Class Syllabus / Policy for Fall 2021
MTH 3315 Section 001: Multivariable Calculus

Name: Dr. Nicholas Long
Department: Mathematics & Statistics
Email: longne@sfasu.edu
Website: http://www.faculty.sfasu.edu/longne/
Phone: 936-468-1822
Office: Math 308
Office Hours: Monday from 1-2 PM, Wednesday from 9:30-10:30, Thursday from 9-10 AM or by appointment (This means you need to meet with me when you have a question)

Class meeting time and place: Mondays, Wednesdays, and Fridays from 11:00 - 11:50 AM in Math 212 and on Thursdays from 11:00-12:15 in Math 212
Final Exam: Tuesday December 7th from 10:30 AM to 12:30 PM

EXPECTATIONS AND ASSESSMENT

To succeed in this class, you are expected to develop two kinds of skills simultaneously: computational facility and conceptual understanding. Both are essential to mastery. You will also work to improve your communication skills—with each other, with me, and with the rest of the world.

Daily work

Multivariable calculus has a plethora of interrelated skills. Not all of them are complicated— in fact, many are quite simple computationally—but they form a network of ideas that has profound implications and enables powerful analysis. The best way to master this network is through daily practice.

Reading/Viewing VR Lessons: Most days, you will be expected to read a section of the textbook or watch a VR lesson before coming to class. This will be your primary first exposure to new material. Most of class time will NOT be spent on lecture.

Discussion and presentation: Instead of lecture, collaboration and problem-solving will occupy around half of our meeting time. You will be given one or more questions to address, and we will discuss different approaches to answering these questions developed within the class. This will allow me to answer the questions that you have (individual and as a group).

Geometry Assignments: We will have assignments focused on drawing and explaining the geometric elements of this course. These geometric assignments will be graded as either satisfactory or unsatisfactory. For most geometry assignments, there is a way to do a makeup or redo assignment. Successful completion of the follow-up assignment will change your unsatisfactory to satisfactory for that week. Some Geometry Assignments will count as more than one point of credit (think small project assignment rather than homework assignment).

Programming/Visualization in Sage, CalcPlot3D, and CalcVR: Computer literacy is a crucial skill in today’s world. The computational and graphing capabilities of modern computers also make it easier to explore complex mathematical ideas without always getting bogged down in calculation. We will also be using the visualization software CalcPlot3D and occasionally Desmos. Some of you are familiar
with Sage and we will use that in various capacities throughout the course to help with both calculations and visualizations. We will be using CalcVR throughout the course since it offers an actual 3D visual.

**Content Quizzes:** We will have in-class quizzes which will be your first attempt at each Content Standard.

**Exams:** There will be four in-class exams during the semester. On these exams, you will not receive a grade but rather you will have your second possible assessment on the standards covered since the previous exam.

**Reassessments:** After a standard has been assessed on an exam, if you wish to have a reassessment in order to improve your score, contact me to arrange a time. You will need to let me know ahead of time which standard you wish to have reassessed. I will reassess up to two standards per student per week pending a reassessment ticket being approved by me.

**WebWork HW:** You will have online homework available for you to practice but the WebWork scores will not be a formal part of your grade. You can log into the course at [https://webwork.sfasu.edu/webwork2/MATH3315-Fall2021/](https://webwork.sfasu.edu/webwork2/MATH3315-Fall2021/).

**Standards Based Grading**

Grading will be based on a collection of standards, not on points or percentages. Each standard reflects a skill or related set of skills you are expected to master for this class. My hope is that this method of grading, called standards-based grading (SBG), will keep you clearly informed as to the expectations of the class and how well you are meeting them, while also removing the (often distracting) elements of linear grading that uses letters or total points. Learning is not always a straightforward process, and part of the purpose of SBG is to give you as many opportunities as possible to demonstrate your understanding. I will be glad to do everything I can to help you towards your goal of mastery. If you have questions or concerns at any time, please feel free to discuss them with me.

