

## **GUIDELINES TO CONSIDER WHEN CREATING EXPECTED LEARNING OUTCOMES**

Source: Assessing Student Learning, by Linda Suskie. The book is available for checkout in the Center for Teaching and Learning.

- Aim for outcomes that are midway between too broad and too specific, focusing on expecting students to use facts and concepts, rather than simply understand them.
- Use concrete action words to describe what students should be able to do in explicit, observable, and measurable terms. (A list of possible verbs is provided on page 2 of this document.)
- Focus on what students should be able to do at the end of the course, not the tasks they are to do while in the course.
- In addition to addressing knowledge and basic understanding, address development of performance skills, interpersonal skills, and critical thinking skills, such as application, analysis, synthesis, evaluation and problem solving.
- Focus on the most important outcomes, striving to create four to six expected learning outcomes for the course.

### **EXAMPLES OF EFFECTIVE EXPECTED LEARNING OUTCOMES**

The following examples are quoted from page 80 of Assessing Student Learning, by Linda Suskie.

Biology: Make appropriate inferences and deductions from biological information.

Business Administration: Develop graphic, spreadsheet, and financial analysis support for positions taken.

Communication Studies: Systematically analyze and solve problems, advocate and defend one's views, and refute opposing views.

Earth Science: Analyze the surface and subsurface (three-dimensional and four-dimensional) geologic characteristics of landforms.

English: Present original interpretations of literary works in the context of existing research on these works.

Health Care Management: Apply basic problem-solving skills along with health care financial management knowledge to develop recommendations related to the financial issues(s) confronted by a health care organization.

### EXAMPLES OF VERBS FOR EXPECTED LEARNING OUTCOMES

Source: Assessing Academic Programs in Higher Education, by Mary J. Allen (Fig. 2.3, p. 37). The book is available for checkout in the Center for Teaching and Learning.

Knowledge	Comprehension	Application	Analysis	Synthesis	Evaluation
cite	arrange	apply	analyze	arrange	appraise
define	classify	change	appraise	assemble	assess
describe	convert	compute	break down	categorize	choose
identify	describe	construct	calculate	collect	compare
indicate	defend	demonstrate	categorize	combine	conclude
know	diagram	discover	compare	compile	contrast
label	discuss	dramatize	contrast	compose	criticize
list	distinguish	employ	criticize	construct	decide
match	estimate	illustrate	debate	create	discriminate
memorize	explain	interpret	determine	design	estimate
name	extend	investigate	diagram	devise	evaluate
outline	generalize	manipulate	differentiate	explain	explain
recall	give examples	modify	discriminate	formulate	grade
recognize	infer	operate	distinguish	generate	interpret
record	locate	organize	examine	manage	judge
relate	outline	practice	experiment	modify	justify
repeat	paraphrase	predict	identify	organize	measure
reproduce	predict	prepare	illustrate	perform	rate
select	report	produce	infer	plan	relate
state	restate	schedule	inspect	prepare	revise
underline	review	shop	inventory	produce	score
	suggest	sketch	outline	propose	select
	summarize	solve	question	rearrange	summarize
	translate	translate	relate	reconstruct	support
		use	select	relate	value
			solve	reorganize	
			test	revise	

## **GUIDELINES TO CONSIDER WHEN CREATING CORRESPONDING ASSESSMENT MEASURES**

Source: Assessing Student Learning, by Linda Suskie. The book is available for checkout in the Center for Teaching and Learning.

- Use multiple, diverse measures of student learning
- Include performance assessments in addition to traditional assessments, such as tests and papers
- Gather direct and indirect evidence of student learning
- Utilize objective and subjective assessments

## **EXAMPLES OF CORRESPONDING ASSESSMENT MEASURES**

### **Examples of traditional assessments:**

Tests  
Quizzes  
Term papers  
Reports

### **Examples of options to traditional assessments** (Selected from a list on page 154 of Assessing Student Learning, by Linda Suskie):

Annotated bibliography	Newspaper story or news report
Brochure or pamphlet	Oral history recording of an event
Case study / analysis	Conduct a product or service
Collaborative group activity	Portfolio
Debate or discussion	Poster, display or exhibit
Dramatization of an event or scenario, in writing or as a presentation	Presentation, demonstration or slide show
Experiment or laboratory experience	Reflection on what and how one has learned
Field notes	Review and critique of one's own work, that of a peer, a performance, exhibit, etc.
Game invention	Survey, including the analysis of the results
Graph, chart, diagram, flowchart, or other visual aid	Teaching a concept to a peer or a child
Graphic organizer, taxonomy, or classification scheme	Video or audio recording
Handbook or instructional manual	Web site
Journal or log	
Letter to an editor or business	
Model, simulation or illustration	

