College of Engineering and Computer Science – Student Learning Outcomes

Degree Program Table

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Mechanical Engineering	See Outcomes	

Mechanical Systems Engineering	**See Outcomes**	
Technology	**See Outcomes**	

Graduate

Computer Science

- M.S. Computer Science graduate students should have a deeper understanding of the theory and application of algorithms, programming languages, and computer processes.
- M.S. Computer Science graduate students should have the ability to apply advanced analysis techniques to problem identification and solution in computing applications.
- M.S. Computer Science graduate students should have the ability to apply advanced implementation techniques to problem identification and solution in computing applications.

Engineering

- Program graduates will be able to apply advanced experimental methods and demonstrate the ability to design experiments and collect data.
- Program graduates will be able to utilize statistical concepts and demonstrate an ability to apply this knowledge to achieve engineering solutions that most efficiently use information and resources.
- Program graduates will have a practical knowledge of fabrication and manufacturing techniques.
- Program graduates will have an ability to apply advanced mathematical concepts to model physical systems and engineering processes to drive knowledge based design.
- Program graduates will have knowledge of advanced cross-disciplinary engineering sciences, and an ability to relate physical concepts from multiple engineering disciplines.
- Program graduates will have an ability to identify critical issues, formulate realistic solutions, evaluate alternatives, and carry out independent research to provide novel solutions to technical problems.
- Program graduates will have a demonstrated ability to make novel, significant contributions to the scientific and engineering body of knowledge.

Engineering Management

- Graduates of the Master of Engineering Management program will be able to identify critical issues, formulate realistic solutions, evaluate alternatives, and solve engineering management problems.
- Graduates of the Master of Engineering Management program will be able to interpret statistical concepts and methods and apply this knowledge to engineering and management problems.
- Graduates of the Master of Engineering Management program will use quality control and improvement techniques and apply this knowledge to improve quality in both the manufacturing and service industries.
- Graduates of the Master of Engineering Management program will be able to construct deterministic modeling and apply this to engineering management problems including design of experiments.

Undergraduate

Core Engineering Student Outcomes (Civil, Electrical, Mechanical)

The Student Outcomes for each of the Arkansas State University undergraduate engineering programs are:

- Outcome No. 1: An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
- Outcome No. 2: An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
- Outcome No. 3: An ability to communicate effectively with a range of audiences
- Outcome No. 4: An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
- Outcome No. 5: An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
- Outcome No. 6: An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
- Outcome No. 7: An ability to acquire and apply new knowledge as needed, using appropriate learning strategies

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Civil Engineering

The Program Educational Objectives (PEOs) for the A-State Civil Engineering Program are listed below.

- Graduates have successfully advanced in civil engineering practice as evidenced by their achievements and contributions to their employers and the greater engineering community.
- Graduates have pursued graduate degrees, obtained professional licensure, and/or completed professional development activities in continuing to advance their knowledge base in civil engineering or related professional fields.
- Graduates are actively working to improve their community and society in general by utilizing and sharing their engineering expertise.

Computer Science (BS/BA)

- Students will attain an ability to apply knowledge of computing and mathematics appropriate to the discipline.
- Students will attain an ability to analyze a problem and identify and define the computing requirements appropriate to its solution.
- Students will attain an ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs.
- Students will attain an ability to function effectively on teams to accomplish a common goal.
- Students will attain an understanding of professional, ethical, legal, security and social issues and responsibilities.
- Students will attain an ability to communicate effectively with a range of audiences.
- Students will attain an ability to analyze the local and global impact of computing on individuals, organizations, and society.
- Students will attain recognition of the need for and an ability to engage in continuing professional development.
- Students will attain an ability to use current techniques, skills, and tools necessary for computing practice.

Construction Management

- An ability to identify, formulate, and solve broadly defined technical or scientific problems by applying knowledge of mathematics and science and/or technical topics to areas relevant to the discipline.
- An ability to formulate or design a system, process, procedure or program to meet desired needs.
- An ability to develop and conduct experiments or test hypotheses, analyze and interpret data and use scientific judgment to draw conclusions.
- An ability to communicate effectively with a range of audiences.

- An ability to understand ethical and professional responsibilities and the impact of technical and/or scientific solutions in global, economic, environmental, and societal contexts.
- An ability to function effectively on teams that establish goals, plan tasks, meet deadlines, and analyze risk and uncertainty.

Data Science and Data Analytics

- Identify societal and ethical impacts as well as the responsibility that come with access to data.
- Critically assess and remediate issues with data organization and data quality.
- Design and implement a solution to a problem in the realm of data science/data analytics through problem identification, problem solving, decision making, visualization, data analysis and reporting.

Electrical Engineering

The Program Educational Objectives (PEOs) for the A-State Electrical Engineering Program are listed below.

- Graduates have successfully advanced in electrical/computer engineering or related relevant practice as evidenced by contributions to their employers and the greater professional community.
- Graduates have completed professional development activities to enhance their credentials or knowledge base.
- Graduates have made a broader contribution by providing an engineering or otherwise technical or objective perspective to the challenges and opportunities of society.

Electrical Systems Engineering

- An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
- An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
- An ability to communicate effectively with a range of audiences.
- An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
- An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.

- An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
- An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Engineering Management Systems

The Engineering Management Systems program graduates will have:

- an ability to apply knowledge, techniques, skills and modern tools of mathematics, science, engineering, and technology to solve broadly-defined engineering problems appropriate to the discipline;
- an ability to design systems, components, or processes meeting specified needs for broadly-defined engineering problems appropriate to the discipline;
- an ability to apply written, oral, and graphical communication in broadly-defined technical and non-technical environments; and an ability to identify and use appropriate technical literature;
- an ability to conduct standard tests, measurements, and experiments and to analyze and interpret the results to improve processes; and
- an ability to function effectively as a member as well as a leader on technical teams.

Industrial Systems Engineering

- An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
- An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
- An ability to communicate effectively with a range of audiences.
- An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
- An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
- An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
- An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Mechanical Engineering

The Program Educational Objectives (PEOs) for the A-State Mechanical Engineering Program are listed below.

- Graduates have successfully advanced in mechanical engineering practice as evidenced by their achievements and contributions to their employers and the greater engineering community.
- Graduates have pursued graduate degrees or completed professional development activities in continuing to advance their knowledge base in the mechanical engineering or related professional fields.
- Graduates have made a broader contribution to the local and national economic development by providing a mechanical engineering perspective to the challenges and opportunities of society.

Mechanical Systems Engineering

- An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
- An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
- An ability to communicate effectively with a range of audiences.
- An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
- An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
- An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
- An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Technology (BS, All Emphasis)

- Students will demonstrate a solid understanding of technology fundamentals.
- Students will utilize knowledge of mathematics and science to solve technology problems.
- Students will exhibit the basic skills to analyze and interpret data. Will be able to formulate the problems and processes for solutions.
- Students will develop ability to organize information and communicate effectively.

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