

## Space Systems Certificate in the MAE Graduate Program

The certificate in Space Systems is to prepare students enrolled in the MAE Masters program to enter the space industry, government space research and development centers. The program offers a rigorous and in depth exposure to scientific and engineering fundamentals in the broad set of core disciplines required in space-related fields. Taking advantage primarily of existing courses (see below) and resources, including the MAE faculty's expertise and state-of-the-art research and teaching laboratories in the MAE Department, students will be prepared to be practicing professionals through specialized coursework and an in-depth research (M.Sc.) or a capstone project (M.Eng.). The graduate certificate also complements the new undergraduate degree in Aerospace Engineering being offered by the MAE department.

### 1<sup>st</sup> Semester (10cr)

Required	642:527 Math	3cr
Required	Seminar	1cr
Space Elective	(Choose one from the list below)	3cr
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### 2<sup>nd</sup> Semester (10cr)

Required	Orbital Mechanics or Spacecraft & Mission Design	3cr
Required	Seminar	1cr
Space Elective	(Choose one from the list below)	3cr
Technical Elective	See below	3cr

### 3<sup>rd</sup> Semester<sup>3</sup> (10cr)

Required	Spacecraft Attitude Dynamics & Control	3cr
Required	Seminar	1cr
Space Elective	(Choose one from the list below)	3cr
Technical Elective	See below	3cr

Required Courses: Math (527), Orbital Mechanics (465) or Spacecraft & Mission Design (457), Seminar in Mechanical Engineering (608, 609), Spacecraft Dynamics & Control (new course proposal is attached).

Space Elective Courses: Math (528), Aerospace Propulsion (459) or Probabilistic Models in Aerospace Systems (447), Advanced Controls I & II (504, 518), Optimal Design (524), Analytical Dynamics (522), Thermodynamics (574), Continua (554), Computational Solids (660), Structural Mechanics (653), Fluid Mechanics I & II (534, 630), Advanced Mechanical and Random Vibration (661).

Technical Elective Courses: Any graduate course offered by Engineering, Math, Computer Science, or Physics. As per Graduate School guidelines, a maximum of two 400-level undergraduate courses can be taken with the permission of the graduate director toward the credit requirements for M.Sc. or M.Eng. degree.

