

1125-F1-2582

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In our modern world, we are inundated and grapple with data on a daily basis. As mathematicians, we are often more comfortable discussing the behavior of functions presented analytically, in contrast with the data-driven or tabular presentations of functions ubiquitous in our culture. In this talk, we present an entry level Mathematical Modeling and Applied Calculus course for students who will (most likely) only take one mathematics course in college and most of whom have a weak algebraic background that (most likely) indicates they will not be successful in a traditional calculus course. Our course is designed to develop a student's ability to model data with elementary functions and then improve their models using the Method of Least Squares, which is also fully developed in the course. The tools of Calculus are used to analyze these models in both the discrete and continuous contexts. Throughout the course, students review pre-calculus ideas while learning about mathematical modeling and the central ideas of calculus. (Received September 20, 2016)