**Content standards:** A full list of the standards appears later in this syllabus. They are listed approximately in the chronological order we will cover them. Each standard represents one to three days of classwork.

- To **COMPLETE** a Standard, one must earn a Satisfactory (S) grade on that Content Standard during a quiz, exam, or reassessment.

- To **MASTER** a Standard, a second grade of Satisfactory (S) must be earned on that same Content Standard during a quiz, exam, or reassessment.

On quizzes, exams, or reassessments, Standards will also be graded either Satisfactory (S), Progressing (P), or Incomplete (I) based on the following general criteria.
Mark: Description:

S  The submission gives complete, clearly-written, and well-reasoned responses. The solution is organized in a thoughtful manner and the mathematics is correct, with few minor errors which do not call into question your understanding of concepts.

P  The submission is complete, neatly written up, and partial understanding of concepts is evident, but there are issues in the writing, mathematics, or reasoning that require revision.

I  The submission has significant omissions or widespread issues so that not enough information is present to determine whether there is adequate understanding.

You will always have opportunities to show improvement, until the end of the course. Do not put off learning the material, however; later skills depend on earlier ones, and it will be hard to catch up if you fall too far behind.

<table>
<thead>
<tr>
<th>Semester Grade &gt;&gt;&gt;&gt;&gt;&gt;&gt;&gt;&gt;&gt;&gt;&gt;&gt;&gt;&gt;</th>
<th>D</th>
<th>C</th>
<th>B</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standards Assessments:</td>
<td>Complete on at least 13 Standards</td>
<td>Complete on at least 14 Standards AND Mastery on at least 4 Standards</td>
<td>Complete on at least 16 standards AND Mastery on at least 7 Standards</td>
<td>Complete on at least 19 AND Mastery on at least 10 of standards</td>
</tr>
<tr>
<td>Geometry Assignments:</td>
<td>50% credit for the semester</td>
<td>60% credit for the semester</td>
<td>70% credit for the semester</td>
<td>80% credit for the semester</td>
</tr>
<tr>
<td>Homework: Between most class meetings, you will be asked to write up one or two problems. These assignments will both preview new ideas and act as follow-up on other topics. These homework assignments will NOT be graded for correctness, but</td>
<td>50% of the Homework assignments are Complete</td>
<td>60% of the Homework assignments are Complete</td>
<td>70% of the Homework assignments are Complete</td>
<td>80% of the Homework assignments are Complete</td>
</tr>
</tbody>
</table>
rather whether I think an adequate attempt was made on the problem. These write-ups are supposed to give me another way to give you individual feedback on your work and ideas.

At this point it should be clear how you can improve your grade at any time during the semester: *improve your scores on the standards!* Higher levels on a standard do not just indicate more *work* that is done, but a fuller *understanding* of the ideas of the course and how to apply them.

Course and Attendance Policies:

- Exam makeups must be approved **beforehand** with documentation of a valid university sanctioned excuse. Quizzes generally will not be allowed to be made up since there is a way to replace the chance at a standard with reassessments.
- Make sure you regularly check on d2l for any changes in due dates. I reserve the right to change dates based on our progress in class. Usually, this will mean allowing more time, not less.
- Bring your university ID card to all exams.
- Arrive on time (early) and prepared to participate in class. While attendance is not a calculated part of your grade, it is expected that you attend every class meeting that is possible and work with Dr. Long to ensure you are up to date in your work for the course.
- **DO NOT** use your cell phone in class. This especially includes texting. Phones should be set to silent mode and put away during class time. **I will confiscate your cell phone for the duration of the class period if I see you use it during class.** You may **NOT** use your cell phone as a clock or calculator on quizzes or exams.

