HORRY GEORGETOWN TECHNICAL COLLEGE

INSTRUCTIONAL PACKAGE

MAT 140
Analytical Geometry and Calculus I

Effective Term
Fall 2023/Spring 2024/Summer 2024

INSTRUCTIONAL PACKAGE

Part I: Course Information

Effective Term: Fall 2023/Spring 2024/Summer 2024

COURSE PREFIX: MAT 140

COURSE TITLE: Analytical Geometry and Calculus I

CONTACT HOURS: 4.0

CREDIT HOURS: 4.0

RATIONALE FOR THE COURSE:

This four-semester hour calculus course is used primarily by colleges and universities in their engineering, science and mathematics majors. The mathematics taught in this course is the basis for at least one more calculus course and is used in statistics, physics and other specialized courses in the student's major.

COURSE DESCRIPTION:

This course includes the following topics: derivatives and integrals of polynomial, rational, logarithmic, exponential, trigonometric, and inverse trigonometric functions; curve sketching; maxima and minima of functions; related rates; work; and analytic geometry. (Prerequisite: a college algebra course and a college trigonometry course or pre-calculus) This course is transferable to public senior institutions as part of the South Carolina Commission on Higher Education Statewide Articulation Agreement.

PREREQUISITES/CO-REQUISITES:

Credit level MAT 111 Minimum Grade of C or Credit level MAT 111 Minimum Grade of TC

*__Online/Hybrid__ courses require students to complete the DLi Orientation Video prior to enrolling in an online course.

REQUIRED MATERIALS:

1. Please visit the BOOKSTORE online site for most current textbook information.

   Enter the semester, course prefix, number and section when prompted and you will be linked to the correct textbook.

2. Scientific/Graphing Calculator

TECHNICAL REQUIREMENTS:

Access to Desire2Learn (D2L), HGTC's learning management system (LMS) used for course materials.

Access to the myHGTC portal for student self-services.
College email access – this is the college's primary official form of communication.

STUDENT IDENTIFICATION VERIFICATION

Students enrolled in online courses will be required to participate in a minimum of one (1) proctored assignment and/or one (1) virtual event to support student identification verification. Please refer to your Instructor Information Sheet for information regarding this requirement.

CLASSROOM ETIQUETTE:

As a matter of courtesy to other students and your professor, please turn off cell phones and other communication/entertainment devices before class begins. If you are monitoring for an emergency, please notify your professor prior to class and switch cell phone ringers to vibrate.

NETIQUETTE: is the term commonly used to refer to conventions adopted by Internet users on the web, mailing lists, public forums, and in live chat focused on online communications etiquette. For more information regarding Netiquette expectations for distance learning courses, please visit Online Netiquette.

Part II: Student Learning Outcomes

COURSE LEARNING OUTCOMES and ASSESSMENTS*:

The student should be able to:

1. Understand and graph polynomial, rational, exponential, logarithmic, trigonometric and inverse trigonometric functions.
2. Understand and answer questions about functions and their graphs.
3. Understand composition of functions and inverse functions.
4. Find limits graphically, numerically and analytically.
5. Verify the continuity or discontinuity of a function.
6. Find derivatives of functions by use of the rules of differentiation including use of the Product Rule, Quotient Rule and the Chain Rule.
7. Find derivatives by use of implicit differentiation.
8. Find relative and absolute minima and maxima of a function & use the First Derivative Test.
9. Check the concavity of a function and find points of inflection & use the Second Derivative Test.
10. Solve optimization problems using techniques from algebra and calculus.

11. Identify indeterminate forms and use L'Hopital's Rule to evaluate them.

12. Solve related rates problems by use of differentials.

13. Find anti-derivatives and understand indefinite integration.

14. Understand and apply the Fundamental Theorem of Calculus to evaluate definite integrals.

15. Evaluate definite and indefinite integrals using the method of substitution for selected polynomial, rational, exponential, logarithmic, trigonometric and inverse trigonometric functions.