**NEW OFFICIAL COURSE SYLLABUS FORMAT  
EXAMPLES OF SECTION II**

**Example for a General Psychology Course:**

<b>Expected Learning Outcomes</b>	<b>Assessment Measures</b>
Students will summarize and discuss the methods of scientific research as they are applied to the understanding and predicting of human and animal behavior.	Journal Article Summary Discussion Board Posts WebCT Learning Quiz with Reflection Opportunity Class Presentation Written Examination
Students will critically evaluate explanations of individual and interpersonal behavior, such as phobias, panic disorders, obsession, etc.	Student Response System Quizzes Case Study Analysis WebCT Learning Quiz with Reflection Opportunity Written Examination
Students will compare and contrast the empirical endeavors of researchers who have devoted their lives to accumulating information leading to increased understanding of human and animal behavior.	Small Group Presentation/JIGSAW Written Examination WebCT Learning Quiz with Reflection Opportunity
Students will prepare and present course content related to life experiences.	Service Learning Project Resource File Written Examination
Students will integrate information read in the textbook and heard in class discussions with information read in current news media.	News Article Reflection Annotated Bibliography Class Discussion

**The above table was developed based on the following course objectives:**

- Understand and discuss the methods of scientific research as they are applied to the understanding and predicting of human and animal behavior.
- Critically evaluate explanations of individual and interpersonal behavior.
- Appreciate the empirical endeavors of researchers who have devoted their lives to accumulating information leading to increased understanding of human and animal behavior.
- Apply course materials to life experiences.
- Integrate information read in the textbook and heard in class discussions with information read in current news media.

**Example for a Business Information Technology Course:**

<b>Expected Learning Outcomes</b>	<b>Assessment Measures</b>
Students will demonstrate their ability to focus the job search through research of traditional and nontraditional careers.	Network Building Project
Students will critique professional documents through application of guidelines and analysis of characteristics.	Professional résumé assignment; chronological and functional résumés in both electronic and paper formats. Cover letter assignment. Thank you letter assignment.
Students will describe the ten steps of interviewing (preparation for the interview, the interview itself, and the interview follow-up)	Students will participate in a professional interview completed on campus by a professional interviewer from an off-site business

**The above table was developed based on the following course objectives:**

- Students will demonstrate their ability to focus the job search through research of traditional and nontraditional careers and by building a network.
- Students will describe the importance and characteristics of chronological and functional résumés in both electronic and paper formats.
- Students will create a professional résumé.
- Students will describe the guidelines and elements of a good cover letter and will write cover letters.
- Students will describe the ten steps of interviewing (preparation for the interview, the interview itself, and the interview follow-up)
- Students will describe the guidelines and elements of a good thank you letter and will write a thank you letter.
- Students will participate in a professional interview completed on campus by a professional interviewer from an off-site business

**Example for a Calculus II Course:**

Expected Learning Outcomes	Assessment Measures
Students will determine the appropriate method (partial fractions, trig integration, trig substitution, inverse trig, integration by parts) for integrating a function and perform definite and indefinite integrals using these methods	Quiz and Test Homework Objective Worksheet (students list objective, and note application, process, examples, and things to keep in mind)
Students will solve logarithmic and exponential equations by use of inverse functions, and differentiate and integrate compound algebraic and transcendental functions	Quiz and Test Homework Objective Worksheet (students list objective, and note application, process, examples, and things to keep in mind)
Students will graph the solutions of functions in polar and parametric form by traditional methods and through use of technology, and translate these functions to and from rectangular form	Quiz and Test Homework Objective Worksheet (students list objective, and note application, process, examples, and things to keep in mind)
Students will graph conic sections, and provide equations for given conic section graphs in both rectangular and polar form	Quiz and Test Homework Objective Worksheet (students list objective, and note application, process, examples, and things to keep in mind)
Students will determine centroids, arc lengths, surface areas and probabilities by integration and determine the reasonableness of these results by comparing them to estimates derived through non-calculus methods.	Quiz and Test Homework Objective Worksheet (students list objective, and note application, process, examples, and things to keep in mind)
Students will represent transcendental functions as infinite polynomials and determine the intervals on which they converge as well as the number of terms required to achieve a specified accuracy	Quiz and Test Homework Objective Worksheet (students list objective, and note application, process, examples, and things to keep in mind)
Students will evaluate the reasonableness of results by comparing them to estimates derived by non-calculus methods	Quiz and Test Homework Objective Worksheet (students list objective, and note application, process, examples, and things to keep in mind)
Students will determine appropriate roles for technology (TI calculators and PC software), and apply it to assist in graphing, checking and predicting results, and approximating integrals	Chapter Projects (students use WinPlot, Equation Editor, or other software to show the steps of one problem)

