## MATH, STATISTICS & NUMERICAL METHODS

### Math
- **MATH 590** Linear Algebra (3)
- **MATH 591** Applied Numerical Linear Algebra (3) S*
- **MATH 596** Math in Biomedical Research (3) Φ
- **MATH 611** Fourier Analysis of Time Series (3) S*
- **MATH 646** Complex Variable and Applications (3)
- **MATH 647** Applied PDEs (3)
- **MATH 648** Calculus of Variations (3) S
- **MATH 724** Combinatorial Mathematics (3) F*
- **MATH 725** Graph Theory (3) S*
- **MATH 750** Stochastic Adaptive Control (3) S*
- **MATH 765** Mathematical Analysis II (3) S
- **MATH 790** Linear Algebra II (3) F
- **MATH 791** Modern Algebra I (3) S
- **MATH 865** Stochastic Processes I (3) S
- **PHSX 718** Mathematical Methods of Physical Sci (3) F

### Statistics
- **BIOL 570** Intro to Biostatistics (3) F
- **BIOL 841** Biometry I (5) F
- **BIOL 943** Multivariate Data Analysis (3) F*
- **BIOS 714** Biostatistics - Fund Biostatistics I (3) F
- **BIOS 717** Biostatistics - Fund Biostatistics II (3) S
- **BIOS 720** Biostatistics - Analysis of Variance (3) F
- **BIOS 730** Biostatistics - Appl Linear Regression (3) F*
- **BIOS 740** Biostatistics - Applied Multivariate Mthds (3) S
- **BIOS 810** Biostatistics - Clinical Trials (3) S
- **BIOS 835** Biostatistics - Categorical Data Analysis (3) F
- **BIOS 840** Biostatistics - Linear Regression (3) F
- **BIOS 871** Biostatistics - Mathematical Statistics (3) F
- **BIOS 830** Biostatistics - Experimental Design (3) S
- **GEOG 716** Advanced Geostatistics (3) S
- **MATH 605** Applied Regression Analysis (3) F*
- **MATH 627** Probability (3) F
- **MATH 628** Mathematical Theory of Statistics (3) S
- **MATH 727** Probability Theory (3) F
- **MATH 728** Statistical Theory (3) S
- **PRVM 814** Health Literacy (3) F*
- **PRVM 817** Gender, Race, Class & Health (3) S*

### Numerical Methods
- **AE 725** Optimization and Structural Design (3) Φ
- **AE 746** Computational Fluid Dynamics (3) S
- **BINF 701** Bioinformatics I (5) F
- **BINF 702** Bioinformatics II (5) S
- **CE 861** Finite Element Mthds- Solid Mechanics (3) S
- **CPE 701** Methods of Chemical and Petroleum Calculations (3) F
- **CPE 778** Optimization of Engineering Systems (3) S
- **EECS 781** Numerical Analysis I (3) F

### MASTER BREADTH COURSE LIST

Revised 11/30/2015

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>EECS 782</td>
<td>Numerical Analysis II (3) S</td>
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<tr>
<td>MATH 783</td>
<td>Applied Numerical Analysis of PDEs (3) S</td>
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<tr>
<td>ME 702</td>
<td>Mechanical Engineering Analysis</td>
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<tr>
<td>ME 860</td>
<td>Adv. Mechanical Engr. Problems</td>
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<tr>
<td>ME 790</td>
<td>Optimal Estimation Φ</td>
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<td>ME 861</td>
<td>Theory of the Finite Element Method (3) F</td>
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<tr>
<td>ME 862</td>
<td>Finite Element Mthd -Transient Analysis (3) S*</td>
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<tr>
<td>ME 961</td>
<td>Finite Element Mthd for Nonlinear Problems in Solid Mechanics (3) ***</td>
</tr>
<tr>
<td>ME 962</td>
<td>p-Approximation, Error Estimation, and Other Advanced Topics in the Finite Element Mthd (3) ***</td>
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</tbody>
</table>

### ENGINEERING

All 700 and above Engineering courses. Suggested courses include:

- **AE 709** Structural Composites (3) F*
- **AE 781** Introduction Adaptive Aerostructures (3) S
- **CE 710** Structural Mechanics (3) F*
- **CE 767** Intro to Fracture Mechanics (3) S*
- **CPE 657** Polymer Science and Technology (3) S*
- **PHCH 715** Drug Delivery (can be counted for either the Engr or Pharm-Chem category) (3) F*
- **CPE 721** Chemical Engine Thermodynamics (3) F*
- **CPE 722** Kinetics and Catalysis (3) S*
- **CPE/PHCH 725** Molecular Cell Biology (3) S*
- **CPE 731** Convection Heat & Momentum (3) F
- **CPE 751** Basic Rheology (3) ***S
- **CPE 752** Tissue Engineering (3) S
- **CPE 765** Corrosion Engineering (3) S
- **CPE 778** Applied Optimization Techniques (3) S*
- **EECS 741** Computer Vision (3) F*
- **ME 712** Adv Engineering Thermodynamics (3) F
- **ME 714** Thin Film Flow (3) F
- **ME 722** Modeling Dynamics of Mech. Sys. (3) S*
- **ME 750** Human Motion Biomechanics (3) F*
- **ME 751** Experimental Biomechanics (3)***
- **ME 753** Bone Biomechanics (3) ***S
- **ME 754** Biomedical Optics (3) S
- **ME 755** Computer Simulation Biomechanics (3) F*
- **ME 756** Biofluids (3) S
- **ME 757** Biomechanical Systems (3) S*
- **ME 758** Physiological Systems (3) S
- **ME 760** Biomedical Product Design (3) S
- **ME 765** Biomaterials (3) F
- **ME 790** Dynamics of Complex Fluids (3)***
- **ME 790** Bio-nanotechnology (3) Φ
- **ME 854** Continuum Mechanics for Soft Tissues (3) S
- **ME 890** Research Methods (3) S
- **ME 990** Advanced Biomaterials (3)
BIOLOGICAL SCIENCES

