

Hudson County Community College STEM Course Syllabus

COURSE: MAT-211-01

COURSE TITLE: Calculus III

CREDIT: 4

INSTRUCTOR _____

TERM: _____

DAY(S) AND TIME(S): _____

LOCATION: _____

OFFICE HOURS: _____

OFF. LOCATION: _____

EMAIL: _____

TELEPHONE: _____

COURSE DESCRIPTION: This course considers the limits, continuity, theory, and techniques of differentiation and integration, with applications of both processes to science/engineering. The use of mathematical software in problem-solving is emphasized.

COURSE PREREQUISITE: MAT 111.

STUDENT LEARNING OUTCOMES

Upon successfully completing this course, students will be able to

- Graph parametric equations
- Use Time as parameter in parametric equations
- Convert rectangular equation to parametric equations
- Find Equation of the tangent line at a point on a plane curve and arc length of a plane curve or a curve represented by polar equations
- Convert between rectangular and polar coordinates
- Identify and graph polar equations
- Use properties of vectors
- Find the scalar and vector product of vectors
- Find the angle between two vectors and the projection of vectors
- Find the vector equation and parametric equations of a line in Space

- Determine whether two lines are skew, parallel or intersecting.
- Find an equation of a plane
- Determine whether two planes are intersecting or parallel.
- Find the distance between two points
- Analyze a vector function: domain, graph, limits, continuity, derivatives
- Find the unit tangent vector, the principal unit normal vector of a smooth curve
- Find the arc length of a curve traced out by a vector function
- Find the curvature of a plane curve given by
- Find an osculating circle
- Find the velocity, acceleration, and speed of a moving particle
- Express the acceleration vector using tangential and normal components
- Work with functions of several variables : level curves, level surfaces, limits and continuity, partial derivatives, second order derivatives
 - Interpret partial derivatives as a rate of change
 - Find the change in
 - Find the differential of a function of three or more variables
 - Find the directional derivatives and Gradient of a function of three variables
- Find a tangent plane to a surface
- Find a normal line to tangent plane
- Find Critical Points , the absolute extrema of two variables and apply to solving optimization problems
- Find Riemann sums of f over closed defined on a closed rectangular region
- Find the volume under a surface and over a rectangular region.
- Use Fubini's theorem for x- and y- simple regions
- Apply properties of double integrals and Find areas and volumes.
- Find double integrals using polar coordinates
- Find Area and volume using polar coordinates
- Find surface areas above a region R.
- Find Triple integrals over closed region and more general solid
- Find the volume of a solid
- Find triple integrals over xy-simple and yz-simple solids.
- Find triple integrals using cylindrical and spherical coordinates.
- Describe a vector field

- Define a line integral in the plane and determine its value along a smooth curve
- Find integrals of the form $\int_C \mathbf{F} \cdot d\mathbf{r}$ and $\int_C \mathbf{F} \cdot \mathbf{n} \, ds$
- Find line integrals along a piece-smooth curve and in space
- Familiar with a conservative vectors and its potential function
- Use the fundamental theorem of Line integrals
- Reconstruct a function from its gradient: Finding the potential function for a conservative field
- Use Green's theorem to find a line integral
- Use Green's theorem to find area
- Use Green's theorem with multiply-connected Regions.
- Describe surfaces parametrically
- Find parametric representation of a surface
- Find equations for a tangent plane and a normal line
- Find the surface area of a parametrized surface
- Find the surface integrals using double integral
- Determine the orientation of a surface
- Find the flux of a vector field across a surface application: Electric Flux
- Find the divergence of a vector field
- Use the divergence theorem
- Interpret the divergence of
- Find the Curl of
- Verify Stokes' theorem
- Use Stokes' theorem to find an integral
- Use Stokes' theorem with conservative vector fields
- Interpret the Curl of

TEXTBOOK & SUPPLEMENTAL MATERIALS

Textbook: Calculus, Early Transcendental functions, 6th edition,

Author: Larson, Bruce Edwards

ISBN: 978-1-285-77478-7

Supplemental Materials:

- **The online home work is obligatory, and due by the next class meeting.**
- **Students are required to purchase the access code. Codes are available at the bookstore.**

if there are supplemental materials required, you may list them here. Please also indicate how students should acquire these materials, as they will not be in the bookstore.

Book Purchase: *Your policy for the purchase of textbooks goes here. Here is an example of such a policy:*

Since we use these books extensively in and out of the class, you **must buy** them before our second meeting. In case you need to wait for the book voucher, it is your responsibility to find a way to make copies of the readings assigned from the books. Any student who has true financial need is eligible to apply for a book scholarship through the Office of the Dean of Students located at 70 Sip Avenue.

