MAT 141

Analytical Geometry & Calculus II

Course Description
This college transfer course includes the following topics: continuation of Calculus of one variable, including analytic geometry, techniques of integration, and volumes by integration, and other applications; infinite series, including Taylor series and improper integrals.

Prerequisites: MAT 140.

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

Course Focus
Through guided practice and lecture, the student will learn to:
1. Find the derivative of and integrate functions
2. Use integration to calculate such things as area between curves, volumes, and surface area
3. Understand the relationship between the inverse functions $e^x$ and $\ln x$ and applications
4. Develop basic integration techniques using paper-pencil and graphing calculator including techniques for improper integrals
5. Develop understanding of infinite (power) series and the use of Taylor's formula

Text and References

MAT 141 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:

- Sketch the curves described by parametric equations.
Develop the inverse of a function.
Derive volumes of various shapes.
Discover centroids.
Determine the applicability of L’Hopital’s Rule.

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

- Differentiation of exponential functions.
- Solving problems using trigonometric substitution.
- Evaluate improper integrals.
- Simplify expressions using partial fractions.
- Diagnose tangents of polar equations.

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. Determining the derivative of natural logs
2. Calculation of integrals of natural logs
3. Determine derivatives of inverse trig functions
4. Calculate the integral of inverse trig functions
5. Develop the inverse of a function
6. Explore exponential equations
7. Differentiation of bases other than e
8. Differentiating hyperbolic functions
9. Differentiation of exponential functions
10. Find the inverse of log functions
11. Integrating hyperbolic functions
12. Figure first order linear differential equations
13. Graph slope fields
14. Solve using spar of variables
15. Solving differential equations
16. Solving homogeneous differential equations
17. Finding area between 2 curves
18. Deriving volume using disc method
19. Derive volume shell method
20. Integration of exponential functions
21. Deriving volume using washer method
22. Solve using trig substitutions
23. Calculating center of mass
24. Calculation of work problems
25. Determination of moments
26. Devise surface area
27. Discover arc length
28. Work with bases other than e
29. Discover centroids
30. Evaluate improper integrals
31. Integrate powers of sine and cosine
32. Integrate secant and tangent
33. Application of integration by parts
34. Use integration rule
35. Apply trig identities to integration
36. Figure Bernoulli equations
37. Integrating using partial fractions
38. Integration of bases other than e
39. Simplify using partial fractions
40. Using partial fractions
41. Apply l’Hospital’s rule
42. Deduce limits of subsequences
43. Conduct the integral test
44. Derive the radius of convergence
45. Determine convergence of a series
46. Graph conic sections
47. Deduce slopes of parametric equations
48. Applicability of the p series
49. Applying the ratio test
50. Differentiate power series
51. Finding a power series
52. Integrals of power series
53. Differentiate a power series
54. Create McLaurin polynomials
55. Create Taylor polynomials
56. Determining equations of conic sections
57. Convert rectangular to polar coordinates
58. Describe graphs of polar equations
59. Develop polar equations of conics
60. Determination of parametric equations
61. Diagnose tangents of polar equations
62. Diagnose equation of lines tangent to parametric equations
63. Sketch the curves described parametric equations
64. Calculate slope in polar form
65. Calculating area of polar curves
66. Find arc length of polar functions
67. Sketch graphs of polar equations

Student Contributions
The lecture method is used to explain new materials and answer questions on previous assignments. Any remaining class time is used for students to work on assignments in groups and under close supervision of instructor. The student is expected to participate in class discussion and complete each assignment.

Course Evaluation
Your grade will be determined from the averages of your grades in the following categories homework, 3 quizzes 3 chapter tests (and a cumulative final exam).

Course Schedule
This course meets 5 hours per week during an 8 week semester (Spring 2).

Developed/Revised: March 16, 2010
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, WLWH 101.1, WSOH 1230 AM, WAEV 97.3, WTOC TV, WTGS TV, WJWJ 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)

**EXTRA:**

**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.