

# MASTER OF SCIENCE IN ENGINEERING

The Rayen School of Engineering, as part of the College of Science, Technology, Engineering, and Mathematics, offers a graduate program leading to the Master of Science degree in engineering. Admission to any of the five engineering options, including chemical, civil and environmental, electrical, industrial and systems, and mechanical engineering, is granted to qualified applicants who have been judged to have a good chance of succeeding in the program and obtaining a graduate degree. Several technical concentration areas are available in each option. Students may select a thesis, non-thesis, or management curriculum plan. These opportunities serve the practicing engineer, as well as the student, who wants to pursue advanced graduate study and research. Courses offered on campus are usually held during the evenings. The educational opportunities include traditional classroom and laboratory courses, seminars, and research projects guided by experienced members of the graduate faculty.

Teaching or research assistantships are available to qualified applicants on a competitive basis upon review and recommendation by the home department. In addition, the College of Graduate Studies may offer scholarships or grants-in-aid to qualified students. Students desiring assistantships or scholarships must submit an application to the College of Graduate Studies by the specified deadlines.

This description provides an overview of admission and degree requirements, advising, and program plans. Information concerning course scheduling and prospective course offerings can be obtained from the YSU website or the individual engineering departments. Further assistance with any matter related to engineering graduate programs may be obtained by telephone, email, or personal visit to the program option coordinator in the student's area of interest.

## Graduate Assistantships

Students interested in a graduate assistantship position must submit a separate application along with three letters of recommendation to the College of Graduate Studies. Further details are provided elsewhere in the Graduate Catalog under Financial Assistance. The College of Graduate Studies will forward the application to the department. Each engineering department has established a process for evaluating applicants. Applicants should contact the option coordinator in their field of interest for details. Final recommendations are forwarded to the dean of the College of Graduate Studies. Applicants are notified by mail of the dean's decision.

In cases where the applicant is not fully prepared for their intended graduate program, completion of undergraduate deficiency courses may be required. This is common when the applicant's undergraduate degree is in a different discipline than the intended graduate program. Such applicants may be granted provisional admission as long as they require no more than 9 semester hours of undergraduate deficiency courses. In addition, some programs may require stronger evidence of academic ability (e.g. higher GPA) for applicants having undergraduate degrees outside the discipline.

## Non-Degree Admission

Students meeting all requirements for admission to the College of Graduate Studies, but who do not intend to pursue a Master of Science degree, may apply for non-degree admission. In addition, an applicant whose academic record does not meet the required standards for admission to a Master of Science program may apply for non-degree admission to the College of Graduate Studies. For students wishing to pursue a Master of Science in Engineering degree, non-degree admission provides an opportunity to demonstrate his/her academic capability. Non-degree students completing nine semester hours of appropriate graduate courses with grades of B or better may apply for admission to a specific engineering degree option with

regular or provisional status to continue his/her study for the Master of Science in Engineering.

## Advisement

The Rayen School of Engineering requires an advisor for each individual graduate student. An advisor is recommended by the option coordinator in the student's discipline and assigned by the College of Graduate Studies upon acceptance. It is the responsibility of the student to initiate contact with his or her advisor, and this should be done as soon as possible before registering for the first time and at the time of course registration each semester. The student, with the help of his or her advisor, shall develop a study plan that includes goals and desired outcomes, and a coursework plan. The plan may be revised, if necessary, as the study progresses, with the approval of the advisor and option coordinator.

## Chemical Engineering

**Pedro Cortes**, Ph.D., Professor

Structure-property relationships of polymers; composites and hybrid materials; smart materials and structures; development of chem-bio sensing platforms based on carbon nanotubes

**Holly J. Martin**, Ph.D., Associate Professor

Corrosion studies; modification of metal surfaces to strongly adhere polymeric coatings for corrosion resistance

**Byung-Wook Park**, Ph.D., Assistant Professor

Engineered biohybrid materials for biomedical applications; biohybrid microswimmers for drug delivery and bioimaging; wearable bioelectronics for chronic wound monitoring; smart wound dressing

## Civil and Environmental Engineering

**Richard Albert Deschenes, Jr.**, Ph.D., Assistant Professor

Materials science; concrete durability and materials; applied mechanics

**AKM Anwarul Islam**, Ph.D., Professor

Impact of blast on highway bridges; use of CFRP in enhancing structural strength of concrete members; structural health monitoring of bridges using wireless sensor network

**Suresh Sharma**, Ph.D., Associate Professor

Complex hydrologic and water quality modeling using various types of data driven, conceptual, physically based and distributed and semi-distributed watershed models in climate change/variability context

## Electrical and Computer Engineering

**Frank Xiyang Li**, Ph.D., Professor, Chair

Electron spin resonance imaging; EMC, RF, and software engineering; networks; applied magnetic fields

## Industrial and Systems Engineering Mechanical Engineering

**S. Cory Brozina**, Ph.D., Assistant Professor

Student support and success in engineering; learning analytics; first-year engineering

**Kyosung Choo**, Ph.D., Associate Professor

Heat and mass transfer; multiphase flow; phase change phenomena; data center cooling; energy audit of buildings; microchannel heat exchangers; linear friction welding; laser welding; kinetics of human body performance

**Hazel Marie**, Ph.D., Professor

FEA/CFD modeling applied to solid-fluid interaction of thin film lubrication sealing; mechanical material modeling of soft biological tissue

**Stefan Moldovan**, Ph.D., Assistant Professor

Multi-scale computational fluid dynamics; experimental techniques as applied to crystal growth within reactors, finger seals, hydrodynamic bearings and dampers; wet friction materials in torque converters

**Jae Joong Ryu**, Ph.D., Associate Professor

Effect of process induced anisotropic microstructure on sliding contact fatigue damage of titanium alloy joint implants; mechanical load assisted dissolution response of medical#grade metals and alloys

**Elvin B. Shields**, Ph.D., Professor

Mechanical vibrations; fracture mechanics; kinematics; the scholarship of teaching and learning

**Virgil C. Solomon**, Ph.D., Professor

Synthesis of shape memory alloys, ceramic-metal composites and nanostructures and their characterization using metallography, thermal analysis and analytical scanning and transmission electron microscopy techniques