*Per SFA policy 5.4, the schedule should reflect that there is (1) an amount of student work per credit hour that reasonably approximates not less than one hour of class or direct faculty instruction and two hours of out-of-class student work per week for fifteen weeks over a long semester, or the equivalent amount of work over a different amount of time; or (2) at least an equivalent amount of work as outlined in item 1 above for other academic activities as established by the institution including laboratory work, internships, practica, studio work, and other academic work leading to the award of credit hours. So, for instance, a 3 credit hour face-to-face course in the fall or spring term should approximate 150 minutes of classroom time and at least 6 hours of out-of-class work per week for fifteen weeks.*

*For this course, we have 225 minutes of classroom time each week AND approximately 8 hours of out-of-class work per week.*

*For Learning Outcomes in this course see* [http://www2.sfasu.edu/math/docs/syllabi/MATH3315Syllabus.pdf](http://www2.sfasu.edu/math/docs/syllabi/MATH3315Syllabus.pdf)

**Academic Integrity**

Academic integrity is a responsibility of all university faculty and students. Faculty members promote academic integrity in multiple ways including instruction on the components of academic honesty, as well as abiding by university policy on penalties for cheating and plagiarism.

The penalty for a student found cheating on any part of an assignment, quiz, or exam in this class will
range from a grade of zero on the work to a grade of F in the course, and may result in additional, more severe disciplinary measures. A student who allows another to copy his work and the student copying the work are both guilty of cheating. Do your own work. Do not show your completed work to others. Do not allow others to copy your work.

Definition of Academic Dishonesty (SFA policy 4.1):
Academic dishonesty includes both cheating and plagiarism. Cheating includes, but is not limited to:
• using or attempting to use unauthorized materials on any class assignment or exam;
• falsifying or inventing of any information, including citations, on an assignment;
• helping or attempting to help other student(s) in an act of cheating or plagiarism.

Plagiarism is presenting the words or ideas of another person as if they were one’s own. Examples of plagiarism include, but are not limited to:
• submitting an assignment as one’s own work when it is at least partly the work of another person;
• submitting a work that has been purchased or otherwise obtained from the Internet or another source;
• incorporating the words or ideas of an author into one's paper or presentation without giving the author credit.

Withheld Grades Semester Grades (SFA Policy 5.5)
Ordinarily, at the discretion of the instructor of record and with the approval of the academic chair/director, a grade of WH will be assigned only if the student cannot complete the course work because of unavoidable circumstances. Students must complete the work within one calendar year from the end of the semester in which they receive a WH, or the grade automatically becomes an F. If students register for the same course in future terms the WH will automatically become an F and will be counted as a repeated course for the purpose of computing the grade point average. The circumstances precipitating the request must have occurred after the last day in which a student could withdraw from a course. Students requesting a WH must be passing the course with a minimum projected grade of C.

Students with Disabilities
To obtain disability related accommodations, alternate formats and/or auxiliary aids, students with disabilities must contact the Office of Disability Services (ODS), Human Services Building, and Room 325, 468-3004 / 468-1004 (TDD) as early as possible in the semester. Once verified, ODS will notify the course instructor and outline the accommodation and/or auxiliary aids to be provided. Failure to request services in a timely manner may delay your accommodations. For additional information, go to http://www.sfasu.edu/disabilityservices.

SFASU Mental Health Statement: SFASU values students’ mental health and the role it plays in academic and overall student success. SFA provides a variety of resources to support students mental health and wellness. Many of these resources are free, and all of them are confidential.

On-campus Resources:
SFASU Counseling Services
www.sfasu.edu/counselingservices
3rd Floor Rusk Building
936-468-2401

SFASU Human Services Counseling Clinic
Crisis Resources:
Burke 24-hour crisis line 1(800) 392-8343
Suicide Prevention Lifeline 1(800) 273-TALK (8255)
Crisis Text Line: Text HELLO to 741-741

Acceptable Student Behavior
Classroom behavior should not interfere with the instructor’s ability to conduct the class or the ability of other students to learn from the instructional program (see the Student Conduct Code, policy 10.4). Unacceptable or disruptive behavior will not be tolerated. Students who disrupt the learning environment may be asked to leave class and may be subject to judicial, academic or other penalties. This prohibition applies to all instructional forums, including electronic, classroom, labs, discussion groups, field trips, etc. The instructor shall have full discretion over what behavior is appropriate/inappropriate in the classroom. Students who do not attend class regularly or who perform poorly on class projects/exams may be referred to the Early Alert Program. This program provides students with recommendations for resources or other assistance that is available to help SFA students succeed.
# Math 3315–Calculus III (Lecture)

## Course Syllabus

### Course description:
Vectors, vector operations, and vector functions; multivariate functions, partial derivatives, gradients, and multiple integrals; integration in vector fields, Green’s, Stokes’, and the Divergence theorems.

