DEPARTMENT OF MATHEMATICS
CALCULUS III
MATH 3315-001/3115-001 FALL 2023
COURSE SYLLABUS

Instructor: Jacob Pratscher  
Email: Jacob.Pratscher@sfasu.edu
Office: Math Building Room 348  
Phone: (936)468-1869
Office hours: MW 9:30-11:30 AM
Class Meetings: TR 11:00 AM-12:15 PM Math Building Room 212
M(Lab) 1:00-2:25 PM Math Building Room 358
Course Link: https://math.sfasu.edu/docs/syllabi/MATH3315Syllabus.pdf

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 theorem.

TEXT/MATERIALS: The required textbook is Calculus (Early Transcendentals), 4th edition, by Rogawski and Adams, ISBN 9781319050740. Topics for MATH 3315 are included in chapters 11 thru 17 of the text.

SUPPLEMENTAL MATERIAL: A resource the instructor will occasionally draw from is S. Schlicker, Active Calculus Multivariable, http://activecalculus.org

CALCULATORS: Each student will need a scientific calculator to use during exams. No graphing calculators or cell phone calculators will be allowed during exams. Having software available like Desmos and CalcPlot3D, will be useful in this course.

WITHDRAWL: The last day to withdraw from a full-session course with a grade of W is December 5th, 2023. Note: You can find the withdrawal dates and procedures on: https://www.sfasu.edu/registrar/registration-information/dates-deadlines and https://www.sfasu.edu/registrar/registration-information/how-to-drop-withdraw

GRADING: Grades will be assigned according to the following percentages.
- 2 one hour exams worth 15% each, dates on Tentative Class Schedule
- Final Exam Worth 25%
- Homework worth a total of 25%.
- Projects worth a total of 20%.

PROJECTS: Projects will be graded by correctness and clarity of work. Projects will be introduced in the lab portion of the course and is to be turned into the DropBox on D2L.

HOMEWORK: Homework will be due on Tuesday and Thursday of the week. Assignments will be announced on D2L. One of the goals of this class is to justify why the solution is the solution, so homework is expected to be written neatly, using complete sentences as appropriate to the exercise. The homework graded may not be sufficient practice, it is the student’s responsibility practice until there is a firm understanding of the material. When questions arise from the homework, please send the instructor an email or go to the instructor’s office hours.

UNIT EXAMS: There will be two one-hour exams, each exam is worth fifteen percent of the grade. The exams will be given in class. You may find dates on the tentative schedule, note that dates may change due to pace of course.

MAKE-UP and LATEWORK POLICIES: No make-ups are allowed without prior discussion beforehand with the instructor, or in case of an emergency. If there are concerns with completing any work on-time or being prepared for an exam please contact the instructor immediately. The decision of a make-up or accepting late work is left to the discretion of the instructor and is final.
ACADEMIC HONESTY: The instructor encourages students to discuss homework and course material. However, each student is expected to turn in their own work on graded assignments and should be explained in the student's own words. If the work is not the student’s own, then this can lead to a grade of zero on the assignment. Any additional material present that was not specified by the instructor, or violations of academic integrity that occur during quizzes and exams is not permitted and may lead up to a zero on the exam or a failing grade in the course.

FINAL EXAM: The Final is scheduled for Tuesday December 12th of 2023 from 10:30 AM - 12:30 PM in Math Building Room 212. The final exam will be a comprehensive examination, worth twenty-five percent of the final grade.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>A</td>
<td>90%-100%</td>
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<tr>
<td>B</td>
<td>80%-89.99%</td>
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<td>C</td>
<td>70%-79.99%</td>
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<td>D</td>
<td>60%-69.99%</td>
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<td>F</td>
<td>59.99% and Lower</td>
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TENTATIVE SCHEDULE: Note that material dates may change according to pace of the course.

<table>
<thead>
<tr>
<th>Week of</th>
<th>Monday (Lab)</th>
<th>Tuesday</th>
<th>Thursday</th>
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<tbody>
<tr>
<td>8/28-9/1</td>
<td>First Day of Class/ Sec 11.1</td>
<td>Sec 11.1/11.2</td>
<td>Sec 11.3</td>
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<tr>
<td>9/4-9/8</td>
<td>Sec 11.4</td>
<td>Sec 12.1</td>
<td>Sec 12.2</td>
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<td>9/11-9/15</td>
<td>Sec 12.2</td>
<td>Sec 12.3</td>
<td>Sec 12.4</td>
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<td>9/18-9/22</td>
<td>Sec 12.5</td>
<td>Sec 12.6/12.7</td>
<td>Sec 12.7</td>
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<tr>
<td>9/25-9/29</td>
<td>Sec 13.1</td>
<td>Review</td>
<td>Exam 1</td>
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<tr>
<td>10/2-10/6</td>
<td>Sec 13.2</td>
<td>Sec 13.3</td>
<td>Sec 13.4</td>
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<td>10/9-10/13</td>
<td>Sec 13.5</td>
<td>Sec 14.1</td>
<td>Sec 14.2</td>
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<td>10/16-10/20</td>
<td>Sec 14.3</td>
<td>Sec 14.4</td>
<td>Sec 14.5</td>
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<td>10/23-10/27</td>
<td>Sec 14.5</td>
<td>Sec 14.6</td>
<td>Sec 14.7</td>
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<td>10/30-11/3</td>
<td>Sec 14.8</td>
<td>Sec 15.1</td>
<td>Review</td>
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<tr>
<td>11/6-11/10</td>
<td>Exam 2</td>
<td>Sec 15.2</td>
<td>Sec 15.3</td>
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<td>11/13-11/17</td>
<td>Sec 15.4</td>
<td>Sec 15.6</td>
<td>Sec 16.1</td>
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<tr>
<td>11/20-11/24</td>
<td>NO CLASS DUE</td>
<td>TO THANKSGIVING</td>
<td>BREAK</td>
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<tr>
<td>11/27-12/1</td>
<td>Sec 16.2</td>
<td>Sec 16.3</td>
<td>Sec 17.1</td>
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<tr>
<td>12/4-12/8</td>
<td>Sec 16.4</td>
<td>Sec 17.2</td>
<td>Review</td>
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<td>Finals Week</td>
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<tr>
<td>12/11-12/15</td>
<td>Final Exam :10:30 AM- 12:30 PM, Math Building Room 212</td>
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Math 3115–Calculus III (Lab)
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: 1

