

# Mechanical Engineering

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## Department Information

- **Department Chair:**  
Alan Kallmeyer, Ph.D.
- **Graduate Coordinator:**  
Yechun Wang, Ph.D.
- **Department Location:**  
111 Dolve Hall
- **Department Phone:**  
(701) 231-8671
- **Department Email:**  
ndsu.me.gradprogram@ndsu.edu
- **Department Web Site:**  
[www.ndsu.edu/me/](http://www.ndsu.edu/me/) (<http://www.ndsu.edu/me/>)
- **Application Deadline:**  
February 15 for fall semester; September 15 for spring semester. Applications received after the deadline will still be considered, but preference is given to those submitted by the deadline.
- **Credential Offered:**  
Ph.D., M.S.
- **English Proficiency Requirements:**  
TOEFL ibt 79; IELTS 6.5; Duolingo 105

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## Program Description

The Department of Mechanical Engineering offers graduate programs leading to the M.S. and Ph.D. degrees. Graduate work may be concentrated in a variety of areas including engineering mechanics, fatigue and fracture, biomechanics and biomaterials, thermal systems, fluid mechanics, energy, controls and mechatronics, or engineering materials with an emphasis on plastics, composite materials and nanomaterials. Students with a B.S. degree in physics or mathematics may pursue a special graduate program of study and earn an M.S. degree in Mechanical Engineering.

Admission to the ME program is granted in a competitive process that is based upon consideration of the student's undergraduate GPA, test scores, and area of interest. Students who have graduated from an accredited institution in the United States with a baccalaureate degree in Mechanical Engineering or a closely related field must possess a GPA of 3.0 or greater for consideration of admission at full standing. International students must also provide both the TOEFL (or IELTS) and GRE general test scores before their applications will be considered. Minimum requirements for consideration of admission are 79 on the TOEFL iBT or 6.5 on the IELTS, and 300 on the GRE (combined quantitative and verbal) with a minimum quantitative score of 155.

## Financial Assistance

Research and/or teaching assistantships may be available to qualified students. Applicants are considered on the basis of scholarship, potential to undertake advanced study and research, and financial need. The availability of research and teaching assistantships is contingent upon current funding levels.

## Mechanical Engineering - M.S.

The minimum total semester credits required for the M.S. degree in Mechanical Engineering is 30. The M.S. degree can be earned with either of two options: the thesis option or the comprehensive study option.

With the thesis option, a student must complete 21-24 credits of graduate courses in mechanical engineering and a master's thesis of 6 to 9 credits of ME 798 Master's Thesis. At the conclusion of the graduate program, the student will be examined orally on the thesis and course work.

With the comprehensive study option, a student must complete 27 credits of graduate courses in mechanical engineering and a master's paper of no more than 3 credits of ME 797 Master's Paper. At the conclusion of the graduate program, the student must pass a comprehensive oral examination on the master's paper and course work.

For more detailed information on the requirements for the M.S. degree, contact the department.

## Mechanical Engineering - Ph.D.

The Ph.D. program requires the completion of 90 credit hours of graduate study beyond the baccalaureate degree (60 credits beyond the M.S. degree). In addition to the credit requirements for the M.S. degree, the Ph.D. degree requires a minimum of 24 course credits and a minimum of 24 credits of research-based dissertation. The remaining 12 credits may consist of any approved graduate level credits.

Code	Title	Credits
M.S. Degree		30
Minimum of 24 course credits		24
Minimum of 24 credits of research-based dissertation		24
Any approved graduate level credits		12
<b>Total Credits</b>		<b>90</b>

After the majority of course work has been completed, each student is required to pass a series of written qualifying exams on core subjects. After passing the written exams, an oral preliminary exam will be administered focusing on the student's proposal for the dissertation research. At the conclusion of the Ph.D. program, each student is required to pass a comprehensive oral final examination primarily focused on the dissertation. This exam may also cover material from course work, particularly courses fundamental to the dissertation. For more detailed information on the requirements for the Ph.D. degree, contact the department.

