Mission, Goals, Objectives, Outcomes based on material IUPUI Mechanical Engineering which takes the step of defining Measurable Outcomes:

University Mission	The mission of IUPUI is to provide for its constituents, excellence in:
	• Teaching and Learning
	• Research, Scholarship, and Creative Activity
	• Civic Engagement, Locally, Nationally, and Globally with each of these core activities characterized by:
	    o Collaboration within and across disciplines and with the community,
	    o A commitment to ensuring diversity, and
	    o Pursuit of best practices.

School Mission	The mission of the IUPUI School of Engineering and Technology is to provide quality education, develop technical leaders, and conduct basic and applied research. The School strives to enhance the local community through civic responsibility and by promoting economic development.
Program Mission	Consistent with the mission of IUPUI and the School of Engineering and Technology, the mission of the Department of Mechanical Engineering is to: • Provide high quality education in mechanical engineering for both undergraduate and graduate students • Provide support for faculty to conduct high quality research and ensure high quality education • Increase the program's national and international reputation • Enhance the community through civic responsibility and the promotion of economic development • Provide technical expertise and training to industry on advanced technologies
Program Educational Objectives	The Program Educational Objectives of the Department of Mechanical Engineering are to educate undergraduate students who – during the first few years following the graduation – will: • Demonstrate excellent technical capabilities in mechanical engineering and related fields • Be responsible citizens • Continue their professional advancement through life-long learning • Apply sound design methodology in multidisciplinary fields of mechanical engineering • Competently use mathematical methods, engineering analysis and computations, and measurement and instrumentation techniques • Practice effective oral and written communication skills • Understand the environmental, ethical, diversity, cultural, and contemporary aspects of their work • Work collaboratively and effectively in engineering or manufacturing industries

Program Educational Outcomes	The Program Outcomes of the Department of Mechanical Engineering are to educate graduates who – by the time of graduation – will be able to:
	a. Demonstrate and apply knowledge of mathematics, science, and engineering with:
	    a1. Knowledge in chemistry and calculus-based physics in depth
	    a2. Mathematics through multivariate calculus, differential equations, and linear algebra
	    a3. Probability and statistics
	    a4. Mechanical engineering sciences: solid mechanics, fluid-thermal sciences, materials science
	b. Conduct experiments methodically, analyze data, and interpret results
	c. Design a system, component, or process to meet desired needs with applications to:
	    c1. Mechanical systems
	    c2. Thermal systems
	d. Function in teams to carry out multidisciplinary projects
	e. Identify, formulate, and solve engineering problems
	f. Understand professional and ethical responsibilities
	g. Communicate effectively in writing and orally
	h. Understand the impact of engineering solutions in a global and societal context through broad education
	i. Recognize the need to engage in lifelong learning
	j. Demonstrate knowledge of contemporary issues
	k. Use the techniques, skills, and modern tools of engineering effectively and correctly in engineering practice with:
	    k1. Mechanical engineering analysis tools (e.g., ANSYS, ProMechanica, etc.)
	    k2. Engineering design and manufacturing tools (e.g., AutoCAD, ProE, etc.)
	    k3. Internet and library information resources
	    k4. Mathematical computing and analysis tools (e.g., Matlab, Excel, LabView, etc.)

Measurable Outcome a1	Ability to work with forces, moments, statics and dynamics of rigid bodies, electricity, material chemistry, electrical circuits, basic digital electronics, basic fluid statics and dynamics, and basic heat energy an thermodynamics.
Measurable Outcome a2	Ability to use multivariate calculus, differential equations, and linear algebra in solving problems in fluid mechanics, heat and mass transfer, system modeling of dynamic systems, dynamic and control systems.

Measurable Outcome a3	Ability to use statistics and probability in experiments and measurements. Use regression analysis to determine relationships between measured dependent and independent variables.
Measurable Outcome a4	Ability to apply the knowledge mathematics and science in solving problems in engineering sciences.
Measurable Outcome b	Ability to conduct experiments methodically, analyze data and interpret results. Use regression analysis to determine relationships between measured dependent and independent variables.
Measurable Outcome c1	Ability to design mechanical systems that meet desired needs, work in teams, communicate the design process and results in the form of written reports, posters, and/or oral presentations. Generate creative and multiple design ideas based on functional specifications and evaluate them based on customer requirements.
Measurable Outcome c2	Ability to design thermal-fluid systems that meet desired needs, work in teams, communicate the design process and results in the form of written reports, posters, and/or oral presentations. Generate creative and multiple design ideas based on functional specifications and evaluate them based on customer requirements.
Measurable Outcome d	Ability to work in teams for solving multidisciplinary projects, such as in electromechanical, dynamic systems and control system. Also, work on projects involving solid, thermal and fluid systems.
Measurable Outcome e	Ability to identify an engineering problem, formulate it mathematically and find a solution for it. Present the solution in the form of a software or hardware product, device or process that meets a need in upper level design courses.
Measurable Outcome f	Ability to: a) describe how an ethics course can help a practicing engineer, b) describe how codes of ethics help an engineer work ethically, c) analyze a behavior using models of right and wrong, d) analyze ethics codes using models of right and wrong, e) describe how group discussions can help with critical thinking, f) discuss ethical issues in the work-place, and g) describe how knowledge of cultures is needed for ethical behavior.
Measurable Outcome g	Ability to effectively write engineering reports and present reports orally. Depict organization, well prepared introduction, good grammar, correct spelling, good conclusions, effective graphical and visual aids.
Measurable Outcome h	a) Awareness of environmental and societal impact of engineering solutions, safety aspect of designs and b) understanding of societal issues, including environment, cultures and ethics.
Measurable Outcome i	Realizing the importance of: a) continuing education to keep-up with ever changing technology after graduation, b) advanced degrees for professional growth, and c) early planning to pursue advanced degrees. Graduates reporting on continued education involvement and obtaining advanced degrees.
Measurable Outcome j	Ability to: a) describe current issues in public forum and b) identify and interpret current ethical issues. Graduates reporting satisfaction in their knowledge of contemporary issues.
Measurable Outcome k1	Ability to use engineering and analysis modeling software, such as finite element method for design and analysis.
Measurable Outcome k2	Ability to use solid modeling and CAD/CAM software, such as ProEngineer for creating solid models of complex engineering products and devices.
Measurable Outcome k3	Ability to conduct library and Internet research to gather information regarding engineering applications, including literature surveys, vendor data collection, and patent checks.
Measurable Outcome k4	Ability to use mathematical computing and analysis tools effectively for engineering design and analysis.
Example of a Course Objective ME 270 Basic Mechanics I	After completion of this course students should be able to: • Draw free body diagrams of particles [a1] • Analyze vectors (vector algebra) [a1] • Express forces in 3-D space [a4] • Apply equilibrium conditions to particles [a1, a4] • Draw free body diagrams of rigid bodies [a1] • Apply vector algebra to rigid bodies [a1] • Analyze rigid bodies for moments, couples, etc. [e, a4] • Apply equilibrium conditions to rigid bodies [a1, a4] • Determine centroids of lines, areas, and volumes [a4] • Analyze structures-trusses, frames and machines [e, a4] • Calculate friction forces [a4] • Calculate moments and product of inertia [a4] Note: The letters within the brackets indicate the program outcomes.