Class Syllabus / Policy

JacksTeach Functions and Modeling

JTCH 3351
Fall 2021

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Phone: 936-468-1804
Office: Bush Math. Bldg, 318 and 103
Office Hours: TR 3:30-5:00pm; W 3:00-5:00pm, or by arrangement

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Department: Mathematics & Statistics
Email: crichardson@sfasu.edu
Phone: 936-468-1736
Office Hours: MTW 2:30—3:30pm, TR 11am — noon, or by arrangement

Class meeting time and place: TR 12:30-1:45pm, Bush Mathematics Bldg. Room 127

Prerequisite:

JTCH 1102; and Math 2413 or concurrent enrollment; or permission of JacksTeach director or co-director

Course Description

Functions and Modeling is designed to provide an in-depth study of topics in secondary school mathematics. Emphasis in modeling with linear, exponential, and trigonometric functions; curve fitting; discrete and continuous models; inquiry-based and project-based teaching modalities. Use of appropriate technology is also explored.

Credit hours: 3

SFASU 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 who wish to be successful should plan to spend at least 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.

Program Learning Outcomes

The successful JacksTeach candidate will:

1. Demonstrate a deep understanding of and ability to apply STEM content and foundational pedagogical content knowledge through effective teaching in K-12 classrooms; (Texas Teacher Standards 1, 2, 3, 4; Texas PPR Standards I, IV; Texas Science Standards I-IV, VI, XI)

2. Develop an effective classroom management plan that creates a STEM classroom environment conducive to active learning and inquiry techniques, and supportive of individual and collaborative learning; (Texas Teacher Standards 1, 2, 4; Texas PPR Standards II, III; Texas Science Standards I-V, VII)

3. Use a variety of instructional strategies to meet the needs of all students and inspire STEM learners to develop curiosity about local and global issues and the connections to STEM, through the application of critical thinking, creativity, problem solving, and technology; (Texas Teacher Standards 1, 2, 4; Texas PPR Standards II, III; Texas Science Standards I-IV, VI-VII, XI)

4. Implement a variety of assessment techniques to monitor learner progress and guide adaptation of instructional plans; and (Texas Teacher Standards 3, 5; Texas PPR Standards I, III, IV; Texas Science Standards IV-V)

5. Exhibit a disposition toward continued learning and professional growth through the utilization of self-evaluation and research-based practices. (Texas Teacher Standards 5, 6; Texas PPR Standards I, IV; Texas Science Standards I-IV)

Student Learning Outcomes

After completing the required readings and participating in class activities, the prospective mathematics or science educator will be able to do the following:

1. Deepen and broaden function-related mathematical content knowledge from Algebra through Calculus by exploring relevant topics in an inquiry based learning situation. (PLO 1, 5)

2. Make connections between college mathematics and secondary school mathematics. (PLO 1, 5)

3. Build preliminary knowledge of professional and state mathematics curriculum standards. (PLO 1, 5)

4. Use reflective and collaborative learning, and develop a stronger sense of professionalism and leadership. (PLO 1, 5)

5. Create efficient seekers of content knowledge. (PLO 1, 3, 5)

6. Explore and learn appropriate use of technology in the mathematics classroom. (PLO 1, 3, 5)

**A complete listing of all the educator preparation standards this course meets and a list of the key assessments used for program accreditation purposes can be found at:
Text and Materials
Your instructors will provide the required textbook in PDF form.

Class Attendance and Participation Policy

Since a majority of this work hinges on group work done during the class time, attendance and presentation of results of class explorations is of utmost importance. Therefore, attendance is extremely important and you are expected be in class each and every day.

Attendance

- Please keep in communication with the instructors about all absences. If you cannot attend class at the scheduled time, you must contact the instructors as soon as possible
- If you must miss a scheduled appointment with the instructors, please let them know as soon as possible
- Missing an exam or presentation is much more problematic than missing a regular class meeting or an appointment, and you should not miss exam or presentation days unless the situation is very serious. If you miss an exam or presentation and do not communicate with the instructors as soon as possible, you risk failing the course.
- Come to class prepared and ready to listen, participate, and engage with the activities for the day
- The university's attendance policy can be found at https://www.sfasu.edu/policies/class-attendance-6.7.pdf

Grading

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
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</thead>
<tbody>
<tr>
<td>Tests (October 7 and November 2)</td>
<td>40 %</td>
</tr>
<tr>
<td>Written Assignments/Labs/Homework</td>
<td>25 %</td>
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<tr>
<td>Midterm Project*</td>
<td>15 %</td>
</tr>
<tr>
<td>Final</td>
<td>20 %</td>
</tr>
<tr>
<td>Total</td>
<td>100 %</td>
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*Midterm Project

You will complete an individual project exploring an aspect of mathematics. Further details will be provided by the instructors. The tentative due date is October 28.
Final Grades will be determined by the standard university A, B, C, D, F grading system.

**Late Work**

Please communicate with the instructors if you are unable to turn in assignments by the specified due date.

**Major Topics**

- Functions and Relations
- Qualitative Graphing
- Sequences/Patterns – Function Patterns
- Mathematical Modeling - Data, & Regression
- Matrices
- Polar & Parametric Relations
- Complex Numbers and Properties
- Exponential Growth and Decay Models

**Tests/Labs/Homework**

There will be frequent homework assignments, labs, and exams to test your knowledge of the concepts we are currently discussing in class.

