HORRY GEORGETOWN TECHNICAL COLLEGE

INSTRUCTIONAL PACKAGE

MAT 240

Analytical Geometry and Calculus III

Effective Term
2018—2019 Academic Year

INSTRUCTIONAL PACKAGE

PART I: COURSE INFORMATION

Effective Term: 2018—2019 Academic Year

COURSE PREFIX: MAT 240

COURSE TITLE: Analytical Geometry and Calculus III

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 a continuation and furtherance of concepts learned in a typical Calculus I/Calculus II sequence, and is used in statistics, physics and other specialized courses in the student's major.

COURSE DESCRIPTION:
This course includes the following topics: multivariable calculus, including vectors; partial derivatives and their applications to maximum and minimum problems with and without constraints; line integrals; multiple integrals in rectangular and other coordinates; and stokes' and green's theorems. (Prerequisite: Analytical Geometry and Calculus II) 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 141 Minimum Grade of C or Credit level MAT 141 Minimum Grade of TC)

*__Online/Hybrid__ courses require students to complete the DLi Online Student Orientation prior to completing an online course. The DLi Online Student Orientation can be found in WaveNet, under the My Student tab.

REQUIRED MATERIALS:

1. Please visit the Bookstore online site for most current textbook information. Use the direct link below to find textbooks.
   BOOKSTORE.

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

2. Scientific/Graphing Calculator.

ENTRY LEVEL COMPETENCIES:

1. Find derivatives and antiderivatives of algebraic and transcendental functions.
2. Evaluate definite integrals of algebraic and transcendental functions.
3. Determine whether a given infinite series is convergent or divergent, and find power series representations of functions.
4. Understand the use of calculus concepts in parametric and polar form.

TECHNICAL REQUIREMENTS:
Access to Desire2Learn (D2L), HGTC's student portal for course materials.
WaveNet and D2L email access.

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 the concept of vectors in the plane and perform vector operations.
2. Understand the three-dimensional coordinate system and the concept of vectors in space.
3. Find the dot product of two vectors and understand properties of the dot product.
4. Find the cross product of two vectors.
5. Find equations of lines, planes and surfaces in space.
6. Understand and apply cylindrical and spherical coordinates to represent surfaces in space.
7. Understand the definition of vector-valued functions, the definition of continuity of vector-valued functions, and find limits of vector-valued functions.
8. Find derivatives and indefinite integrals of vector-valued functions.
9. Use vector-valued functions to determine the velocity and acceleration of a moving object.
10. Find tangent and normal vectors.
11. Understand the definition of and notation for multivariate functions.
12. Investigate the continuity of and evaluate limits for multivariate functions.
13. Find partial derivatives.
14. Find and apply directional derivatives and gradients.
15. Find equations of normal lines and tangent planes.
16. Find absolute and relative maximum and minimum values of functions of two variables, and use these skills to solve optimization problems.
17. Use Lagrange multipliers to solve optimization problems with constraints.
18. Find iterated and double integrals, in both rectangular and polar form, and apply them to determine areas and volumes.
19. Find triple integrals, in rectangular, cylindrical and spherical coordinates.

20. Understand and apply the concepts of vector fields, and the curl and divergence of vector fields.
21. Evaluate line integrals.
22. Apply the Fundamental Theorem of Line Integrals.
23. Understand and apply Green's Theorem.
24. Understand the parametrization of surfaces, and evaluate surface integrals.
25. Understand and apply the Divergence Theorem.
26. Understand and apply Stokes's Theorem.

UNIT I: Vectors and the Geometry of Space

Vectors and the Geometry of Space (Chapter 11)

1. Vectors in the Plane (11.1)
2. Space Coordinates and Vectors in Space (11.2)
3. The Dot Product of Two Vectors (11.3)
4. The Cross Product of Two Vectors in Space (11.4)
5. Lines and Planes in Space (11.5)
6. Surfaces in Space (11.6)
7. Cylindrical and Spherical Coordinates (11.7)

UNIT II: Vector-Valued Functions

Vector-Valued Functions (Chapter 12)

1. Vector-Valued Functions (12.1)
2. Differentiation and Integration of Vector-Valued Functions (12.2)
3. Velocity and Acceleration (12.3)
4. Tangent Vectors and Normal Vectors (12.4)
5. Arc Length and Curvature (12.5)**

UNIT III: Functions of Several Variables

Functions of Several Variables (Chapter 13)

