MAT 140

MAT 140 Analytical Geometry & Calculus I

Course Description
This college transfer course includes the following topics: derivatives and integrals of polynomials, rational, logarithmic, exponential, trigonometric and inverse trigonometric functions; curve sketching; maxima and minima of functions; related rates; work; and analytic geometry.

Prerequisites: MAT 110, MAT 111 or MAT 112.

4.0 Cr (4 lect/pres, 0 lab, 0 other)

Course Focus
Upon satisfactory completion of this course, students should be able to perform the following tasks:

1. Solve equations and inequalities algebraically and graphically
2. Use transformations to graph functions and inverses
3. Find the limit of a function
4. Determine whether a function is continuous
5. Find the derivative of a function
6. Find the instantaneous rate of change and other related rates
7. Use derivatives to solve applications
8. Find the definite / indefinite integral of a function

Text and References
MAT 140 CORE CURRICULUM COMPETENCIES
All courses approved for the general education core curriculum help students develop communication skills and/or critical thinking.
This course develops communication skills, as demonstrated by the following:

- Discuss continuity.
- Develop algebraically algebraic equations.
- Define critical values.
- Finding area under a curve.
- Define instantaneous rate of change.

This course develops critical thinking skills, as demonstrated by the following:

- Determine whether a function is continuous.
- Solve equations and inequalities algebraically and graphically.
- Evaluate limits.
- Compute derivatives of trig functions.
- Implement the fundamental THM of calculus.

Course Goals
The following list of course goals will be addressed in the course. These goals are directly related to the performance objectives. (*designates a CRUCIAL goal)

1. Apply the intermediate value THM *
2. Calculate one sided limits *
3. Define horizontal asymptotes
4. Depict limits graphically
5. Detect average rate of change
6. Detect limits of trig functions
7. Determine if functions are continuous *
8. Diagnose the limits at infinity
9. Discuss continuity
10. Evaluate limits
11. Find infinite limits
12. Finding limits numerically
13. Finding limits of functions *
14. Learn the properties of limits
15. Solve algebraically inequalities
16. Solve graphically inequalities
17. Calculate derivatives *
18. Compute derivatives of trig functions
19. Define instantaneous rate of change
20. Derive first derivative of a function
21. Derive higher order derivatives *
22. Determine the slope of a tangent line
23. Determining equation of a tangent line *
24. Diagnose second derivative implicitly
25. Differentiating using the sums rules
26. Differentiation using the chain rules
27. Differentiation using the differences rules
28. Differentiation using the power rules
29. Illustrate problems with related rates
30. Learn the basic differentiation rule
31. Perform implicit differentiation *
32. Use the chain rule
33. Use the product rule
34. Use the quotient rule
35. Applying mean value THM
36. Compute inflection points
37. Conduct the first derivative test
38. Conduct the second derivative test
39. Define critical values *
40. Detect the extreme on an interval
41. Discuss concavity
42. Implement the mean value THM
43. Incorporate Rolles THM *
44. Incorporate Simpsons rule *
45. Manage the trapezoidal rule *
46. Solve optimization problems *
47. Utilize transformations to graph functions
48. Apply integrals *
49. Applying integration by substitution
50. Compute definite integrals
51. Find anti derivatives *
52. Find indefinite integrals
53. Finding area under a curve *
54. Integrate using substitution
55. Implement the fundamental THM of calculus
56. Integrate with Riemann sums *
57. Manage change of variables
58. Breakdown using logarithmic properties
59. Differentiate logarithmic functions *
60. Integrate logarithmic functions *
61. Utilize transformations to graph inverses

Student Contributions
Graphing Calculator - TI-83, 84 preferred or 89.
Completion of MAT 111 with a C or better.

Course Evaluation
Grading policy - we will be covering chapters 1-5 of Calculus of a Single Variable by Larson, Edwards, 9th edition. Your grade will be determined from your homework, 4 quizzes, 4 chapter tests and a cumulative final exam.
The grading scale is as follows:

- 90 - 100 = A
- 80 - 89 = B
- 70 - 79 = C
- 60 - 69 = D
- Below 60 = F

Course Schedule
The class meets for 4 lecture/presentation hours per week.