**The above table was developed based on the following course objectives:**

Inverse Functions

- Find inverses of functions
- Graph exponential functions
- ‘Expand’, ‘contract’, and evaluate logarithmic expressions
- Convert exponential expressions to and from logarithmic form

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- Use logs to solve equations containing exponential expressions
- Differentiate and integrate functions containing exponential and log expressions
- Integrate functions using  $\frac{d}{dx} \ln x = \frac{1}{x}$
- Use logarithmic differentiation
- Solve word problems involving exponential growth and decay
- Evaluate inverse trig functions
- Rewrite expressions of the type  $\sin(\arctan x)$  algebraically
- Differentiate and integrate functions using inverse trig expressions
- Use L'Hopital's Rule to evaluate limits of indeterminate forms;  $\frac{0}{0}$ ,  $\frac{\infty}{\infty}$ , and  $0 \cdot \infty$

Methods of Integration - Evaluate integrals of the form:

- $\int f(x) \cdot g(x) dx$  and  $\int f(x) dx$  by using integration by parts
- $\int f(x) \cdot g(x) dx$  where one is integrable and the other 'differentiates periodically'
- $\int \sin^m x \cdot \cos^n x \cdot dx$  where m, n, or both are odd
- $\int \sec^m x \cdot \tan^n x \cdot dx$  (except when m is odd and n is even)
- a product or quotient of  $x^n$  and  $\sqrt{a-x^2}$ ,  $\sqrt{x^2-a^2}$ , or  $\sqrt{a^2+x^2}$  by using trig substitution
- $\int_a^\infty f(x) dx$  or  $\int_{-\infty}^a f(x) dx$  (evaluate or identify as divergent)
- $\int_a^b f(x) dx$  where  $f(x)$  is undefined at a or b (evaluate or identify as divergent)
- Evaluate, by the method of partial fractions, integrals containing rational expressions in which the factors of the denominator are linear and quadratic
- Approximate definite integrals by evaluating  $M_n$  (midpoint rule),  $T_n$  (trapezoidal rule), or  $S_n$  (Simpson's rule) for a given function with  $n \leq 10$ .
- Use technology to evaluate the reasonableness of your result by approximating integrals

Applications of Integrals

- Find the length of the arc of a given function over a given interval
- Find the area of a surface formed by the revolution of a given arc about either axis
- Find the centroid of a region bounded by one or more curves
- Given a normal distribution find the probability that random selection will yield a result within a specified range
- Given an exponential distribution, find the mean and median of the distribution, and find the probability that random selection will yield a result within a specified range
- Given sufficient information, find the equation for an exponential distribution

Calculus in Parametric and Polar Coordinates

- Convert equations from parametric form to Cartesian form and vice versa

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- Graph parametric equations
- Find the parametric equation of a given graph : lines, parabolas, circles and ellipses
- Find the equation of the line tangent to a parametric curve at a given point or value of t
- Find points at which the tangent line to a parametric curve is vertical or horizontal
- Find the length of the arc of a given parametric function over a given interval
- Find the area of a region bounded by one or more parametric curves
- Convert points and equations from polar to Cartesian form and vice versa
- Graph polar functions
- Find polar equations of given graphs : lines, circles, cardioids and roses
- Find lengths of the arc of a given polar function over a given interval
- Find the area of a region bounded by one or more polar curves
- Graph any conic given its Cartesian equation
- Provide the Cartesian equation of a conic given sufficient information
- Graph any conic given its polar equation :  $r = \frac{ed}{1 \pm e \cos \theta}$  or  $r = \frac{ed}{1 \pm e \sin \theta}$
- Provide the polar equation of a conic given the vertex or vertices

Sequences and Series

- List terms of a sequence given in formula form
- Express a sequence symbolically (explicitly and recursively) given a sufficient number or terms
- Identify the properties of a given sequence (increasing, decreasing, bounded, alternating, convergent, or not)
- Give the limit of a convergent geometric sequence
- Calculate partial sums of a given series (by hand and on TI)
- Express a series symbolically given a sufficient number of terms
- Use the power series, integral, comparison, alternating series, and ratio tests to identify a series as absolutely convergent, conditionally convergent or divergent
- Find or approximate the limit of convergent series
- Use the integral test to calculate how many terms of a series need to be added to approximate the sum to a specified degree of accuracy
- Use the ratio test to identify the interval of convergence for a given power, Taylor, and Maclaurin series.
- Use the formula  $\sum_{n=0}^{\infty} ar^n = \frac{a}{1-r}$  and variations to express appropriate functions as infinite polynomials
- Express a given function as a power series, Taylor series or Maclaurin series
- Use Taylor and Maclaurin Polynomials to approximate given functions
- Express a given binomial raised to a negative or rational exponent as an infinite polynomial