

POLICY ON THE S.M. MATHEMATICS REQUIREMENT
DEPARTMENT OF AERONAUTICS AND ASTRONAUTICS

September 2007

The purpose of the graduate math requirement is to give S.M. students exposure to advanced mathematical concepts at the graduate level. Although mathematics is an integral part of all engineering curricula, it is our experience that additional math subjects can add significantly to the student's problem solving capabilities. The graduate math requirement is designed to give the S.M. student experience in mathematics at a deeper level than can be achieved in an undergraduate program.

Any of the subjects on the following listings will count towards the 66 units required for the S.M. degree in Aero/Astro.

The Department's policy regarding the S.M. math requirement is as follows:

1. The graduate math requirement for S.M. students is two subjects, carrying a minimum total credit of 18 units. Exceptions can be made for students who have already taken advanced subjects in mathematics as undergraduates *and who demonstrate their capability by receiving a grade of B or better* in one of the specifically designated advanced math subjects (see 3 below).
2. Any subject offered by the Department of Mathematics and designated as "G" or "H-Level" for students who are not Mathematics majors can be used toward satisfying the math requirement.
3. Students with exceptionally strong mathematical background may take only one course (minimum of 12 units) from the list of advanced subjects below. The course must be completed with a grade of B or better (B- is not acceptable).

18.305 Advanced Analytic Methods in Science and Engineering; 3-0-9; H(Fall)

18.306 Advanced Partial Differential Equations with Applications; 3-0-9; H(Spring)

18.307 Integral Equations; 3-0-9; H(Spring)

18.308 Wave Motion; 3-0-9; H(Spring)

18.335J/6.337J Introduction to Numerical Methods; 3-0-9; H(Fall, Summer)

18.336 Numerical Methods for Partial Differential Equations; 3-0-9; H(Spring)

18.385J/2.036J Nonlinear Dynamics and Chaos; 3-0-9; H(Fall)

18.386J/2.037J; Advanced Nonlinear Dynamics and Chaos; 3-0-9; H(Spring)

18.404J/6.840J Theory of Computation; 4-0-8; H(Fall)

18.415J/6.854J Advanced Algorithms; 5-0-7; H(Fall)

18.416J/6.856J Randomized Algorithms; 5-0-7; H(Spring)

4. Selected subjects offered by departments other than Mathematics can also be used toward the math requirement. The Department Graduate Committee will maintain a list of these subjects (see section 5 below).
5. The list of acceptable subjects given outside the Department of Mathematics is as follows (effective November 2004):

A. Probability and Statistics

- 1.151 Probability and Statistics in Engineering; 3-0-9; H(Spring);
- 6.262 Discrete Stochastic Processes; 3-0-9; H(Spring)
- 6.431 Applied Probability; 4-0-8; G(Fall, Spring); Meets with U-Level 6.041
- 14.382 Econometrics I; 4-0-8; H(Spring)
- 15.064J/ESD.751J Engineering Probability and Statistics; 4-0-8; H(Summer)
- 16.391J/6.434J Statistics for Engineers and Scientists; 3-0-9; H(Fall)
- 16.470J/ESD.756J Statistical Methods in Experimental Design; 3-0-9; H(Spring)
- 16.76J/1.203J/6.281J/15.073J/ESD216J Logistical and Transportation Planning Methods; 3-0-9; H(Fall)
- HST.191 Intro to Biostatistics and Epidemiology; 3-0-3; H(IAP)

B. Optimization

- 6.251J/15.081J/Intro to Mathematical Programming; 4-0-8; H(Fall)
- 15.082J/6.855J/ESD.78J Network Optimization; 3-0-9; H(Spring)
- 15.083J/6.859J Integer Programming and Combinatorial Optimization; 3-0-9; H(Fall)
- 15.084J/6.252J Nonlinear Programming; 3-0-9; H(Spring)
- 15.093J//6.255J Optimization Methods; 4-0-8; H(Fall)

C. Numerical Methods

- 16.910J/2.096J/6.336J Intro to Numerical Simulation*; 3-0-9; H(Fall)
- 16.920J/ 2.097J/6.339J Numerical Methods for Partial Differential Equations; 3-0-9; H(Fall)
- 16.940J/1.128J/2.089J Computational Geometry; 3-0-9; H(Spring)

In cases where a Course 16 subject is *jointly* listed, Aero/Astro students would register under the Course 16 number. Also, please check the current *MIT Course Catalogue* for course descriptions and years offered as some subjects are taught alternate years.