Outcome a. Graduates will demonstrate an ability to apply knowledge of mathematics, science and engineering.

Tools used:
Course Specific Rubrics

Data Collection:
Rubrics are completed by course instructors through evaluation of specific coursework, including in-class assignments, homework assignments, exams, and projects

Frequency of Data Collection:
The data are collected every time courses are taught.

Data Analysis:
The data obtained are analyzed every year by the instructor and by the program faculty members.

Closing the Loop:
This outcome is subject to review every year based on performance criteria and metrics and specific action items are developed, if necessary, to revise the content or instruction of the courses. The analyzed data are presented separately to the following groups in meetings.

a) Feedback to students on all assignments
b) Feedback to and discussion with faculty on rubric results
c) Integration of results from faculty discussion on rubric results

Performance criteria and metrics:
Rubrics for each course are given on the BMEG assessment page (https://cbe.statler.wvu.edu/home/biomedeng/bmeg-assessment) or can be reached by following the link on the course number in the table below.

Students should reach a level of proficiency defined as a goal metric value of 3.0 based on the rubric scale of

(1) not proficient,
(2) progressing to proficiency,
(3) proficient, and
(4) superior proficiency.

Course Assessed	#	Performance Criterion
BMEG 230	1	Apply basic concepts of numerical analysis to biosystems.
	2	Solve linear and nonlinear algebraic equations as applied to biological systems
	3	Apply ordinary and partial differential equations in dynamic systems to evaluate biomedical engineering relevant problems
BMEG 310	1	Describe how biomedical images are created using different imaging modalities
	2	Interpret biomedically-relevant images to determine the measure of image quality affected as related to modality used and image processing
BMEG 315	1	Apply conservation laws and constitutive equations to problems related to the convective and diffusive transport of mass, energy, and momentum.
	2	Distinguish between modes of mass transfer
BMEG 350	1	Describe basic concepts of biomaterials preparation for a drug delivery vehicle. This will include determining impact of different variables on hydrogel properties and analyzing release data with respect to the material chemical and physical properties.
	2	Analyze the differentiate the mechanical properties of a non-living model system (e.g., pipettor tip) and a living system (e.g., chicken skin) in tensile stress
	3	Identify the chemical reactions involved in the preparation of polydimethylsiloxane (PDMS) microchannels and the assembly of PDMS microfluidic chips
	4	Describe and demonstrate understanding of basic concepts of biomedical imaging
BMEG 420	1	Describe the dynamic classification of biomedical instrumentation
	2	Derive mathematical models for biomedical instrumentation devices
	3	Apply digital signal processing techniques to biosignals
BMEG 455/456	1	Demonstrate the ability to apply scientific principles and engineering skills to solve problems at the interface of medicine and biology.
	2	Apply knowledge from human physiology, thermodynamics, transport in biological systems, math, chemistry, physics, biomedical instrumentation, biomechanics, etc. to complex, open-ended biomedical engineering problems