Math 155 – Calculus I
Objectives/Competencies:

Objective 1: Analyze Functions and Relations.
Competencies:
1. Describe a region using set notation, interval notation, and on the Real number line.
2. Determine the length of a segment.
3. Determine the midpoint of a segment.
4. Determine the equation of a circle given its center and radius or diameter.
5. Determine the center and radius of a circle given its equation.
6. Find coterminal angles.
7. Convert between radian and degree measure.
8. Determine all six trigonometric functions for a given angle.
9. Evaluate a trig. function from a right triangle with one unknown side.
10. Evaluate trig. functions with and without using a calculator.
11. Solve trig. equations.
12. Determine period and amplitude of sine and cosine functions.
13. Graph sine and cosine functions with and without using a graphing utility.
14. Plot a relation and determine symmetry.
15. Define the properties of logarithmic functions.
16. Define the properties of exponential functions.
17. Sketch the graphs of logarithmic and exponential functions.
18. Evaluate a function and function formulas.
19. Find domain and range of a function.
20. Determine the region(s) over which a functions one-to-one.
21. Plot a function by analyzing shifts.
22. Plot a compound function.
23. Determine if a function is even or odd.

Objective 2: Evaluate Limits.
Competencies:
1. Estimate limits using a table.
2. Evaluate limits using direct substitution.
3. Evaluate limits using factoring.
4. Evaluate limits using rationalization.
5. Determine when a limit does not exist.

Objective 3: Discuss Continuity of a Function.
Competencies:
1. Determine point(s) of discontinuity of a function.
2. Give examples of why each part of the continuity definition is necessary.
3. Apply the Intermediate Value Theorem to find zeros of a function.
4. Find vertical and horizontal asymptotes for a rational function.

Objective 4: Differentiate
Competencies:
1. Apply definition to compute the derivative.
2. Apply the Power Rule.
3. Apply the Product Rule.
4. Apply the Quotient Rule.
5. Apply the Chain Rule.
6. Find the derivative of trigonometric forms.
7. Find the derivative of inverse trigonometric forms.
8. Find the derivative of exponential functions.
9. Find the derivative of logarithmic functions.
10. Compute the implicit derivative of a given function.

Objective 5: Apply the Derivative to Various Applied (Rate of Change) Problems.
Competencies:

1. Find the slope and equation of the line tangent to the graph of a function.
2. Compute the average rate of change of a function over an interval.
3. Given a position function, compute (instantaneous) velocity function.
4. Given a velocity function, compute the (instantaneous) acceleration function.
5. Solve applied problems in which quantities are changing with time.

Objective 6: Compute the Extreme Values of a Function.
Competencies:
1. Compute the critical number(s) of a function.
2. Determine region(s) over which a function is increasing/decreasing.
3. Apply First Derivative Test to classify critical number(s) as being associated with relative max/min.
4. Apply Second Derivative Test to classify critical number(s) as being associated with relative max/min.

Objective 7: Discuss Concavity of a Given Function.
Competencies:
1. Compute point(s) of inflection for a given function.
2. Determine region(s) over which a function is concave up/down.

Objective 8: Sketch Curves using Calculus Techniques.
Competencies:
1. Compute domain and range.
2. Compute x-intercept(s) and y-intercept(s).
3. Determine symmetry.
4. Find any point(s) of discontinuity.
5. Compute vertical and horizontal asymptote(s).
6. Find point(s) of nondifferentiability.
7. Compute relative extrema.
8. Discuss concavity.
9. Compute point(s) of inflection.
10. Determine behavior over the extent using limits at infinity.

Objective 9: Solve Optimization Problems.
Competencies:
1. Find absolute max/min of a function.
2. Solve applied max/min problems.