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:

- Vector operations and vector functions
  - Vectors and vector operations
    - Definition, addition, scalar multiplication
    - Vector products: dot, cross, box
    - Lines and planes in space
  - Vector-valued functions
    - Limits and continuity; differentiation and integration
    - Arc length
    - Unit tangents and normals, curvature

- Multivariate functions
  - Definitions, domain/range, surfaces, level curves/surfaces
  - Limits and continuity
  - Partial derivatives/implicit differentiation
    - The extended chain rule
    - Directional derivatives and gradients
    - Tangent planes
    - Extreme values
  - Multiple integrals
    - Double integrals, areas, moments and center of mass
    - Triple integrals, masses and moments
    - Substitution with multiple integrals, Jacobians
    - Integrals in other coordinate systems

Approximate time spent: 20%
• Integration in vector fields
  - Line integrals
  - Vector fields: work and potential, circulation, flux
  - Green’s Theorem: divergence and curl
  - Surface integrals
  - Stokes’ Theorem
  - Divergence Theorem

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.

Student Learning Outcomes (SLO): At the end of MTH 3315/3115, 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]

Academic Integrity
The Code of Student Conduct and Academic Integrity outlines the prohibited conduct by any student enrolled in a course at SFA. It is the responsibility of all members of all faculty, staff, and students to adhere to and uphold this policy.

Articles IV, VI, and VII of the new Code of Student Conduct and Academic Integrity outline the violations and procedures concerning academic conduct, including cheating, plagiarism, collusion, and misrepresentation. Cheating includes, but is not limited to: (1) Copying from the test paper (or other assignment) of another student, (2) Possession and/or use during a test of materials that are not authorized by the person giving the test, (3) Using, obtaining, or attempting to obtain by any means the whole or any part of a non-administered test, test key, homework solution, or computer program, or using a test that has been administered in prior classes or semesters without permission of the Faculty member, (4) Substituting for another person, or permitting another person to substitute for one’s self, to take a test, (5) Falsifying research data, laboratory reports, and/or other records or academic work offered for credit, (6) Using any sort of unauthorized resources or technology in completion of educational activities.

Plagiarism is the appropriation of material that is attributable in whole or in part to another source or the use of one’s own previous work in another context without citing that it was used previously, without any indication of the original source, including words, ideas, illustrations, structure, computer code, and other expression or media,
and presenting that material as one’s own academic work being offered for credit or in conjunction with a program course or degree requirements.

Collusion is the unauthorized collaboration with another person in preparing academic assignments offered for credit or collaboration with another person to commit a violation of any provision of the rules on academic dishonesty, including disclosing and/or distributing the contents of an exam.

Misrepresentation is providing false grades or résumés; providing false or misleading information in an effort to receive a postponement or an extension on a test, quiz, or other assignment for the purpose of obtaining an academic or financial benefit for oneself or another individual or to injure another student academically or financially.

**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. For additional information, go to https://www.sfasu.edu/policies/course-grades-5.5.pdf.

**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.

**Student Wellness and Well-Being**
SFA values students’ overall well-being, mental health and the role it plays in academic and overall student success. Students may experience stressors that can impact both their academic experience and their personal well-being. These may include academic pressure and challenges associated with relationships, emotional well-being, alcohol and other drugs, identities, finances, etc.

If you are experiencing concerns, seeking help, 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:**
The Dean of Students Office (Rusk Building, 3rd floor lobby)
www.sfasu.edu/deanofstudents
936.468.7249
dos@sfasu.edu

SFA Human Services Counseling Clinic Human Services, Room 202
www.sfasu.edu/humanservices/139.asp
936.468.1041

The Health and Wellness Hub “The Hub”
Location: corner of E. College and Raguet St.

To support the health and well-being of every Lumberjack, the Health and Wellness Hub offers comprehensive services that treat the whole person – mind, body and spirit. Services include:

- Health Services
- Counseling Services
• Student Outreach and Support
• Food Pantry
• Wellness Coaching
• Alcohol and Other Drug Education

www.sfasu.edu/thehub
936.468.4008
thehub@sfasu.edu

Crisis Resources:
• Burke 24-hour crisis line: 1.800.392.8343
• National Suicide Crisis Prevention: 9-8-8
• 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.

Date of document: 08/23/2023