### Credit hours: 3

The following is an excerpt from SFA Policy 5.4:

*The federal definition of a credit hour is an amount of work represented in intended learning outcomes and verified by evidence of student achievement that is an institutionally established equivalency that reasonably approximates:

1. Not less than one hour of classroom or direct faculty instruction and a minimum of two hours out-of-class student work each week for approximately fifteen weeks for one semester or trimester hour of credit, or 10 to 12 weeks for one quarter hour of credit, or the equivalent amount of work over a different amount of time, or;

2. At least an equivalent amount of work as outlined in item 1 above for other academic activities as established by the institution including laboratory work, internships, practica, studio work, and other academic work leading to the award of credit hours.*

To this end, all students in courses offered by the Department of Mathematics and Statistics that wish to be successful should plan to spend a minimum of two hours outside of class for every credit hour associated with this course. Expected activities to be completed in the time outside of class include reviewing notes from previous class meetings, reading assigned course resources, completing all assigned exercises and projects, and performing periodic assessment preparation.

### Course Prerequisites and Corequisites:
MATH 2314 and MATH 2314L

### Course outline:

<table>
<thead>
<tr>
<th>Approximate time spent</th>
<th>Vector operations and vector functions</th>
<th>Multivariate functions</th>
<th>Integration in vector fields</th>
</tr>
</thead>
<tbody>
<tr>
<td>20%</td>
<td>Vectors and vector operations</td>
<td>40%</td>
<td>40%</td>
</tr>
<tr>
<td></td>
<td>o Definition, addition, scalar multiplication</td>
<td></td>
<td>o Line integrals</td>
</tr>
<tr>
<td></td>
<td>o Vector products: dot, cross, box</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Lines and planes in space</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Vector-valued functions</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Limits and continuity; differentiation and integration</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Arc length</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Unit tangents and normals, curvature</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Definitions, domain/range, surfaces, level curves/surfaces</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Limits and continuity</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Partial derivatives/implicit differentiation</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o The extended chain rule</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Directional derivatives and gradients</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Tangent planes</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Extreme values</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Double integrals, areas, moments and center of mass</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Triple integrals, masses and moments</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Substitution with multiple integrals, Jacobians</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Integrals in other coordinate systems</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Student Learning Outcomes (SLO): At the end of MTH 333, a student who has studied and learned the material should be able to:

1. Perform and interpret the standard vector operations. [PLO: 1,2,3]
2. Calculate and interpret the arc length, unit tangent vector, curvature, and principal unit normal of vector-valued functions parameterized either by time or arc length. [PLO: 1,2,3]
3. Demonstrate an understanding of the connection between the gradient of a multivariate function, directional derivatives, and tangent planes. [PLO: 1,2,3]
4. Set up, manipulate, transform, and interpret multiple integrals to solve mathematical and real-world problems. [PLO: 1,2,3]
5. Calculate line integrals in vector fields and relate these integrals to the notions of circulation and flux. [PLO: 1,2,3]
6. Use Green’s Theorem to connect the flux of a vector field to its divergence and the circulation to the curl. [PLO: 1,2,3]
7. Calculate surface integrals and relate them to real-world applications. [PLO: 1,2,3]
8. Generalize Green’s Theorem in the plane to Stokes’ Theorem and the Divergence Theorem on surfaces. [PLO: 1,2,3]

Program Learning Outcomes (PLO): Students graduating from SFA with a B.S. Degree and a major in mathematics will:

1. Written Communication - SFA Mathematics majors communicate mathematical ideas effectively in written form, integrating mathematical notation correctly and consistently.
2. Verbal Communication - SFA Mathematics majors communicate mathematics effectively to diverse audiences.
3. Mathematical Maturation - SFA Mathematics majors grow from a computational understanding of mathematics to an integrated approach which includes critical thinking proficiency, computational facility, conceptual understanding, and problem-solving persistence.

