WASHINGTON UNIVERSITY

DEPARTMENT OF MECHANICAL ENGINEERING & MATERIALS SCIENCE

MASTER OF SCIENCE DEGREE COURSE OPTION

(Revised 9-1-17)

The Department offers the Master of Science degree in Mechanical or Aerospace Engineering without thesis. The quantitative requirement for the degree is 30-credit hours (normally 10 courses) completed with a grade-point average of 2.7 or better. Course programs may be composed from one area of specialization below (MSME) or in aerospace engineering (MSAE). They must conform to the following distribution:

Applied Mathematics	*6 credits*
Area of Specialization	*15 credits*
Electives	*9 credits*

Elective courses may be chosen in any area of engineering or mathematics at 400-level or higher. Of the 30 units, a minimum of 24 must be in 500-level courses. No more than 6 units may be in 400-level courses; core requirements for the ME undergraduate degree are not allowed. A maximum of 3 credits of Independent Study, MEMS 400/500, may be included as an elective course. A minimum of 15 units must be in MEMS. Non-engineering courses (such as T-courses or finance and entrepreneurship) cannot be counted as engineering electives. Full-time MS students in any area are required to take MEMS 501 Seminar every semester, which is a zero-unit pass-fail course.

Degree candidates will plan their course programs with the help of a departmental advisor. Given below are <u>partial</u> listings of courses recommended for satisfaction of distribution requirements in mathematics and each of the available areas of specialization.

APPLIED MATHEMATICS

ESE 405	Reliability and Quality Control
ESE 415	Optimization
ESE 501-502	Mathematics of Modern Engineering I, II
ESE 517	Partial Differential Equations
ESE 520	Probability and Stochastic Processes
Math 416	Complex Variables
Math 429-430	Linear Algebra, Modern Algebra
Math 449	Numerical Applied Mathematics
Math 4111	Intro to Analysis
Physics 501-502	Theoretical Physics (must know quantum mechanics)
Physics 503-504	Advanced Math Methods for Physicists and Engineers
MEMS 5001	Optimization Methods in Engineering
MEMS 5301	Nonlinear Vibrations
MEMS 5403	Conduction and Convection Heat Transfer
MEMS 5501	Mechanics of Continua
MEMS 5610	Quantitative Materials Science and Engineering

AEROSPACE ENGINEERING (MS in Aerospace Engineering)

EECE 512	Combustion Phenomenon
ESE 543	Control Systems Design by State-Space Methods
ESE 547	Robust and Adaptive Control
MEMS 424	Introduction to Finite Element Methods for Structural Analysis
MEMS 5001	Optimization
MEMS 5102	Materials Selection
MEMS 5301	Nonlinear Vibrations
MEMS 5302	Theory of Vibrations
MEMS 5401	Thermodynamics
MEMS 5402	Radiation Heat Transfer
MEMS 5403	Conduction and Convection Heat Transfer
MEMS 5410-5411	Fluid Dynamics I and II (Fluids I is not required for Fluids II)
MEMS 5412-5413	Computational Fluid Dynamics I, II
MEMS 5414	Aeroelasticity and Flow-Induced Vibrations
MEMS 5416	Turbulence
MEMS 5500	Elasticity
MEMS 5501	Mechanics of Continua
MEMS 5507	Fatigue and Fracture Mechanics
MEMS 5515-5516	Numerical Simulation in Solid Mechanics I, II
MEMS 5601	Mechanical Behavior of Materials
MEMS 5602	Non-Metallics
MEMS 5605	Mechanical Behavior of Composite Materials
MEMS 5607	Introduction to Polymer Blends and Composites
MEMS 5700	Aerodynamics
MEMS 5701	Aerospace Propulsion
MEMS 5703	Analysis of Rotary-Wing Systems
MEMS 5704	Aerospace Structures
MEMS 5705	Wind Energy Systems
MEMS 5706	Aircraft Performance
MEMS 5801	Micro-Electrical Mechanical Systems