

**Core Curriculum
Course Proposal Cover Sheet**

Department: **Mathematics**
College: **College of Science & Technology**
Department Head: **Bryant Wyatt**

Course Prefix & Number: **Math 120**
Course Title: **Calculus I**
Course Description: Algebraic and transcendental functions, limits, continuity, derivatives and related applications, an introduction to the definite integral, integration, and the Fundamental Theorem of Calculus. Use of computer technology and laboratory assignments will be required in this course.

Please select the THECB Foundational Component Area for which this course is being submitted. (Please select only one)
Mathematics ([download forms](#))

(The “download forms” link for the selected Component Area includes the ***Foundational Component Area Justification Form*** and the ***Student Learning Outcome Alignment Form***)

Checklist:

Course Proposal Cover Sheet
Foundational Component Area Justification Form
Student Learning Outcome Alignment Form

MATHEMATICS

FOUNDATIONAL COMPONENT AREA JUSTIFICATION FORM

Rationale: Please provide a rationale for the course which explains how the course being proposed fits into this component based on the component's description. For your convenience, the overall description and rationale for this component are included below.

Mathematics (from THECB Chapter 4: 4.28)

- Courses in this category focus on quantitative literacy in logic, patterns, and relationships
- Courses involve the understanding of key mathematical concepts and the application of appropriate quantitative tools to everyday experience.
- The following three Core Objectives must be addressed in each course approved to fulfill this category requirement: Critical Thinking Skills, Communication Skills, Empirical and Quantitative Skills.
 - Critical Thinking Skills: to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information;
 - Communication Skills: to include effective development, interpretation and expression of ideas through written, oral and visual communication;
 - Empirical and Quantitative Skills: to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions.

Rationale for Inclusion in this Category:

The **Math 120** course is primarily a study of the rates of change of functions and their application to modeling. In this capacity, students use logic to analyze patterns and relationships to evaluate the types of functions that most appropriately model change in real world situations. Students must justify their solutions in written form, using appropriate technology as needed to support their conclusions.

STUDENT LEARNING OUTCOME ALIGNMENT FORM
Mathematics

Course Prefix/Number: Math 120
Course Title: Calculus I

Core Objective: Critical Thinking CT1: Students will evaluate evidence in analysis, interpretation or arguments

Course SLO(s):

1. Using technology when appropriate, apply the derivative in solving problems including optimization, related rates & curve sketching.
2. Using technology when appropriate, apply the fundamental theorem of calculus.
3. Communicate mathematical ideas, solutions, proofs, and counterexamples using proper notation, appropriate technical and non-technical language, and helpful diagrams and graphs.

Learning Activities: Class lecture, cooperative learning activities, students working at the board, discovery-based activities, homework (including on-line homework)

Means of Assessment: Embedded test questions on the final exam

Core Objective: Critical Thinking CT2: Students will be able to synthesize varied components of information to form a rational conclusion.

Course SLO(s):

1. Using technology when appropriate, investigate the concepts of single variable calculus descriptively, numerically, graphically and symbolically.
2. Apply the derivative in solving problems including optimization, related rates & curve sketching.
3. Apply the fundamental theorem of calculus.
4. Communicate mathematical ideas, solutions, proofs, and counter examples using proper notation, appropriate technical and non-technical language, and helpful diagrams and graphs.

Learning Activities: Class lecture, cooperative learning activities, students working at the board, discovery-based activities, homework (including on-line homework)

Means of Assessment: Embedded test questions on the final exam

Core Objective: Communication C1: Students will express ideas in written, visual or oral forms to a range of diverse audiences in multiple settings.

Course SLO(s):

1. Demonstrate an understanding of the development of limits, derivatives, integrals and related connections.
2. Using technology when appropriate, apply the derivative in solving problems including optimization, related rates & curve sketching.
3. Using technology when appropriate, apply the fundamental theorem of calculus.
4. Communicate mathematical ideas, solutions, proofs, and counterexamples using proper notation, appropriate technical and non-technical language, and helpful diagrams and graphs.

Learning Activities: Class lecture, cooperative learning activities, students working at the board, discovery-based activities, homework (including on-line homework)

Means of Assessment: Embedded test questions on the final exam

Core Objective: Empirical and Quantitative EQS1: Students will gather, interpret or use numerical data/observable facts to arrive at an informed conclusion.

Course SLO(s):

1. Using technology when appropriate, apply the derivative in solving problems including optimization, related rates & curve sketching.
2. Using technology when appropriate, apply the fundamental theorem of calculus.
3. Communicate mathematical ideas, solutions, proofs, and counterexamples using proper notation, appropriate technical and non-technical language, and helpful diagrams and graphs.

Learning Activities: Class lecture, cooperative learning activities, students working at the board, discovery-based activities, homework (including on-line homework)

Means of Assessment: Embedded test questions on the final exam

As department head, I will ensure that all faculty that teach this course are aware of the requirements that these core objectives and learning strategies be incorporated into the above referenced course. This action is taken so that Tarleton State University will be in compliance with Texas Higher Education Coordinating Board foundational component area and core objective requirements for the General Education Core Curriculum.

Signature_____

We, the undersigned faculty, support the proposed changes to this course and agree to incorporate them into our section of the above referenced course. This action is taken so that Tarleton State University will be in compliance with Texas Higher Education Coordinating Board foundational component area and core objective requirements for the General Education Core Curriculum.

(Signed document should be kept in department office, listing names below on the electronic document implies acceptance)

The SLOs for Calculus I were developed by mathematics faculty; the department then voted to approve these SLOs in 2009. All mathematics department faculty are in agreement that these SLOs represent the Calculus I course.