

This is a SouthArk Master Syllabus. The course syllabus distributed by the instructor may include additional requirements, must be followed by the student in the given term, and is considered to supersede the Master Syllabus.

Course Number

MATH 2015

Course Title

Calculus I

Course Description

Differential and integral calculus of functions of one variable with applications; topics from plane analytic geometry. Topics include limits differentiation, applications of differentiation, anti-derivatives, definite integrals, applications of definite integrals, differential equations, differentiation and integration applied to logarithmic and exponential functions.

College Mission

South Arkansas Community College promotes excellence in learning, teaching, and service; provides lifelong educational opportunities; and serves as a cultural, intellectual, and economic resource for the community.

College Wide Student Learner Outcomes

Critical Thinking

Responsibility

Communication

ACTS Course

Program Course

ACTS Outcomes

The students should:

1. Apply the concepts involved with limits and continuity of functions, slopes of functions, minimum and maximum values of functions, relative extrema, inflection points, and asymptotes of functions and use those concepts to analyze a function.
2. Perform and apply differentiation including implicit differentiation and rates of change.
3. Find antiderivatives and apply them to indefinite integration.
4. Calculate definite integrals and use them to solve problems involving area between curves, and other relevant applications.
5. Apply differentiation and integration to problems involving exponential, trigonometric, and logarithmic functions including problems dealing with exponential growth and decay.

Program Outcomes

Course Outcomes

CLO #	Course Learner Outcomes (CLO)	Unit Outcomes/Competencies	ACTS	Program Outcomes	Critical Thinking	Communication	Responsibility	Assessment
CLO 1	Apply the concepts involved with limits and continuity of functions, slopes of functions, minimum and maximum values of functions, relative extrema, inflection points, and asymptotes of functions and use those concepts to analyze a function.	II	1		CT2			Final Exam
CLO 2	Perform and apply differentiation including implicit differentiation and rates of change.	III	2		CT 2			Final Exam
CLO 3	Find antiderivatives and apply them to indefinite integration.	IV, V	3		CT2			Final Exam
CLO 4	Calculate definite integrals and use them to solve problems involving area between curves, and other relevant applications.	V	4		CT2			Final Exam
CLO 5	Apply differentiation and integration to problems	VI	5		CT2			Final Exam

	involving exponential, trigonometric, and logarithmic functions including problems dealing with exponential growth and decay.							
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Unit Outcomes/ Competencies

I. Review and Functions.

The student should be able to:

1. Apply and graph piecewise-defined functions, the greatest integer function, and the least integer function.
2. Interpret mathematical models for real-life data.
3. Analyze composites of functions.
4. Evaluate trigonometric functions and apply trigonometric identities.
5. Determine an appropriate window on a graphing utility for a given function.

II. Limits and Continuity.

The student should be able to:

1. To find the limits of functions graphically, numerically, and analytically.
2. Evaluate one-sided limits.
3. Determine the points of continuity and discontinuity of a function.
4. Evaluate infinite limits.
5. Use limits to find vertical asymptotes of a function and to graph the function.

III. Derivatives.

The student should be able to:

1. Find the tangent line at some point on the graph of a function.
2. Find the derivative of a function.
3. Determine if a function is differentiable at some point on the graph of that function.
4. Use the derivative to determine the slope of a function at some point on its graph.
5. Use the derivative to solve problems that involve rates of change.
6. Apply the differentiation theorems.
7. Find higher-order derivatives.
8. Find derivatives by implicit differentiation.
9. Solve problems involving related rates.
10. Find the differential of a function and use differentials to make approximations.

IV. Applications of differentiation.

The student should be able to:

1. Find the relative extrema of a function.
2. Find the absolute extrema of a function on an interval.
3. Determine intervals on which a given function is increasing and decreasing.
4. Analyze the concavity of a function and determine the inflection points.
5. Evaluate limits at infinity and use them to determine any horizontal asymptotes of a function.
6. Apply the concepts of this unit to curve sketching.
7. Solve problems that involve finding the maxima and/or minima of a function.
8. Find the general antiderivative for a function.
9. Find the complete and/or particular solution to a differential equation

V. Integrals.

The student should be able to:

1. Evaluate definite integrals.
2. Find the area of a plane region by using definite integrals.
3. Evaluate Indefinite Integrals and apply the substitution method.

VI. Logarithmic, Exponential, and Other Transcendental Functions.

The student should be able to:

1. Find the derivative of logarithmic functions.
2. Evaluate integrals for which the antiderivative is a logarithmic function.
3. Evaluate derivatives and integrals of exponential functions.
4. Solve problems that involve applications of exponential and logarithmic functions.
5. Use exponential functions to model exponential growth and decay problems.

Assessment Description(s)

Each course completer will take a comprehensive final exam. For each of the learner outcomes, the instructors will select two questions from that exam that are judged to best measure that outcome. A student will be proficient on the outcome if that student correctly solves at least one of those two problems. The goal is for each outcome, at least 70% of the course completers demonstrate proficiency. .

Materials and Technological Requirements

Calculus, Single Variable, by Thomas, Weir and Haas, 13th edition together with the MyMathLab access code.
TI-84 Plus graphing calculator.

