

Department of Mechanical Engineering

PhD Graduation Requirements

| Requirements | Credits | Details | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| General Engineering & Mathematics Courses | 06 | <p>EML 5930 – Analysis in Mechanical Engineering II and one (1) course from the list below. Courses not on this list maybe taken only with the approval of your faculty advisor AND the Graduate Coordinator. The request must be made prior to enrolling in the course.</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 33%;">EEL 5173 - Signal and System Analysis</td> <td style="width: 33%;">MAD 5708 - Numerical Analysis II</td> <td style="width: 33%;">MAP 5513 - Wave Propagation Theory</td> </tr> <tr> <td>EEL 6502 - Digital Signal Processing I</td> <td>MAD 5738 - Numerical Solution of PDE's I</td> <td>MAS 4106 - Applied Linear Algebra II</td> </tr> <tr> <td>EEN 5456 - Computational Mechanics</td> <td>MAD 5739 - Numerical Solution of PDE's II</td> <td>PHY 5515 - Thermal & Statistical Physics</td> </tr> <tr> <td>EML 5361 - Multivariable Control</td> <td>MAD 5745 - Spectral Methods for PDE's</td> <td>PHY 4523 - Statistical Physics</td> </tr> <tr> <td>EML 5930 - Adaptive Controls</td> <td>MAP 5207 - Optimization</td> <td>STA 4202 - Design of Experiments I</td> </tr> <tr> <td>EEM 5444 - Advance Dynamics</td> <td>MAP 5217 - Calculus of Variations</td> <td>STA 5206 - Analysis of Variance & Design</td> </tr> <tr> <td>EML 5317 - Advance Controls</td> <td>MAP 5336 - Qualitative Theory of ODE's</td> <td>STA 5207 - Applied Regression Methods</td> </tr> <tr> <td>ESI 5408 - Applied Optimization</td> <td>MAP 5346 - Elementary PDE's II</td> <td></td> </tr> <tr> <td>MAA 4402 - Complex Variables</td> <td>MAP 5423 - Complex Vars, Asymp. Exps</td> <td></td> </tr> <tr> <td>MAD 5420 - Numerical Optimization</td> <td>MAP 5441 - Perturbation Theory</td> <td></td> </tr> </table> | EEL 5173 - Signal and System Analysis | MAD 5708 - Numerical Analysis II | MAP 5513 - Wave Propagation Theory | EEL 6502 - Digital Signal Processing I | MAD 5738 - Numerical Solution of PDE's I | MAS 4106 - Applied Linear Algebra II | EEN 5456 - Computational Mechanics | MAD 5739 - Numerical Solution of PDE's II | PHY 5515 - Thermal & Statistical Physics | EML 5361 - Multivariable Control | MAD 5745 - Spectral Methods for PDE's | PHY 4523 - Statistical Physics | EML 5930 - Adaptive Controls | MAP 5207 - Optimization | STA 4202 - Design of Experiments I | EEM 5444 - Advance Dynamics | MAP 5217 - Calculus of Variations | STA 5206 - Analysis of Variance & Design | EML 5317 - Advance Controls | MAP 5336 - Qualitative Theory of ODE's | STA 5207 - Applied Regression Methods | ESI 5408 - Applied Optimization | MAP 5346 - Elementary PDE's II | | MAA 4402 - Complex Variables | MAP 5423 - Complex Vars, Asymp. Exps | | MAD 5420 - Numerical Optimization | MAP 5441 - Perturbation Theory | |
| EEL 5173 - Signal and System Analysis | MAD 5708 - Numerical Analysis II | MAP 5513 - Wave Propagation Theory | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| EEL 6502 - Digital Signal Processing I | MAD 5738 - Numerical Solution of PDE's I | MAS 4106 - Applied Linear Algebra II | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| EEN 5456 - Computational Mechanics | MAD 5739 - Numerical Solution of PDE's II | PHY 5515 - Thermal & Statistical Physics | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| EML 5361 - Multivariable Control | MAD 5745 - Spectral Methods for PDE's | PHY 4523 - Statistical Physics | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| EML 5930 - Adaptive Controls | MAP 5207 - Optimization | STA 4202 - Design of Experiments I | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| EEM 5444 - Advance Dynamics | MAP 5217 - Calculus of Variations | STA 5206 - Analysis of Variance & Design | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| EML 5317 - Advance Controls | MAP 5336 - Qualitative Theory of ODE's | STA 5207 - Applied Regression Methods | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ESI 5408 - Applied Optimization | MAP 5346 - Elementary PDE's II | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MAA 4402 - Complex Variables | MAP 5423 - Complex Vars, Asymp. Exps | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MAD 5420 - Numerical Optimization | MAP 5441 - Perturbation Theory | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Technical Electives | 15 | Select five (5) graduate-level, letter-graded courses in engineering, mathematics, and/or any science discipline (e.g. computer science, physics, etc.). All technical electives must be approved by your graduate advisor or the Graduate Coordinator. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Preliminary Examination & Admission to Candidacy | | All PhD students are required to register for and pass EML 8968 - Preliminary Examination before the end of their second semester. The exam consists of both written and oral examinations and is administered in the Spring semester. After passing the exam, you must file an Admission to Candidacy Form with the Registrar's Office. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Formation of Dissertation Committee & Prospectus Defense | | Once candidacy status has been granted you should begin forming your Dissertation Committee. The committee must consist of your faculty advisor, at least two members of the ME department, (one of which must be outside your depth area), and at least one member from outside the Department. Within one year of obtaining candidacy status you must present to your Committee a prospectus on a research project suitable for a doctoral dissertation. A 45-minute presentation of the proposed dissertation topic will be followed by an oral examination in the general area of the dissertation. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dissertation & Dissertation Defense | 24 | You must register for twenty-four (24) credit hours of EML 6980 - Dissertation. Additionally, in your final term you must register for EML 8985 - Dissertation Defense. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total | 45 | You must complete forty-five (45) credit hours of graduate-level coursework (of which at least twenty-four (24) credit hours must be dissertation courses) to satisfy the requirements for a PhD in Mechanical Engineering. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