ANAT 832  Electron Micro Tec (3)
ANAT 845  Histology (2)
ANAT 847  Developmental Neurobiology (2)
BIOL 503  Immunology (3) F
BIOL 560  Histology (3) S
BIOL 636  Biochemistry I (3) F
BIOL 637  Intro Biochemistry Laboratory (2) F
BIOL 638  Biochemistry II (3) S
BIOL 639  Advanced Biochemistry Laboratory (2) S
BIOL 644  Comparative Animal Physiology (3) F*
BIOL 646  Mammalian Physiology (4)
BIOL 768  Plant Molecular Biology (3)
BIOL 673  Cell and Mol Neurobiology (3) F*
BIOL 688  Molecular Biology of Cancer (3) F
BIOL 712  Evolutionary Biology (3) S
BIOL 743  Population Genetics (3) S*
BIOL 750  Advanced Biochemistry (3) ***S
BIOL 752  Cell Biology (3) S
BIOL 754  Brain Diseases & Neurological Disorders (3)
BIOL 755  Mechanisms of Development (3) O
BIOL 757  Carcinogenesis & Cancer Biology (3) O
BIOL 772  Gene Expression (3) S
BIOL 775  Chemistry of the Nervous System (3) S*
BIOL 841  Biometry I (3) F
BIOL 895  Human Genetics (3) S
BIOL 918  Modern Biochemical and Biophysical Mthds (4) S
BIOL 943  Multivariate Data Analysis (3) F*
BIOL 952  Intro. Molecular Modeling (3) S*
MICR 808  Immunology (3) S
MICR 820  Bact Genes & Pathogens (3) S
MICR 825  Virology (3) S
NURO 710  Advanced Neurobiology (3)***

CHEMISTRY (BIOCHEM, PHARM CHEM, MED

CHEM)

CHEM 510  Biological Physical Chemistry (3) F*
CHEM 635  Instrumental Mthds of Analysis (2) S
CHEM 718  Mathematical Mthds in Physical Sciences (3) F
CHEM 720  Fundamentals & Mthds Analyt. Chem (3) F
CHEM 740  Principles of Organic Reactions (3) F
CHEM 742  Spectroscopic Identification of Organic Compounds (3) SU
CHEM 750  Intro to Quantum Mechanics (3) F
CHEM 760  Intro to Chemistry in Biology (3) F
CHEM 824  Spectrochemical Mthds of Analysis (3)***
CHEM 840  Physical Organic Chemistry (3) S
CHEM 852  Statistical Thermodynamics (3) S
CHEM 856  Molecular Spectroscopy (3)***
MDCM 790  Principles of Drug Design (3) S
MDCM 791  Principles of Drug Disposition (1) S
PHCH 625  Pharmacokinetics (3) F
PHCH 718  Physl-Chem Prin Soltn Dsg Frm (3) S
PHCH 775  Chemistry of the Nervous System (3) S
PHCH 850  Solid State Stability and Formation (3) O
PHCH 862  Pharmaceutical Equilibria (3-4) F

PHCH 870  Advanced Pharm Biotechnology (3) S*
PHCH 920  Chemical Kinetics (2) S
PHCH 972  Drug Stability (2-4) S
PHCH 974  Adv Topic: FTIR
PHCH 974  Adv Topic: Vaccines
PHCH 976  Adv Topic: Biopharmct & Pharmacokin I (3)

LIFE SCIENCES

GSMC 840  Clinical Observation for Bioengineers (3)
HSES 670  Intro to Biomechanics (3) S
HSES 672  Exercise Physiology (3)
HSES 805  Laboratory Experiments and Analysis – Exercise Physiology (3) F*
HSES 810  Advanced Exercise Physiology (3) F*
HSES 825  Skeletal Muscle Physiology (3) S*
HSES 872  Exercise & the Cardiovascular System (3) S*
HSES 910  Biochemistry of Exercise (3) S
PHSL 838  Advanced Topics – Fundamentals of Imaging
PHSL 844  Neurophysiology (3) S*
PHSL 846  Advanced Neuroscience (5) SU
PTRS 711  Applied Kinesiology and Biomechanics (4) F
PTRS 825  Exercise Physiology (3) F
REHS 970  Instrumental Analysis of Human Function (3) F
REHS 862  Pathobiology of Human Function (4) F

OTHER ELECTIVE COURSES

GEOL 791-1050 Advanced Topics in Geology: Applied Vibrational Spectroscopy
ENTR 750  New Venture Creation/Bus Plan Devel (4) S

KEY:
S: Spring  *: biannually
F: Fall    ***: Infrequently
SU: Summer
O: New course
Blue: KUMC Campus

Please note these are all subject to change without notice.

Some courses outside of engineering may require a permission number from the course department. Contact the professor or the program assistant for that department for a permission number.