Calculus - Late Transcendental (LT)

Course Description:

This calculus course is at least a 4 hour credit course and consists of the algebraic, graphic, numeric, and modeling approach to the study of calculus, with or without technology, and with appropriate symbolic manipulation. The course includes the use of appropriate mathematical language, including symbolism, to define, evaluate, and analyze the characteristics of calculus concepts. It includes solving problems involving the techniques of calculus and applications of calculus. At least 70% of the course time must be spent on all essential topics.

Course objectives will stem from these essential topics:

- Limits (including limits at infinity and one-sided limits)
- Statement of limit properties (such as limit of a constant, sum, product, or quotient)
- Continuity (including an intuitive understanding and continuity in terms of limits)
- Definitions of the derivative
- Relationship between differentiability and continuity
- Derivatives of elementary algebraic functions
- Curve sketching (such as increasing and decreasing functions; relative and absolute maximum and minimum points; concavity; points of inflection; and corresponding characteristics of f , f', and f'')
- Applications of the derivative (such as slope of a curve at a point, optimization, related rates)
- Derivatives of sums, differences, products, and quotients
- Derivative of a composite function (chain rule)
- Implicit differentiation
- Derivative of the inverse of a function
- Higher order derivatives
- Derivatives of trigonometric functions
- Differentials and Linear Approximation
- Mean Value Theorem
- Use of L'Hopital's Rule
- Concept of antiderivatives
- Basic integration formulas
- Application of antiderivatives (such as distance & velocity from acceleration, & growth & decay)
- Definition of a definite integral (limit of a sequence of Riemann sums)
- Approximations of the definite integral (using areas of rectangles)
- Properties of the definite integral
- The Fundamental Theorem of Calculus
- Applications of the definite integral
- Integration by substitution (using identities and change of variables)

Additional optional topics:

- Derivatives of exponential functions
- Derivatives of logarithmic functions

***NOTE:** A transferable calculus course can have as its main focus the study of algebraic functions (functions that can be built up by the usual algebraic operations of addition, subtraction, multiplication, division, and raising to constant powers). It is recommended that students in a LT Calculus I complete a LT Calculus II course

Template for Course Inventory

Please fill out the following table and submit attachment(s). Approved courses must be resubmitted every 5 years.

Please attach the following materials:

- Current working syllabus and lab syllabus that contains instructional goals and/or objectives
- Comprehensive final; in the absence of a comprehensive final no more than 5 sample assessments

Course #			
Course Title			
Beginning Term (when is/was it first offered?)	If more than five years, check box ☐		
	If less than five years, enter date:		
Credit Hours (including the entire course, lecture/lab)	Course:	Lab:	
Co-/Pre-requisite (test scores for placement)		Test	Score
	Co-Requisite		
	Pre-Requisite		
Successor Course:			
Catalog Description			
All Textbook(s)/Lab Manual	ISBN: Title: Publisher: Author: Edition: Copyright Year:	ISBN: Title: Publisher: Author: Edition: Copyright Year:	

Indicate the percent time spent on each learning objective (should add up to 100%). To indicate where evidence of each learning objective is located in this submission, please check all boxes that apply.

S – Syllabus T – Topics list C – Catalog Description A – Assessment O – other attachment

Indicate the typical percentage of time spent on each learning outcome/topic	**Learning Objective**	**% Time**	**S**	**T**	**C**	**A**	**O**
	1. Limits (including limits at infinity and one-sided limits)						
	2. Statement of limit properties (such as limit of a constant, sum, product, or quotient)						
	3. Continuity (including an intuitive understanding and continuity in terms of limits)						
	4. Definitions of the derivative						
	5. Relationship between differentiablity and continuity						
	6. Derivatives of elementary algebraic functions						
	7. Curve sketching (such as increasing and decreasing functions; relative and absolute maximum and minimum points; concavity; points of inflection; and corresponding characteristics of f , f', and f'')						
	8. Applications of the derivative (such as slope of a curve at a point, optimization, related rates)						
	9. Derivatives of sums, differences, products, and quotients						
	10. Derivative of a composite function (chain rule)						
	11. Implicit differentiation						
	12. Derivative of the inverse of a function						
	13. Higher order derivatives						
	14. Derivatives of trigonometric functions						
	15. Differentials and Linear Approximation						
	16. Mean Value Theorem						
	17. Use of L'Hopital's Rule						
	18. Concept of antiderivatives						
	19. Basic integration formulas						
	20. Application of antiderivatives (such as distance and velocity from acceleration, and growth and decay)						
	21. Definition of a definite integral (limit of a sequence of Riemann sums)						
	22. Approximations of the definite integral (using areas of rectangles)						
	23. Properties of the definite integral						

	24. The Fundamental Theorem of Calculus						
	25. Applications of the definite integral						
	26. Integration by substitution (using identities and change of variables)						
Non-essential topics	1. Derivatives of exponential functions						
	2. Derivatives of logarithmic functions						
	3. Other:						
Additional Comments:							

Name of individual submitting:_____Date:_____

Email address:_____

Please contact WVHEPC, Academic Affairs with questions