You must maintain at least a 3.0 cumulative GPA each semester you are enrolled. If your GPA drops below a 3.0 you will be placed on academic probation. Additionally, you may not earn more than two C's. If you do, you will be required to repeat a course in which you earned a 'C' grade.

Department of Mechanical Engineering

BS-PhD Graduation Requirements

| Requirements | Credits | Details | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| General Engineering & Mathematics Courses | 06 | <p>EML 5060 – Analysis in Mechanical Engineering I and one additional course from the list below. Courses not on this list maybe taken only with the approval of your faculty advisor AND the Graduate Coordinator. The request must be made prior to enrolling in the course.</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 33%;">EEL 5173 – Signal and System Analysis</td> <td style="width: 33%;">MAD 5420 – Numerical Optimization</td> <td style="width: 33%;">MAP 5441 – Perturbation Theory</td> </tr> <tr> <td>EEL 6502 – Digital Signal Processing I</td> <td>MAD 5708 – Numerical Analysis II</td> <td>MAP 5513 – Wave Propagation Theory</td> </tr> <tr> <td>EGN 5456 – Computational Mechanics</td> <td>MAD 5738 – Numerical Solution of PDE's I</td> <td>MAS 4106 – Applied Linear Algebra II</td> </tr> <tr> <td>EML 5060 – Analysis in ME II</td> <td>MAD 5739 – Numerical Solution of PDE's II</td> <td>PHY 5515 – Thermal & Statistical Physics</td> </tr> <tr> <td>EML 5361 – Multivariable Control</td> <td>MAD 5745 – Spectral Methods for PDE's</td> <td>PHY 4523 – Statistical Physics</td> </tr> <tr> <td>EML 5930 – Adaptive Controls</td> <td>MAP 5207 – Optimization</td> <td>STA 4202 – Design of Experiments I</td> </tr> <tr> <td>EGM 5444 – Advance Dynamics</td> <td>MAP 5217 – Calculus of Variations</td> <td>STA 5206 – Analysis of Variance & Design</td> </tr> <tr> <td>EML 5317 – Advance Controls</td> <td>MAP 5336 – Qualitative Theory of ODE's</td> <td>STA 5207 – Applied Regression Methods</td> </tr> <tr> <td>ESI 5408 – Applied Optimization</td> <td>MAP 5346 – Elementary PDE's II</td> <td></td> </tr> <tr> <td>MAA 4402 – Complex Variables</td> <td>MAP 5423 – Complex Vars, Asymp. Exps</td> <td></td> </tr> </table> | EEL 5173 – Signal and System Analysis | MAD 5420 – Numerical Optimization | MAP 5441 – Perturbation Theory | EEL 6502 – Digital Signal Processing I | MAD 5708 – Numerical Analysis II | MAP 5513 – Wave Propagation Theory | EGN 5456 – Computational Mechanics | MAD 5738 – Numerical Solution of PDE's I | MAS 4106 – Applied Linear Algebra II | EML 5060 – Analysis in ME II | MAD 5739 – Numerical Solution of PDE's II | PHY 5515 – Thermal & Statistical Physics | EML 5361 – Multivariable Control | MAD 5745 – Spectral Methods for PDE's | PHY 4523 – Statistical Physics | EML 5930 – Adaptive Controls | MAP 5207 – Optimization | STA 4202 – Design of Experiments I | EGM 5444 – Advance Dynamics | MAP 5217 – Calculus of Variations | STA 5206 – Analysis of Variance & Design | EML 5317 – Advance Controls | MAP 5336 – Qualitative Theory of ODE's | STA 5207 – Applied Regression Methods | ESI 5408 – Applied Optimization | MAP 5346 – Elementary PDE's II | | MAA 4402 – Complex Variables | MAP 5423 – Complex Vars, Asymp. Exps | | | | |
