | X           |           | X           |           | X           |           | X           |
| Jones           | 675*                                                    | Unsteady and Inviscid Aerodynamics              |           |             | X         |             |           |             | X         |             |           |             |
| Martin          | 676                                                     | Turbulence                                      |           |             |           | X           |           |             |           | X           |           |             |
| Laurence        | 682                                                     | Hypersonic Aerodynamics                         |           | X           |           |             |           | X           |           |             |           | X           |
| Laurence        | 683                                                     | High Temperature Gasdynamics                    |           |             |           | X           |           |             |           | X           |           |             |
| Baeder          | 684                                                     | Computational Fluid Dynamics I                  | X         |             | X         |             | X         |             | X         |             | X         |             |
| Baeder          | 685                                                     | Computational Fluid Dynamics II                 |           |             |           | X           |           |             |           | X           |           |             |
| Oran            | 788A                                                    | Fundamentals of Explosions I                    | X         |             | X         |             | X         |             | X         |             | X         |             |
| Baeder          | 788I                                                    | Wind Energy Theory                              |           | X           |           |             |           | X           |           |             |           | X           |
| Oran            | 788J/Y                                                  | Fundamentals of Explosions II                   |           | X           |           | X           |           | X           |           | X           |           | X           |
|                 | <b>Space Systems</b>                                    |                                                 |           |             |           |             |           |             |           |             |           |             |
| Hartzell        | 601                                                     | Astrodynamic                                    | X         |             | X         |             | X         |             | X         |             | X         |             |
| Mitchell        | 602                                                     | S/C Attitude Dynamics & Control                 |           |             |           | X           |           |             |           | X           |           |             |
| Hraster         | 691                                                     | Satellite Design                                |           |             |           | X           |           |             |           | X           |           |             |
| Carignan/Akin   | 692                                                     | Intro to Space Robotics                         | X         |             |           |             | X         |             |           |             | X         |             |
| Israel          | 694                                                     | Spacecraft Communications                       |           | X           |           |             |           | X           |           |             |           | X           |
| Silk            | 696                                                     | Spacecraft Thermal Design                       |           | X           |           |             |           | X           |           |             |           | X           |
| Akin            | 697                                                     | Space Human Factors & Life Support              |           |             |           | X           |           |             |           | X           |           |             |
| Barbee          | 741                                                     | Interplanetary Navigation & Guidance            |           |             |           | X           |           |             |           | X           |           |             |
| Akin            | 788D                                                    | Advanced Space Systems Design                   | X         |             | X         |             | X         |             | X         |             | X         |             |
| Barbee          | 603*                                                    | Near-Earth Object Exploration                   | X         |             | X         |             | X         |             | X         |             | X         |             |
| Akin            | 788X                                                    | Planetary Surface Robotics                      |           |             | X         |             |           |             | X         |             |           |             |
| Akin            | 791                                                     | Launch & Entry Vehicle Design                   |           | X           |           |             |           | X           |           |             |           | X           |
|                 | <b>Other</b>                                            |                                                 |           |             |           |             |           |             |           |             |           |             |
| Celi            | 681                                                     | Engineering Optimization                        |           |             | X         |             |           |             | X         |             |           |             |
| SUSPENDED       | 788O                                                    | Emerging Challenges in Aerospace                |           |             |           |             |           |             |           |             |           |             |
|                 |                                                         | ENAE646 formerly ENAE788G                       |           |             |           |             |           |             |           |             |           |             |
|                 |                                                         | ENAE647 formerly ENAE788Q                       |           |             |           |             |           |             |           |             |           |             |
|                 |                                                         | ENAE655 formerly ENAE672; ENAE603 formerly 788N |           |             |           |             |           |             |           |             |           |             |
|                 | <b>NOTE: Schedule subject to change without notice.</b> |                                                 |           |             |           |             |           |             |           |             |           |             |

## Courses outside the Department of Aerospace Engineering

As described in the aerospace department graduate guide, MS students may take courses outside the department to satisfy their graduate course requirements. PhD students are required to take not less than 9 semester hours of coursework emphasizing mathematics, physical sciences, life sciences, or computer sciences. *All courses must be approved by the student's faculty adviser to officially be accepted as part of his/her graduate program.*

Below are a list of programs available at the University of Maryland that students have drawn courses from to include in their graduate plan of study. Each program name is hyperlinked to their corresponding course listings. Please consult the department websites or Testudo to see when specific courses are offered.

### Engineering

[Bioengineering \(BIOE\)](#)  
[Chemical and Biomolecular Engineering \(CHBE\)](#)  
[Civil and Environmental Engineering \(ENCE\)](#)  
[Electrical & Computer Engineering \(ENEE\)](#)  
[Fire Protection Engineering \(ENFP\)](#)  
[Materials Science and Engineering \(ENMA\)](#)  
[Mechanical Engineering \(ENME\)](#)  
[Reliability Engineering \(ENRE\)](#)  
[Systems Engineering \(ENSE\)](#)

### Outside Engineering

[Applied Mathematics & Scientific Computation \(AMSC\)](#)  
[Astronomy \(ASTR\)](#)  
[Atmospheric and Oceanic Science \(AOSC\)](#)  
[Biological Sciences \(BISI\)](#)  
[Computer Science \(CMSC\)](#)  
[Kinesiology \(KNES\)](#)  
[Mathematical Statistics \(STAT\)](#)  
[Mathematics \(MATH\)](#)  
[Neuroscience & Cognitive Science \(NACS\)](#)  
[Physics \(PHYS\)](#)