ATTENDANCE

Your attendance policy goes here. For your reference, the college policy is generally that a student may fail a course due to lack of attendance if s/he missed more than 6 hours of instructional time for a 3-credit course. You can choose to follow this policy or create your own.

GRADING POLICY

BREAKDOWN OF GRADING:

3 class Exam: ----- 70%

Final Exam: -----30%

The grade scale for this class will be as follows:

This is a sample grading scale. You may adjust (within reason) to your own policy regarding grading. Note: At HCCC, we do not have a grade of C-.

100 – 94 = A

93 – 90 = A-

79—77 = C+

89 - 87 = B+

76—70 = C

86—84 = B

69—60 = D

83—80 = B-

Below 60 = F

CELL PHONE USE POLICY

Please put your policy for the use of cell phones here. The policy may vary from forbidding phone use to the active use of the phone in class. Please be aware that some students may need an exception to the policy, for example if they have small children at home or a sick relative and may need to be notified in the event of an emergency.

Mandatory Use of HCCC Email Address

Members of the HCCC community are required to check their official HCCC email address in order to stay current with College and course communications. All college business communication between faculty, students, and staff must be sent via an official HCCC email address. If an employee or student elects to forward or link his/her HCCC email to a separate and private account, that individual remains responsible for all material transmitted to that account. Employees of HCCC shall not be responsible for any material that remains undelivered, due to defects in the private non-HCCC accounts. Failure in the operations of private email accounts shall not be cause for excuse from communications between the student and the employee. Students that encounter difficulty with HCCC email should view the FAQ's section on the Portal.

INCOMPLETE

An INCOMPLETE grade for the course is given under specific conditions when a student, because of serious and unexpected reasons, cannot complete the requirements of the course. For example, if a student did not attend the final because of illness his or her excuse must be verified by a physician. Other absences from other assigned activities must be made up at another appointed time. To arrange for an incomplete grade, the student must see the instructor before final exam, so proper documentations could established and submitted to Division and The office of Academic Affairs.

Disability Support Services:

Students with disabilities who believe that they might need accommodations in this class are encouraged to contact Disability Support Services at (201) 360-4157, as soon as possible to better ensure that such accommodations are implemented in a timely fashion. All disabilities must be documented by a qualified professional such as a Physician, Licensed Learning Disabilities Teacher Consultant (LDTC), Psychiatrist, Psychologist, Psychiatric Nurse, Licensed Social Worker or Licensed Professional Counselor, who is qualified to assess the disability that the student claims to have and make recommendations on accommodations for the student. All information provided to the Disability Support Services Program will be confidential between the program, professors involved with the student and individual student.

ACADEMIC INTEGRITY

Academic Integrity Standards

Academic integrity is central to the pursuit of education. For students at HCCC, this means maintaining the highest ethical standards in completing their academic work. In doing so, students *earn* college credits by their honest efforts. When they are awarded a certificate or degree, they have attained a goal representing genuine achievement and can reflect with pride on their accomplishment. This is what gives college education its essential value.

Violations of the principle of academic integrity include:

- Cheating on exams.
- Reporting false research data or experimental results.
- Allowing other students to copy one's work to submit to instructors.

- Communicating the contents of an exam to other students who will be taking the same test.
- Submitting the same project in more than one course, without discussing this first with instructors.
- Submitting *plagiarized* work. *Plagiarism* is the use of another writer's words or ideas without properly crediting that person. This unacknowledged use may be from published books or articles, the Internet, or another student's work.

Violations of Academic Integrity

When students act dishonestly in meeting their course requirements, they lower the value of education for all students. Students who violate the college's policy on academic integrity are subject to failing grades on exams or projects, or for the entire course. In some cases, serious or repeated instances of academic integrity violations may warrant further disciplinary action.

Detailed information on the College's Academic Integrity policy may be found in the *HCCC Student Handbook*. The handbook also contains useful information for students on completing research projects and avoiding plagiarism.

Your personal policy for a violation of the College's academic integrity policy go here. You must include this information for your students.

OTHER

Any other information, policies, etc. that you feel a student needs to know can go here

TENTATIVE COURSE SCHEDULE

Week	Section number	Section name	Homework
Week 1	10.2	Plane Curve and Parametric equations	1, 3, 5, 13,15,17,31,57,59, 61, 63 ,79,
Week 1	10.4	Parametric equations and Calculus	1, 3, 5, 7,9, 11,13,14,45,47,49,
Week 1	10.4	Polar Coordinates and Polar Graphs	1, 3, 7,3,33, 37,39,43, 49,51,23,27,31,77.79, 83, 85,87,104,105,107,109
Week 2	10.5	Area and Arc length in Polar coordinates	1, 3,5, 9,11,13,15, 17,19, 21,29,33,35,37,39,41,45,47,
Week 2	11.1	Vectors in the Plane	5, 7,9,11, 13,49,51,53,61, 63,67, 71,87, 89,91, 93,95,
Week 2	11.2	Space coordinates and Vectors in space	1,3,5,7,9,11,15,19,21,27,29,41,43,49,51,53,55,57,59,61,63, 65,67,71,75,65,67,91,92,99,1100,03,104
Week 3	11.3	The Dot product	1,3,5,9,12,13,17,19,23,25,27,35, 37,59,61,63,
		Exam 1	