ADA STATEMENT
The Technical College of the Lowcountry provides access, equal opportunity and reasonable accommodation in its services, programs, activities, education and employment for individuals with disabilities. To request disability accommodation, contact the counselor for students with disabilities at (843) 525-8228 during the first ten business days of the academic term.

ACADEMIC MISCONDUCT
There is no tolerance at TCL for academic dishonesty and misconduct. The College expects all students to conduct themselves with dignity and to maintain high standards of responsible citizenship.

It is the student’s responsibility to address any questions regarding what might constitute academic misconduct to the course instructor for further clarification.

The College adheres to the Student Code for the South Carolina Technical College System. Copies of the Student Code and Grievance Procedure are provided in the TCL Student Handbook, the Division Office, and the Learning Resources Center.

ATTENDANCE
The College’s statement of policy indicates that students must attend ninety percent of total class hours or they will be in violation of the attendance policy.

- Students not physically attending class during the first ten calendar days from the start of the semester must be dropped from the class for NOT ATTENDING.
- Students taking an online/internet class must sign in and communicate with the instructor within the first ten calendar days from the start of the semester to indicate attendance in the class. Students not attending class during the first ten calendar days from the start of the semester must be dropped from the class for NOT ATTENDING.
- Reinstatement requires the signature of the division dean.
- In the event it becomes necessary for a student to withdraw from the course OR if a student stops attending class, it is the student’s responsibility to initiate and complete the necessary paperwork. Withdrawing from class may have consequences associated with financial aid and time to completion.
- When a student exceeds the allowed absences; the student is in violation of the attendance policy. The instructor MUST withdrawal the student with a grade of “W”, “WP”, or “WF” depending on the date the student exceeded the allowed absences and the student’s progress up to the last date of attendance or
• Under extenuating circumstances and at the discretion of the faculty member teaching the class, allow the student to continue in the class and make-up the work. This exception must be documented at the time the allowed absences are exceeded.

• Absences are counted from the first day of class. There are no "excused" absences. All absences are counted, regardless of the reason for the absence.
  ▪ A student must take the final exam or be excused from the final exam in order to earn a non-withdrawal grade.
  ▪ A copy of TCL’s STATEMENT OF POLICY NUMBER: 3-1-307 CLASS ATTENDANCE (WITHDRAWAL) is on file in the Division Office and in the Learning Resources Center.

HAZARDOUS WEATHER
In case weather conditions are so severe that operation of the College may clearly pose a hardship on students and staff traveling to the College, notification of closing will be made through the following radio and television stations: WYKZ 98.7, WGCO 98.3, WGZO 103.1, WFXH 106.1, WWVV 106.9, WLOW 107.9, WGZR 104.9, WFXH 1130 AM, WLVH 101.1, WSOK 1230 AM, WAEV 97.3, WTOC TV, WTGS TV, WIWJ TV, and WSAV TV. Students, faculty and staff are highly encouraged to opt in to the Emergency Text Message Alert System. [www.tcl.edu/textalert.asp](http://www.tcl.edu/textalert.asp)

EMERGENCY TEXT MESSAGE ALERT
Students, faculty and staff are highly encouraged to opt in to the Emergency Text Message Alert System. Participants receive immediate notification of emergency events and weather cancelations via text messaging on their cell phones. Participants can also opt in to receive non-emergency news and announcements. Go to [www.tcl.edu](http://www.tcl.edu). On the homepage, click on “emergency TextAlert at TCL” and fill out the form or go to [www.tcl.edu/textalert.asp](http://www.tcl.edu/textalert.asp)

GRADING METHODOLOGY
The final grade must be 70 or more in order to pass the course and progress in the program. Students absent from an examination or presentation will receive a “0” grade for the examination unless other arrangements are made with the individual instructor prior to the examination or presentation day or on the examination or presentation day before the test/presentation is scheduled to be given.

The student is responsible for notifying the instructor for the reason of the absence. It is also the responsibility of the student to contact the appropriate instructor to arrange to make up the examination. Arrangements may be completed by telephone.

If the instructor is not available, a message should be left on the instructor’s voice mail AND with another member of the faculty or administrative assistant. The make-up exam will be scheduled and the instructor will decide the method of examination. Messages sent by other students are unacceptable.