Academic Integrity
Academic integrity is a responsibility of all university faculty and students. Faculty members promote academic integrity in multiple ways including instruction on the components of academic honesty, as well as abiding by university policy on penalties for cheating and plagiarism.

The penalty for a student found cheating on any part of an assignment, quiz, or exam in this class will range from a grade of zero on the work to a grade of F in the course, and may result in additional, more severe disciplinary measures. A student who allows another to copy his work and the student copying the work are both guilty of cheating. Do your own work. Do not show your completed work to others. Do not allow others to copy your work.

Definition of Academic Dishonesty (SFA policy 4.1):
Academic dishonesty includes both cheating and plagiarism. Cheating includes, but is not limited to:

- using or attempting to use unauthorized materials on any class assignment or exam;
- falsifying or inventing of any information, including citations, on an assignment;
- helping or attempting to help other student(s) in an act of cheating or plagiarism.

Plagiarism is presenting the words or ideas of another person as if they were one’s own. Examples of plagiarism include, but are not limited to:

- submitting an assignment as one’s own work when it is at least partly the work of another person;
- submitting a work that has been purchased or otherwise obtained from the Internet or another source;
- incorporating the words or ideas of an author into one’s paper or presentation without giving the author credit.
Withheld Grades Semester Grades (SFA Policy 5.5)
Ordinarily, at the discretion of the instructor of record and with the approval of the academic chair/director, a grade of WH will be assigned only if the student cannot complete the course work because of unavoidable circumstances. Students must complete the work within one calendar year from the end of the semester in which they receive a WH, or the grade automatically becomes an F. If students register for the same course in future terms the WH will automatically become an F and will be counted as a repeated course for the purpose of computing the grade point average. The circumstances precipitating the request must have occurred after the last day in which a student could withdraw from a course. Students requesting a WH must be passing the course with a minimum projected grade of C.

Students with Disabilities
To obtain disability related accommodations, alternate formats and/or auxiliary aids, students with disabilities must contact the Office of Disability Services (ODS), Human Services Building, and Room 325, 468-3004 / 468-1004 (TDD) as early as possible in the semester. Once verified, ODS will notify the course instructor and outline the accommodation and/or auxiliary aids to be provided. Failure to request services in a timely manner may delay your accommodations. For additional information, go to http://www.sfasu.edu/disabilityservices.

SFASU Mental Health Statement: SFASU values students’ mental health and the role it plays in academic and overall student success. SFA provides a variety of resources to support students mental health and wellness. Many of these resources are free, and all of them are confidential.

On-campus Resources:
SFASU Counseling Services
www.sfasu.edu/counselingservices
3rd Floor Rusk Building
936-468-2401

SFASU Human Services Counseling Clinic
www.sfasu.edu/humanservices/139.asp
Human Services Room 202
936-468-1041

Crisis Resources:
Burke 24-hour crisis line 1(800) 392-8343
Suicide Prevention Lifeline 1(800) 273-TALK (8255)
Crisis Text Line: Text HELLO to 741-741

Acceptable Student Behavior
Classroom behavior should not interfere with the instructor’s ability to conduct the class or the ability of other students to learn from the instructional program (see the Student Conduct Code, policy 10.4). Unacceptable or disruptive behavior will not be tolerated. Students who disrupt the learning environment may be asked to leave class and may be subject to judicial, academic or other penalties. This prohibition applies to all instructional forums, including electronic, classroom, labs, discussion groups, field trips, etc. The instructor shall have full discretion over what behavior is appropriate/inappropriate in the classroom. Students who do not attend class regularly or who perform poorly on class projects/exams may be referred to the Early Alert Program. This program provides students with recommendations for resources or other assistance that is available to help SFA students succeed.

Date of document: 08/17/2021