Week 3	11.4	The Cross product of two vectors in Space	1,2,3,5,7,9,11,13,15,21,23,25,27,29,31,37,39,33,35,37,39,41,43,45,47,47,1,53,55,59,79,85,89,91,93,102,107,108,109,110,111,112,113,114,
Week 3	11.5	Lines and Planes in space	1-6,7,11,13,21,35,37,39,41,43,47,51,53,
Week 4	11.6	Surface in space in space	1,3,5,7,11,13,15,17,19,21,23,25,27,31,33,63,65,67,71,73,75,91,93,95,97,101,103,105,107,109,
Week 4	11.7	Cylindrical and spherical coordinates	1,3,5,7,9,11,13,15,17,19,21,23,25,27,29,31,33,49,41,53,57-62,35,37,39,63,65,67,71,73,75,77,83,85,87,91,93,99-104
Week 4	12.1	Vector Valued functions	1,3,5,7,9,11,13,15,19—22,23,27,31,
Week 5	12.3	Velocity and acceleration	1,3,5,7,9,11,13,15,17,19,31,33,37,25,27,43,47,49,51,53,55,
Week 5	12.4	Tangent vectors and normal vectors curvature	1,3,5,7,9,11,13,15,29,31,37,39,41,51,53,55,49,69,71,
Week 5	12.5	Arc length and Curvature	3,5,9,11,13,29,31,33,37,39,49,51,55,67,73,79,91,93,83,91,93,
Week 6	13.1	Introduction to functions of several variables	1,2,3,5,7,9,11,13,15,17,23,25,27,29,31,45—48,47,49,51,53,78.
Week 6	13.2	Limits and continuity	23,25,27,29,321,33,35,37,38,39,40,41,42,69—72,73,74
		Exam 2	
Week 7	13.3	Partial Derivatives	7—38,51,53,55,59,51,63,65,67,69,83,87,89,112,113
Week 7	13.4	Differentials'	
Week 7	13.5	Chaine Rules for Functions of several variables	1,3,5,7,13,15,36,32,33,35,38,39,43,1,3,5,7,9,11,13,15,41,49,51,53,55
Week 8	13.6	Directional derivatives and gradient	1,3,5,7,9,11,13,15,17,27,29,31,37,39,40,43,46,69--73,
Week 8	13.7	Tangent Planes and normal lines n	1,3,5,7,9,11,13,15,17,19,31,33,35,37,39,41,43,45,49,51,
Week 8	13.8	Extrema of Functions of two variables	1,3,5,7,9,11,13,15,17,19,17,41,43,45,47,
Week 9	14.1	Iterated integrals and Area in The Plane	: 1,2,3,4,5,6,7,8....63,
Week 9	14.2	Double integrals	1,2,3,4,5,6,7...55
Week 9	14.3	Change of Variables: Polar Coordinates	1,2,3,4,5,6,7.....43,
Week 11	14.5	Surface Area	1,2,3,4,5,6,7....13

Week Week10	14.6	Triple integrals and Applications	1,3,5,7,11,12,13,14,15,15,25,27,6,17,18,19,21,22,23,24,25,27,29,31,33,39,41,
Week10	14.7	Triple integrals in Other Coordinates	1,3,5,9,13,15,17,
		Exam 3	
Week 11	15.1	Vector Field	1—4,15,17,23,33,37,41,43,45,47,49,51,53,57—60,63,
Week11	15.2	Line integrals	1—5,15,17,7,9,11,13,19,23,25,27,29,41,42,55,57,59
Week12	15.3	Conservative vector fields	1,3,5,9,7,9,15,17,19,21,23,25,27,29,35,43,
Week12	15.4	Greens theorem	1,3,5,7,9,13,15,17,19,21,23,33,35,41,45,47,
Week13	15.5	Parametric Surfaces	1,3,5,13,17,21,23,25,27,39,31,43,37,51,17,19,29,31,
Week 13	15.6	Surface integrals	1,3,5,7,9,11,17
Week14	15.7	Divergence theorem	5,7,9,11,13,15
Week 14	15.8	Stokes's theorem	5,7,9,11,13,15,17
Week 15		Final exam	