16. Estimate a propagated error using a differential.

UNIT I: Preparation & Preview for Calculus

A. Preparation for Calculus (Chapter 1)
   1. Functions and Their Graphs (1.3)
   2. Review of Trigonometric Functions (1.4)
   3. Inverse Functions (1.5)
   4. Exponential and Logarithmic Functions (1.6)

B. Limits and Their Properties (Chapter 2)
   1. A Preview of Calculus (2.1)
   2. Finding Limits Graphically and Numerically (2.2)
   3. Evaluating Limits Analytically (2.3)
   4. Continuity and One-Sided Limits (2.4)
   5. Infinite Limits (2.5)

UNIT II: Derivatives

Differentiation (Chapter 3)
1. The Derivative and the Tangent Line Problem (3.1)
2. Basic Differentiation Rules and Rates of Change (3.2)
3. Product and Quotient Rules and Higher-Order Derivatives (3.3)
4. The Chain Rule (3.4)
5. Implicit Differentiation (3.5)
6. Derivatives of Inverse Functions (3.6)
7. Related Rates (3.7)

UNIT III: Applications of Derivatives

Application of Differentiation (Chapter 4)
1. Extrema on an Interval (4.1)
2. The Mean Value Theorem (4.2)
3. Increasing and Decreasing Functions and the First Derivative Test (4.3)
4. Concavity and the Second Derivative Test (4.4)
5. Limits at Infinity (4.5)
6. Indeterminate Forms and L'Hopital's Rule (5.6)

7. A Summary of Curve Sketching (4.6)
8. Optimization Problems (4.7)
9. Differentials (4.8)

UNIT IV: Integration

Integration (Chapter 5)

1. Antiderivatives and Indefinite Integration (5.1)
2. Area (5.2)
3. Riemann Sums and Definite Integrals (5.3)
4. The Fundamental Theorem of Calculus (5.4)
5. Integration by Substitution (5.5)
6. Natural Logarithmic Function: Integration (5.7)
7. Inverse Trigonometric Functions (5.8)
8. **Hyperbolic Functions (5.9)

**As time permits.

Students – please refer to the Instructor's Course Information sheet for specific information on assessments and due dates.

General Education Outcomes

This course fulfills the following General Education Outcomes through a standardized departmental assignment. Upon completion of this course, students will be able to:
☒Communicate effectively;
☒Think critically;
☒Self and professional development.

Part III: Grading and Assessment

EVALUATION OF REQUIRED COURSE MEASURES/ARTIFACTS*

Students, for the specific number and type of evaluations, please refer to the Instructor's Course Information Sheet.

GRADING SYSTEM:

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

Grades earned in courses impact academic progression and financial aid status. Before withdrawing from a course, be sure to talk with your instructor and financial aid counselor about the implications of that course of action. Ds, Fs, Ws, WFs and Is also negatively impact academic progression and

financial aid status.

The Add/Drop Period is the first 5 days of the semester for **full term** classes. Add/Drop periods are shorter for accelerated format courses. Please refer to the academic calendar for deadlines for add/drop. You must attend at least one meeting of all of your classes during that period. If you do not, you will be dropped from the course(s) and your Financial Aid will be reduced accordingly.

Part IV: Attendance

Horry-Georgetown Technical College maintains a general attendance policy requiring students to be present for a minimum of 80 percent (80%) of their classes in order to receive credit for any course. Due to the varied nature of courses taught at the college, some faculty may require up to 90 percent (90%) attendance. Pursuant to 34 Code of Federal Regulations 228.22 - Return to Title IV Funds, once a student has missed over 20% of the course or has missed two (2) consecutive weeks, the faculty is obligated to withdraw the student and a student may not be permitted to reenroll. **Instructors define absentee limits for their class at the beginning of each term; please refer to the Instructor Course Information Sheet.**

For online and hybrid courses, check your Instructor's Course Information Sheet for any required on-site meeting times. Please note, instructors may require tests to be taken at approved testing sites, and if you use a testing center other than those provided by HGTC, the center may charge a fee for its services.

Part V: Student Resources

THE STUDENT SUCCESS AND TUTORING CENTER (SSTC):

The SSTC offers to all students the following **free** resources:

1. **Academic tutors** for most subject areas, **Writing Center support**, and **college success skills**.
2. Online **tutoring** and academic support resources.
3. Professional and interpersonal communication **coaching** in the EPIC Labs.

Visit the Student Success & Tutoring Center website for more information. To schedule tutoring, contact the SSTC at sstc@hgtc.edu or self-schedule in the Penji iOS/Android app or at www.penjiapp.com. Email sstc@hgtc.edu or call SSTC Conway, 349-7872; SSTC Grand Strand, 477-2113; and SSTC Georgetown, 520-1455, or go to the Online Resource Center to access on-demand resources.