Tests and labs will be in class; homework needs to be finished outside of class time. **You are expected to enhance classroom discussion with extended research of topics outside of the classroom. YOU ARE RESPONSIBLE FOR KNOWING ALL TECHNOLOGY TECHNIQUES PRESENTED IN CLASS.**

**Course Outline**

<table>
<thead>
<tr>
<th>Week</th>
<th>Day</th>
<th>Date</th>
<th>Topic - in class</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tuesday</td>
<td>8/24/2021</td>
<td>Handouts. Prob solving - Conundrum. Connections</td>
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<tr>
<td>2</td>
<td>Tuesday</td>
<td>8/31/2021</td>
<td>Definitions of Function. Parabola Roots Exploration.</td>
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<tr>
<td>3</td>
<td>Tuesday</td>
<td>9/7/2021</td>
<td>Conic Sections. Homework 1</td>
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<tr>
<td>3</td>
<td>Thursday</td>
<td>9/9/2021</td>
<td>Conic Sections continued</td>
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<tr>
<td>4</td>
<td>Tuesday</td>
<td>9/14/2021</td>
<td>Spring Mass Lab</td>
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<tr>
<td>4</td>
<td>Thursday</td>
<td>9/16/2021</td>
<td>Sequences. Triangular Differences Activity Homework 1 Due</td>
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<tr>
<td>5</td>
<td>Tuesday</td>
<td>9/21/2021</td>
<td>Triangular Differences continued. Homework 2</td>
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<tr>
<td>5</td>
<td>Thursday</td>
<td>9/23/2021</td>
<td>Functions as Sequences (i.e. Function Patterns)</td>
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<tr>
<td>Date</td>
<td>Day</td>
<td>Event</td>
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<tr>
<td>6/28/2021</td>
<td>Tuesday</td>
<td>Functions Patterns Exploration Homework 2 Due</td>
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<tr>
<td>6/30/2021</td>
<td>Thursday</td>
<td>Exponential Growth and decay; Rate of Change</td>
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<tr>
<td>7/5/2021</td>
<td>Tuesday</td>
<td>Modeling Functions from data: Thunder Storms, Charles Law, and Linear Regression</td>
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<tr>
<td>7/7/2021</td>
<td>Thursday</td>
<td>TEST 1 - Unit 1</td>
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<tr>
<td>7/12/2021</td>
<td>Tuesday</td>
<td>Modeling Functions from data. More regression. Residuals. Midterm Assignment</td>
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<tr>
<td>7/14/2021</td>
<td>Thursday</td>
<td>Terminal Velocity Lab Homework 3</td>
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<tr>
<td>7/19/2021</td>
<td>Tuesday</td>
<td>Modeling Functions from Data: Data with Matrices</td>
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<tr>
<td>7/21/2021</td>
<td>Thursday</td>
<td>Modeling Functions from Data: Standard Forms Homework 3 Due</td>
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<tr>
<td>7/26/2021</td>
<td>Tuesday</td>
<td>Roller Coaster Exploration</td>
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<td>7/28/2021</td>
<td>Thursday</td>
<td>Parametric models; Midterm Assignment Due</td>
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<tr>
<td>8/2/2021</td>
<td>Tuesday</td>
<td>TEST 2</td>
<td></td>
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<td>8/4/2021</td>
<td>Thursday</td>
<td>Parametric Exploration Problems</td>
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<td>8/9/2021</td>
<td>Tuesday</td>
<td>The Golf Shot – An Exploration</td>
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<td>8/11/2021</td>
<td>Thursday</td>
<td>Vector Lab Homework 4</td>
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<td>8/16/2021</td>
<td>Tuesday</td>
<td>Polar Coordinate System</td>
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<td>8/18/2021</td>
<td>Thursday</td>
<td>Geometry of Complex Numbers</td>
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<tr>
<td>8/23/2021</td>
<td>Tuesday</td>
<td>Asynchronous - Semester project</td>
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<tr>
<td>8/25/2021</td>
<td>Thursday</td>
<td>Asynchronous - Semester project</td>
<td></td>
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<tr>
<td>8/30/2021</td>
<td>Tuesday</td>
<td>Geometry of Complex Numbers continued Homework 4 Due</td>
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<tr>
<td>9/2/2021</td>
<td>Thursday</td>
<td>Polar Complex - Euler Number</td>
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<tr>
<td>9/9/2021</td>
<td>Tuesday</td>
<td>Final Exam, Scheduled Time: 10:30am -12:30pm</td>
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**Dropping or Withdrawing**

Please see the following for more information:

Drops/Withdraws (Dates): [https://www.sfasu.edu/registrar/registration-information/dates-deadlines](https://www.sfasu.edu/registrar/registration-information/dates-deadlines)

Drops/Withdraws (Procedures): [https://www.sfasu.edu/registrar/registration-information/how-to-drop-withdraw](https://www.sfasu.edu/registrar/registration-information/how-to-drop-withdraw)

**Academic Integrity (4.1)**

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.

**Definition of Academic Dishonesty**

Academic dishonesty includes both cheating and plagiarism. Cheating includes but is not limited to:

1. Using or attempting to use unauthorized materials to aid in achieving a better grade on a component of a class;
2. The falsification or invention of any information, including citations, on an assigned exercise; and/or
Plagiarism is presenting the words or ideas of another person as if they were your own. Examples of plagiarism are

1. submitting an assignment as if it were one's own work when, in fact, it is at least partly the work of another;
2. submitting a work that has been purchased or otherwise obtained from an Internet source or another source; and
3. incorporating the words or ideas of an author into one's paper without giving the author due credit.

Please read the complete policy at http://www.sfasu.edu/policies/student-academic-dishonesty-4.1.pdf

Withheld Grades Semester Grades 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.

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/.

Mental Health and Wellness
SFA 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:
SFA Counseling Services
www.sfasu.edu/counselingservices
Rusk Building, 3rd Floor
936.468.2401

SFA 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

Student Code of Conduct (University Policy 10.4)
Available at http://www.sfasu.edu/policies/student-code-of-conduct-10.4.pdf