

### **Definition of a Learning Outcome**

Learning outcomes state those **skills/abilities that are measurable** and which the instructor or program coordinator expects **each student to have mastered at the end of the course or program**.

### **Rationale for Review of Assessable Learning Outcomes at the Faculty Senate Level**

Basically, accreditation bodies for higher education have mandated that learning outcomes be assessable. WVU has a policy of bringing courses and curricula in line with this requirement. Although individual faculty, programs, and departments should play a primary role in developing assessment methods for their courses and curricula, other WVU administrative bodies are charged with examining course-level student learning outcomes. The Faculty Senate Curriculum Committee examines course-level learning outcomes to ensure, to the best of our ability, that they accord with national standards. **Therefore, we ask that learning outcomes be measurable and reflective of the course and program level (e.g., higher order for graduate courses).**

### **Format for Learning Outcomes at WVU**

- Outcomes should be student centered – they can begin with “Students will be able to...”
- Outcomes must be measureable – verb choice is important here. Refer to Bloom’s Taxonomy for a list of commonly used verbs.
- Outcomes should be clear.
- Outcomes should be achievable, both in the scope of the individual outcome as well as in the number of total outcomes set
- Outcomes should be aligned with learning opportunities and assessments
- Outcomes should be appropriate to the level of learning, taking into account both the course level and degree type.
- Outcomes should be consistent across all locations and methods of delivery as per Harmonization.

### **Examples of Current Course Learning Outcomes**

#### Women’s Studies 250: Women in Science

After completing this course, the student will be able to:

1. Discuss women’s experiences with science, including personal and social dimensions, and use this knowledge to explain the origins and persistence of current issues facing women in science in the U.S.
2. Analyze how gender affects the representation of scientists in popular culture.
3. Apply techniques from feminist science studies to a scientific field.
4. Present ideas in written formats.
5. Find and evaluate information appropriate to research topics.

#### Marketing 440: Export Management

After completing this course, students will be able to:

1. Work in a team of business professionals

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2. Work directly with a company interested in venturing into the exporting business or expanding their existing exporting business.
3. Develop an Export Business Plan.
4. Identify existing local, state, and federal exporting resources.
5. Demonstrate an understanding of cultural diversity in the Export Business Plan.
6. Describe the role that governments play in international business transactions.
7. Demonstrate, using the Export Business Plan, how domestic marketing strategies are impacted and may have to change, when doing business on an international scale.

Forensic Identification Program 401: Professional Forensic Communications

Upon successful completion of the course, students will be able to:

1. Define and produce legally defensible documentation.
2. Demonstrate the proper methods of documenting crime scenes and evidence through notes and logs.
3. Demonstrate the proper procedures for creating and maintaining chain-of-custody of evidence.
4. Demonstrate the proper procedures for documenting laboratory work using logs and notes.
5. Demonstrate preparation of a standard operating procedure.
6. Create a professional quality poster presentation.
7. Write a report summarizing forensic laboratory results for a non-scientist such as a police officer or attorney.

HPML680– Performance and Economic Evaluation for Public Health

By the end of this course, students should be able to:

1. Synthesize the skills and knowledge required in conducting performance and economic evaluation.
2. Compare and contrast the most prevalent forms of economic evaluation: 'cost effectiveness analysis (CEA), cost utility analysis (CUA), and cost benefit analysis (CBA) used in public health.
3. Derive the value of public health programs and policies to justify investment by business organizations.

EPID 712 : Quantitative Methods-Epidemiology

Upon completion of this course, students will be able to:

- 1) Link appropriate analytic models with public health research questions and epidemiologic study designs.
- 2) Interpret epidemiologic analyses from a range of multivariable models (including linear, logistic, Poisson, and Cox regression models)
- 3) Implement both stratified approaches and multivariable regression to account for the presence of confounding bias
- 4) Critically evaluate different approaches to modeling complex exposures including dose-response relationships & time-varying exposures.

## Examples of Current Program Learning Outcomes

### BS Mechanical Engineering

Upon graduation, all Bachelor of Science students in Mechanical Engineering will be able to:

- Apply knowledge of mathematics, science and engineering.
- Design and conduct experiments, as well as to analyze data.
- Design a system, component or process to meet desired needs.
- Function on multidisciplinary teams.
- Identify, formulate and solve engineering problems.
- Understand professional and ethical responsibility.
- Communicate effectively.
- Understand the impact of engineering solutions in a global and societal context.
- Recognize the need for, and an ability to engage in, life-long learning.
- Demonstrate knowledge of contemporary issues.
- Use the techniques, skills and modern engineering tools necessary for engineering practice.

### BS Biology

Upon graduation, students will be able to:

- Demonstrate competency in five content areas (listed below) at three biological levels (cellular/molecular, organismal, ecology and population).
  - Information flow
  - Transformations of energy and matter
  - Structure-function relationships
  - Evolution
  - Systems and interactions
- Apply science process skills, including: reading the primary literature, developing a testable hypothesis, designing an experiment, collecting and analyzing data statistically.
- Communicate effectively with both fellow scientists and non-scientists in both written and oral forms.
- Synthesize knowledge and skills from across the curriculum and apply them to societal issues and problems.

### PharmD Pharmacy

Upon graduation, students will be able to:

- Develop, integrate, and apply foundational knowledge (e.g., concepts, facts, principles) from biological, pharmaceutical, social, behavioral, administrative, and clinical sciences to evaluate the scientific literature, explain drug actions, solve therapeutic problems, and advance individual and population health.
- Effectively communicate verbally and nonverbally when interacting with an individual,

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group, or organization.

- Exhibit behaviors and values consistent with the professional trust given by patients, healthcare providers, and society; assure that patients' best interests are represented; and demonstrate responsibility for achieving shared goals regardless of position.
- Examine and assess personal knowledge, skills, abilities, attitudes, beliefs, motivation, and emotions and strive for continual improvement.
- Actively participate as a healthcare team member by demonstrating mutual respect, understanding, and values to meet patient care needs.
- Provide patient-centered care as the medication expert.
- Design and implement prevention, intervention, and educational strategies for communities to manage chronic disease and improve health and wellness.
- Manage patient healthcare needs using human, financial, technological, and physical resources to optimize the safety and efficacy of medication use systems.

**Bloom's Taxonomy—A More Detailed Theory of Learning Outcomes:**

Student Learning Outcomes should describe what students should know, be able to do and/or be like (dispositions) by the end of the defined course. These types of Student Learning Outcomes are typically linked to domains. The common domains of learning include cognitive, affective and psychomotor. Benjamin Bloom is credited with identifying the Taxonomy of the Cognitive Domain.

**Resources for Identifying and Selecting Appropriate Verbs Based on Bloom's Taxonomy**  
(there are many more not listed here)

[http://www.utar.edu.my/fegt/file/Revised\\_Blooms\\_Info.pdf](http://www.utar.edu.my/fegt/file/Revised_Blooms_Info.pdf)

<http://www.celt.iastate.edu/teaching-resources/effective-practice/revised-blooms-taxonomy/>

<http://teaching.uncc.edu/learning-resources/articles-books/best-practice/goals-objectives/writing-objectives>

Many higher education and professional degree-granting bodies have developed their own guidelines for formulating measurable learning outcomes.

For example, the **American Association of Law Libraries** has a helpful on-line document clarifying the rationale for learning outcomes and providing suggestions for how to formulate them: <http://www.aallnet.org/prodev/outcomes.asp>.

Perhaps your discipline has its own established guidelines. Please feel free to use those guidelines, while keeping in mind the WVU FS CC requirements that learning outcomes be measurable.