STUDENT INFORMATION CENTER: TECH Central

TECH Central offers to all students the following free resources:

1. **Getting around HGTC**: General information and guidance for enrollment, financial aid, registration, and payment plan support!
2. Use the Online Resource Center (ORC) including Office 365 support, password resets, and username information.
3. **In-person workshops, online tutorials and more services** are available in Desire2Learn, Student Portal, Degree Works, and Office 365.
4. **Chat with our staff on TECH Talk**, our live chat service. TECH Talk can be accessed on the student portal and on TECH Central's website, or by texting questions to (843) 375-8552.

Visit the Tech Central website for more information. Live Chat and Center locations are posted on the website. Or please call (843) 349 – TECH (8324), Option #1.

HGTC LIBRARY:

Each campus location has a library where HGTC students, faculty, and staff may check out materials with their HGTC ID. All three HGTC campus libraries are equipped with computers to support academic research and related school work; printing is available as well. Visit the Library website for more information or call (843) 349-5268.

STUDENT TESTING:

Testing in an **online/hybrid** course and in **make-up** exam situations may be accomplished in a variety of ways:

- Test administered within D2L
- Test administered in writing on paper
- Test administered through Publisher Platforms (which may have a fee associated with the usage)

Furthermore, tests may have time limits and/or require a proctor.

Proctoring can be accomplished either face-to-face at an approved site or online through our online proctoring service. To find out more about proctoring services, please visit the Online Testing section of the HGTC's Testing Center webpage.

The **Instructor Information Sheet** will have more details on test requirements for your course.

DISABILITY SERVICES:

HGTC is committed to providing an accessible environment for students with disabilities. Inquiries may be directed to HGTC's Accessibility and Disability Service webpage. The Accessibility and Disability staff will review documentation of the student's disability and, in a confidential setting with the student, develop an educational accommodation plan.

Note: It is the student's responsibility to self-identify as needing accommodations and to provide acceptable documentation. After a student has self-identified and submitted documentation of a disability, accommodations may be determined, accepted, and provided.

STATEMENT OF EQUAL OPPORTUNITY/NON-DISCRIMINATION STATEMENT:

Horry-Georgetown Technical College prohibits discrimination and harassment, including sexual harassment and abuse, on the basis of race, color, sex, national or ethnic origin, age, religion, disability, marital or family status, veteran status, political ideas, sexual orientation, gender identity, or pregnancy, childbirth, or related medical conditions, including, but not limited to, lactation in educational programs and/or activities.

TITLE IX REQUIREMENTS:

All students (as well as other persons) at Horry-Georgetown Technical College are protected by Title IX—regardless of their sex, sexual orientation, gender identity, part- or full-time status, disability, race, or national origin—in all aspects of educational programs and activities. Any student, or other member of the college community, who believes that he/she is or has been a victim of sexual harassment or sexual violence may file a report with the college's Chief Student Services Officer, campus law enforcement, or with the college's Title IX Coordinator or designee.

> *Faculty and Staff are required to report incidents to the Title IX Coordinators when involving students. The only HGTC employees exempt from mandatory reporting are licensed mental health professionals (only as part of their job description such as counseling services).

INQUIRIES REGARDING THE NON-DISCRIMINATION/TITLE IX POLICIES:

Student and prospective student inquiries concerning Section 504, Title II, Title VII, and Title IX and their application to the College or any student decision may be directed to the Vice President for Student Affairs.

Dr. Melissa Batten, VP Student Affairs
Title IX, Section 504, and Title II Coordinator
Building 1100, Room 107A, Conway Campus
PO Box 261966, Conway, SC 29528-6066
843-349-5228
Melissa.Batten@hgtc.edu

Employee and applicant inquiries concerning Section 504, Title II, and Title IX and their application to the College may be directed to the Vice President for Human Resources.

Jacquelyne Snyder, VP Human Resources
Affirmative Action/Equal Opportunity Officer and Title IX Coordinator
Building 200, Room 205B, Conway Campus
PO Box 261966, Conway, SC 29528-6066
843-349-5212
Jacquelyne.Snyder@hgtc.edu