DASC 2594\_Multivariable Math for Data Scientists\_Unit #3\_Vectors, Vector Geometry, and Vector-valued Functions

|  |  |  |
| --- | --- | --- |
| **Stage 1 Desired Results** | | |
| ESTABLISHED GOALS  **Timeframe:** (maximum) 6 days  **Lesson Plans Referenced**:   * DASC 2594\_Unit 3\_Lesson Plan 8\_Vectors, Geometry and Vector-Valued Functions | ***Acquisition*** | |
| *Students completing Unit 3 of DASC 2594 should be able to:*   * Identify vector-valued functions and understand how these functions describe an underlying geometry * Use vector-valued functions to make calculations about physical processes * Calculate tangents to curves in space and understand how these relate to position, velocity, speed, and acceleration | *Students will be skilled at…*   * Applying vector-valued functions to calculate characteristics about objects * Defining curves in space using vector valued functions * Calculating tangents to vector-valued functions * Solving physics-based problems using vector valued functions |
| ***Meaning*** | |
| UNDERSTANDINGS  *Students will understand …*   * What is meant by parallel and orthogonal planes * How vector-valued functions define torque, gravitation, and motion * How vector-valued functions define geometric objects * How vector-valued functions can be used to solve physical problems | ESSENTIAL QUESTIONS   1. What are important mathematical operations of vectors? 2. What are some underlying geometries that can be defined using vector-valued functions? 3. How does one apply derivatives to vector-valued functions? 4. What is the physical meaning of vector-valued functions and their derivatives |
| ***Transfer*** | |
| *Students will be able to independently use their learning to…*   * Apply and solve for derivatives of vector-valued functions * Solve for physically-relevant values like acceleration and tangent vectors | |
| **Stage 2 - Evidence** | | |
| **Evaluative Criteria** | **Assessment Evidence** | |
| Rubric Names: | PERFORMANCE TASK(S)    *Pre-Test:*  *Formative Assessment :*   * *HW 09: Vector-valued functions*   *Summative Assessment:*   * Exam (In class and take home after Unit 4) | |
|  | OTHER EVIDENCE:   * In class questions using learning software (google forms, etc.) * Student feedback and questions | |
| **Stage 3 – Learning Plan** | | |
| *Summary of Key Learning Events and Instruction*  *Unit #3 (maximum) 6 days*  Textbook: To be determined (likely will be primarily based on class lecture notes)  Technology: RStudio /RStudio Server / RStudio Connect;  Prerequisite Knowledge/Course(s): Fundamental understanding of Calculus at the level of Calculus II and ability to program in R  **Activity 1 (6 days):** List Topic Refer to DASC 2594\_Unit 3\_Lesson Plan 8\_Vectors, Geometry and Vector-Valued Functions | | |

|  |  |
| --- | --- |
| **Learning Accommodations** | |
| **Student Accommodations** | **Accelerated Students** |
| Compliance/ADA/504 | Challenge Students who want/need more |