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| EGN 5456 – Computational Mechanics | MAD 5738 – Numerical Solution of PDE's I | MAS 4106 – Applied Linear Algebra II | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| EML 5930 – Adaptive Controls | MAP 5207 – Optimization | STA 4202 – Design of Experiments I | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| MAA 4402 – Complex Variables | MAP 5423 – Complex Vars, Asymp. Exps | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Core Courses | 12 | <p>Select two (2) core courses in your Depth Area and one (1) course from each remaining area.</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 33%;"><u>Dynamics & Controls</u></td> <td style="width: 33%;"><u>Fluid Mechanics & Heat Transfer</u></td> <td style="width: 33%;"><u>Mechanics & Materials</u></td> </tr> <tr> <td>EGM 5444 – Advance Dynamics</td> <td>EGM 5152 – Heat Transfer</td> <td>EGM 5611 – Continuum Mechanics</td> </tr> <tr> <td>EML 5317 – Advance Controls</td> <td>EML 5709 – Fluid Mechanics</td> <td>EGM 5653 – Theory of Elasticity</td> </tr> <tr> <td>EML 5361 – Multivariable Control</td> <td>EML 5155 – Convective Heat Transfer</td> <td>EML 5930 – Advance Materials</td> </tr> <tr> <td>EML 5930 – Adaptive Controls</td> <td></td> <td></td> </tr> </table> | <u>Dynamics & Controls</u> | <u>Fluid Mechanics & Heat Transfer</u> | <u>Mechanics & Materials</u> | EGM 5444 – Advance Dynamics | EGM 5152 – Heat Transfer | EGM 5611 – Continuum Mechanics | EML 5317 – Advance Controls | EML 5709 – Fluid Mechanics | EGM 5653 – Theory of Elasticity | EML 5361 – Multivariable Control | EML 5155 – Convective Heat Transfer | EML 5930 – Advance Materials | EML 5930 – Adaptive Controls | | | | | | | | | | | | | | | | | | | | |
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| EML 5930 – Adaptive Controls | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Major Depth Courses | 06 | <p>Select two (2) courses from your Depth Area.</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 33%;"><u>Dynamics & Controls</u></td> <td style="width: 33%;"><u>Fluid Mechanics & Heat Transfer</u></td> <td style="width: 33%;"><u>Mechanics & Materials</u></td> </tr> <tr> <td>EGM 5444 – Advance Dynamics</td> <td>EGM 5152 – Heat Transfer</td> <td>EGM 5611 – Continuum Mechanics</td> </tr> <tr> <td>EML 5317 – Advance Controls</td> <td>EGM 5810 – Viscous Fluid Flows</td> <td>EGM 5653 – Theory of Elasticity</td> </tr> <tr> <td>EML 5361 – Multivariable Control</td> <td>EGN 5456 – Computational Mechanics</td> <td>EGM 5671 – Plasticity & Viscoelasticity</td> </tr> <tr> <td>EML 5802 – Robotics & Mechatronics</td> <td>EML 5155 – Convective Heat Transfer</td> <td>EMA 5226 – Adv. Mechanical Metallurgy</td> </tr> <tr> <td>EML 5930 – Adaptive Controls</td> <td>EML 5162 – Cryogenics</td> <td>EMA 5514 – Optical & Electron Microscopy</td> </tr> <tr> <td>EML 5930 – Mobile Robotics</td> <td>EML 5451 – Energy Conversion Sys. I</td> <td>EML 5072 – Applied Superconductivity</td> </tr> <tr> <td>EML 6365 – Robust Control</td> <td>EML 5709 – Fluid Mechanics</td> <td>EML 5543 – Materials Selection in Design</td> </tr> <tr> <td></td> <td>EML 5710 – Intro. To Gas Dynamics</td> <td>EML 5930 – Advance Materials</td> </tr> <tr> <td></td> <td>EML 5930 – Propulsion Systems</td> <td>EML 5930 - Elements of Magnet Design</td> </tr> <tr> <td></td> <td>EML 5930 - Energy Conversion Sys. II</td> <td>EML 5930 - Superconducting Magnet Design</td> </tr> </table> <p style="text-align: center;">NOTE: Additional courses may be offered each semester. Please see course listing for details.