1. Introduction to Functions of Several Variables (13.1)
2. Limits and Continuity (13.2)
3. Partial Derivatives (13.3)
4. Differentials (13.4)**
5. Chain Rules for Functions of Several Variables (13.5)
6. Directional Derivatives and Gradients (13.6)
7. Tangent Planes and Normal Lines (13.7)
8. Extrema of Functions of Two Variables (13.8)
9. Applications of Extrema (13.9)
10. Lagrange Multipliers (13.10)

UNIT IV: Multiple Integration

Multiple Integration (Chapter 14)

1. Iterated Integrals and Area in the Plane (14.1)
2. Double Integrals and Volume (14.2)
3. Change of Variables: Polar Coordinates (14.3)
4. Center of Mass and Moments of Inertia (14.4)**
5. Surface Area (14.5)**
6. Triple Integrals and Applications (14.6)
7. Triple Integrals in Other Coordinates (14.7)
8. Change of Variables: Jacobians (14.8)**

UNIT V: Vector Analysis

Vector Analysis (Chapter 15)

1. Vector Fields (15.1)
2. Line Integrals (15.2)
3. Conservative Vector Fields and Independence of Path (15.3)
4. Green's Theorem (15.4)
5. Parametric Surface (15.5)
6. Surface Integrals (15.6)
7. Divergence Theorem (15.7)
8. Stokes's Theorem (15.8)

**AS TIME PERMITS

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

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 (ACADEMIC CALENDAR). 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 eighty percent (80%) of his or her classes in order to be eligible to receive credit for any course. However, due to the varied nature of courses taught at the College, a more rigid attendance policy may be required by individual instructors. At a minimum, a student may be withdrawn from a course(s) after he or she has been absent in excess of ten percent (10%) of the total contact hours for a course. Additionally, students will be withdrawn if they miss more than two weeks of consecutive class meetings. **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, 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 coaches** for most subject areas, **Writing Center Support**, and **college success skills.**
2. **On-line student success and academic support resources.**

Visit the SSTC website: Student Success & Tutoring Center and visit the student services tab in your WaveNet account to schedule appointments using TutorTrac. For more information, call: SSTC Conway, 349-7872; SSTC Grand Strand, 477-2113; and SSTC Georgetown, 520-1455. Room locations and Live Chat is available on the SSTC website.

Student Information Center: WaveNet Central (WNC)

WNC offers to all students the following **free** resources:

1. **Getting around HGTC**: General information and guidance for enrollment!
2. Use the **Online Resource Center (ORC)** for COMPASS support, technology education, and online tools.
3. **Drop-in technology support or scheduled training** in the Center or in class.
4. **In-person workshops, online tutorials and more services** are available.

Visit the WNC website: Wavenet Central. Live Chat and Center locations are posted on the website. Or please call one of the following locations: WNC Conway, 349-5182; WNC Grand Strand, 477-2076; and WNC Georgetown, 520-1473.

Student Testing

Testing in an **online/hybrid** course may be accomplished in a variety of ways:

- Test administered within D2L
- Test administered in writing on paper
- Test administered through Publisher Platforms

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 RPNow, 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 Jocelyn Williams, Director of Student Development on the Conway Campus Jaime Davis, Counselor/Advisor on the Georgetown Campus or Kristin Griffin, Counselor on the Grand Strand Campus. These individuals 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, gender, national or ethnic origin, age, religion, disability, marital status, veteran status, sexual orientation, gender identity, or pregnancy in educational programs and/or activities.

Title IX Requirements

Horry Georgetown Technical College prohibits the offenses of domestic violence, dating violence, sexual assault, and stalking. Any student who believe he or she has experienced or witnessed discrimination including sexual harassment, domestic violence, dating violence, sexual assault or stalking is encouraged to report such incidents to one of the College's Title IX Coordinators.

> *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 policies:	
Student and prospective student inquiries concerning Section 504, Title II, and Title IX and their application to the College or any student decision may be directed to the Associate Vice President for Student Affairs.	Employee and applicant inquiries concerning Section 504, Title II, and Title IX and their application to the College may be directed to the Associate Vice President for Human Resources.
Dr. Melissa Batten, AVP Student Affairs *Title IX Coordinator* Building 1100, Room 107A, Conway Campus PO Box 261966, Conway, SC 29528-6066 843-349-5228 Melissa.Batten@hgtc.edu	**Jacquelyne Snyder, AVP Human Resources** *Section 504, Title II, and Title IX Coordinator* Building 200, Room 212A, Conway Campus PO Box 261966, Conway, SC 29528-6066 843-349-5212 Jacquelyne.Snyder@hgtc.edu