### Fardad Azarmi, Ph.D.

University of Toronto, 2008

Research Interests: Thermal Spray Coatings, Thin Film, Multiscale Engineering Analysis, Finite Element Analysis, Failure in Materials, Corrosion, Materials Characterization, High Temperature Materials, Composite Structures, Metal Foams, Functionally Graded Materials

### Jordi Estevadeordal, Ph.D.

University of Houston, 1996

Research Interests: Advanced Laser Techniques, Thermo-Fluid and Spray Diagnostics, 3D particle Image Velocimetry, Phosphorescence, Infrared Thermography, Filtered Rayleigh Scattering, Bio-Fluid Measurements

### Adam Gladen, Ph.D.

University of Minnesota, 2014

Research Interests: Renewable Energy, Solar Thermal Energy, Energy Storage - in particular Thermochemical Energy Storage, Thermodynamics, Solar Thermochemistry, Heat transfer, Radiative Transfer in Participating Media, Solar Reactor Design

### Alan R. Kallmeyer, Ph.D.

University of Iowa, 1995

Research Interests: Theoretical, Computational, and Experimental Solid Mechanics, Fatigue and Fracture of Engineering Materials, Composite Materials

### Ghodrat Karami, Ph.D.

Imperial College of Science and Technology, University of London, 1984

Research Interests: Multiscale Computational Solid Mechanics, Biomechanics, Cellular Mechanics, Micromechanics Characterization of Composites, Continuum Mechanics, Structural Mechanics, Nonlinear and Large Deformation and Analysis, Thermoelastic Analysis

### Sumathy Krishnan, Ph.D.

Indian Institute of Technology, 1995

Research Interests: Solar Heating and Cooling, Concentrated Solar Power, Renewable Energy Integrated Systems

### Robert V. Pieri, Ph.D.

Carnegie-Mellon University, 1987

Research Interests: Design, Materials and Nanomaterials Characterization, Instructional Pedagogy, Fracture Mechanics, Measurements, Alternative Energy, and Industrial Support

### Majura Selekwa, Ph.D.

Florida A&M University, 2001

Research Interests: Robotics, Machine Intelligence, Soft computing Applications, Numerical Methods and Numerical Optimization, Optimal and Robust Control, Smart Actuation Control Systems, Real-Time Control in Mechatronics

### Yildirim Bora Suzen, Ph.D.

Wichita State University, 1998

Research Interests: Computational Fluid Dynamics, Aerodynamics, Modeling of Industrial Transport Processes, Transition and Turbulence Modeling, Active/Adaptive Flow Control, Turbo machinery, Multiprocessor CFD

### Annie X.W. Tangpong, Ph.D.

Carnegie Mellon University, 2006

Research Interests: Vibrations and Dynamics, Tribology, Friction Damping in Rotating Structures, Friction Damping in Nano- and Bio-materials

**Chad A. Ulven, Ph.D.**

University of Alabama at Birmingham, 2005

Research Interests: Advanced Composites Materials Development, Environmentally Friendly Materials Processing, Nondestructive Evaluation, Impact/High Strain Rate Characterization of Advanced Materials

**Jessica L. Vold, Ph.D**

North Dakota State University, 2012

Research Interests: Additive Manufacturing Materials, Polymer Matrix Composites, Torrefaction of Lignocellulosic Materials, Bio-Based Composite Materials, Mechanical Testing, Material Characterization

**Xinnan Wang, Ph.D.**

University of South Carolina, 2008

Research Interests: Experimental Biomechanics, Synthesis of Nanomaterials, Nanomechanical Characterization, Nanomanipulation

**Yechun Wang, Ph.D.**

University of Maryland, 2007

Research Interests: Microfluidics, Biofluid Mechanics, Computational Fluid Dynamics, Numerical Analysis, and Characterization of Organic Coatings

**Xiangfa Wu, Ph.D.**

University of Nebraska-Lincoln, 2003

Beijing Institute of Technology, 1998

Research Interests: Nanofabrication and Nanomaterials, Advanced Composites, Fracture and Impact Mechanics

**Yan Zhang, Ph.D.**

Iowa State University, 2013

Research Interests: Experimental Fluid Dynamics, Advanced Flow Diagnostic Techniques, Wind Engineering and Wind Hazard Mitigation, Bio-Fluid Mechanics and Cardiovascular Hemodynamics Modeling