Class Attendance Policy

Students are expected to attend all classes in which they are enrolled. If a student is absent from a class session, it is the student's responsibility to make arrangements to complete or make up any work missed. No make-up work for missed classes will be allowed without the approval of the instructor. Students who enroll late must assume all responsibility for work missed. Classes not attended as a result of late enrollment may be counted toward excessive absences. Students not attending the entire class period may be counted absent for that period. An instructor may drop students with a grade of "WE" if students have been absent for an excessive number of days. Warning letters will be sent to the students advising them of the consequences of nonattendance and urging them to contact their instructors immediately. Excessive absences are defined as follows:

Regular Semester

Courses which meet once a week 2 absences
Courses that meet twice per week 3 absences
Courses that meet four times per week 5 absences

Summer Session

Courses that meet four times per week in a five week session 3 absences
Courses which meet two evenings per week in a 10 week session 3 absences

Students enrolled in special programs or individualized instruction should contact their program director/instructor regarding specific attendance requirements for the program/course. Some of the selective-admission, health-science programs have specific criteria regarding attendance. Students are encouraged to refer to program policies in these matters.

Jury Duty/Military/Official School Function

Scheduled absences are those that occur due to college-related activities or as a result of summons to jury duty or military duty. Classes missed as a result of scheduled absences will not be counted as excessive absences if the instructor is notified and provided documentation prior to the absence(s). Make-up work for scheduled absences will be at the discretion of the instructor.

In all instances, documentation must be provided to the instructor within 24 hours of receipt. Documentation should come from an appropriate party on letterhead or other official stationery with a signature and contact information. Documentation should list the corresponding dates of the leave.

Medical leave

For medical-related absences, documentation must include written notice from the treating medical professional documenting time needed off related to medical reasons and time student may resume classes. The medical reason does not need to be listed on the documentation; the documentation must include only that there is a medical reason, the amount of time the student needs to be absent, and the time the student should be able to return to classes. Students who elect to work at home while on excused leave must meet with their instructors to make arrangements to do so. Working on coursework while on medical leave is not a requirement but can be requested by students. If students request that they be allowed to work at home while on an excused leave, the instructor will make every reasonable effort to ensure that the student is able to do so.

For students who have a medical condition necessitating time off or accommodation:

- 1) They may work at home on assignments if they choose to if on medical leave approved by a medical professional
- 2) Receive appropriate accommodations related to coursework (i.e., excused from labs with potentially harmful chemicals, have a larger desk, etc.)
- 3) Resume their studies where they left off once they return to classes
- 4) Be allowed to make up any missed work related to medical leave
- 5) Receive incompletes on their transcripts until coursework is completed, according to the incomplete grade contract.

6) Be given a reasonable time frame in which to complete missed coursework

Academic Honesty Policy

Students enrolled at South Arkansas Community College are expected at all times to uphold standards of integrity. Students are expected to perform honestly and to work in every way possible to eliminate academic dishonesty. Academic dishonesty includes cheating and plagiarism, which are defined as follows:

- Cheating is an attempt to deceive the instructor in his/her effort to evaluate fairly an academic exercise. Cheating includes copying another student's homework, class work, or required project (in whole or in part) and/or presenting another's work as the student's own. Cheating also includes giving, receiving, offering, and/or soliciting information on a quiz, test, or examination.
- Plagiarism is the copying of any published work such as books, magazines, audiovisual programs, electronic media, and films or copying the theme or manuscript of another student. It is plagiarism when one uses direct quotations without proper credit or when one uses the ideas of another without giving proper credit. When three or more consecutive words are borrowed, the borrowing should be recognized by the use of quotation marks and proper parenthetical and bibliographic notations.

If, upon investigation, the instructor determines that the student is guilty of cheating or plagiarism, the following penalties will apply:

- The student will receive a penalty of no less than a zero on the work in question.
- The instructor will submit a Student Academic Misconduct Form, written report of the incident, to the appropriate dean.
- The dean will submit form to Vice President for Learning to determine disciplinary action.
- The Vice President for Learning will determine whether further disciplinary action will be taken.
- All decisions may be appealed for review through the college's academic appeals procedure.

Equal Opportunity-Affirmative Action Statement

South Arkansas Community College does not discriminate on the basis of age, race, color, creed, gender, religion, marital status, veteran's status, national origin, disability, or sexual orientation in making decisions regarding employment, student admission, or other functions, operations, or activities.

Library Services

Library Homepage: <http://southark.libguides.com/homepage> Library Contact: LibraryStaff@southark.edu or 870.864.7115

Procedures to Accommodate Students with Disabilities:

If you need reasonable accommodations because of a disability, please report this to the Vice President of Student Services with proper documentation. . VPSS Contact: 870.875.7262

The Early Alert System

In an effort to ensure student retention and success, South Arkansas Community College employs an Early Alert System to identify and support at-risk students as soon as possible in a given semester. The intent of Early Alert is to provide this assistance while there is still time to address behaviors or issues that have the potential of preventing students from completing their courses and degree plans. Students referred through the Early Alert System will be required to work on a corrective action plan with their student advising coach and to include attendance accountability and mandatory academic tutoring either in the academic division or in the Testing and Learning Center (TLC).

Once the Student Advising Coach has met with the referred student, and again when the student has met the prescribed corrective actions, the coach will update the Early Alert System so that the instructor is kept informed of the progress in resolving issues.

Behavioral Review Team

At South Arkansas Community College (SouthArk), we are committed to proactive leadership in student wellbeing and campus safety. By focusing on prevention and early intervention with campus situations that involve any person experiencing distress or engaging in harmful or disruptive behaviors, the BRT will serve as the coordinating hub of existing resources to develop intervention and support strategies and offer case management. Students, faculty, staff, and campus guests are encouraged to report any person on campus who is a concern. BRT Contact: 870.875.7262 BRT@southark.edu

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