</p> | <u>Dynamics & Controls</u> | <u>Fluid Mechanics & Heat Transfer</u> | <u>Mechanics & Materials</u> | EGM 5444 – Advance Dynamics | EGM 5152 – Heat Transfer | EGM 5611 – Continuum Mechanics | EML 5317 – Advance Controls | EGM 5810 – Viscous Fluid Flows | EGM 5653 – Theory of Elasticity | EML 5361 – Multivariable Control | EGN 5456 – Computational Mechanics | EGM 5671 – Plasticity & Viscoelasticity | EML 5802 – Robotics & Mechatronics | EML 5155 – Convective Heat Transfer | EMA 5226 – Adv. Mechanical Metallurgy | EML 5930 – Adaptive Controls | EML 5162 – Cryogenics | EMA 5514 – Optical & Electron Microscopy | EML 5930 – Mobile Robotics | EML 5451 – Energy Conversion Sys. I | EML 5072 – Applied Superconductivity | EML 6365 – Robust Control | EML 5709 – Fluid Mechanics | EML 5543 – Materials Selection in Design | | EML 5710 – Intro. To Gas Dynamics | EML 5930 – Advance Materials | | EML 5930 – Propulsion Systems | EML 5930 - Elements of Magnet Design | | EML 5930 - Energy Conversion Sys. II | EML 5930 - Superconducting Magnet Design |
| <u>Dynamics & Controls</u> | <u>Fluid Mechanics & Heat Transfer</u> | <u>Mechanics & Materials</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| EGM 5444 – Advance Dynamics | EGM 5152 – Heat Transfer | EGM 5611 – Continuum Mechanics | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| EML 5317 – Advance Controls | EGM 5810 – Viscous Fluid Flows | EGM 5653 – Theory of Elasticity | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| EML 5361 – Multivariable Control | EGN 5456 – Computational Mechanics | EGM 5671 – Plasticity & Viscoelasticity | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| EML 5802 – Robotics & Mechatronics | EML 5155 – Convective Heat Transfer | EMA 5226 – Adv. Mechanical Metallurgy | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| EML 5930 – Adaptive Controls | EML 5162 – Cryogenics | EMA 5514 – Optical & Electron Microscopy | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| | EML 5930 - Energy Conversion Sys. II | EML 5930 - Superconducting Magnet Design | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Technical Electives | 12 | Select four (4) graduate-level, letter-graded courses in engineering, mathematics, and/or any science discipline (e.g. computer science, physics, etc.). All technical electives must be approved by your faculty advisor or the Coordinator of Graduate Studies. You may take also take one (1) DIS/SR as an elective. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dissertation & Dissertation Defense | 24 | You must register for twenty-four (24) credit hours of EML 6980 - Dissertation. Additionally, in your final term you must register for EML 8985 - Dissertation Defense. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total | 60 | You must complete sixty (60) credit hours of graduate-level coursework (of which at least twenty-four (24) credit hours must be dissertation courses) to satisfy the requirements for a PhD in Mechanical Engineering. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

You must maintain at least a 3.0 cumulative GPA each semester you are enrolled. If your GPA drops below a 3.0 you will be placed on academic probation. Additionally, you may not earn more than two C's. If you do, you will be required to repeat a course in which you earned a 'C' grade.