

## ABSTRACT

### Simulating the Flow of Students through Cal Poly's Undergraduate Industrial Engineering Program for Policy Analysis

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The purpose of this project is to analyze the flow of Industrial Engineering students at California Polytechnic University San Luis Obispo in order to measure various graduation metrics by use of a simulation. Currently, graduation rates are relatively low in comparison with the rest of the state of California and future growth and decreased budgets may threaten graduation rates for incoming students. This simulation will identify bottleneck classes [those that hold up students from graduating] and provide a basis for a sensitivity analysis in which different scenarios are constructed to determine their effects on graduation metrics. The simulation will offer a Microsoft Excel Spreadsheet as an input in which any user could alter class capacities and offerings so as to determine the effects of these decisions. This tool provides a valuable resource for the Department Chair of the Industrial and Manufacturing Department at California Polytechnic University San Luis Obispo because it provides a high-level view of the impact of important decisions for the department. The project concludes with a sensitivity analysis of eight different cases that are analyzed to provide insight into whether or not certain decisions should be made about the curriculum. Of the many conclusions determined from the sensitivity analysis, it is noted that the department can sustain a 10% increase in enrollment of new students, but not a 20% increase in enrollment, while maintaining current graduation rates. Furthermore, the elimination of pass and fail rates from the system does not provide a significant effect on graduation rates and it is recommended that they stay in place. Additionally, it is noted that a reduction in capacity of 10% across all classes is very harmful to students while the adjustment of classes based on effective capacities [the percentage of Industrial Engineering students enrolled multiplied by class capacity] is highly beneficial. It is the hope that this simulation tool can be used by the department in making decisions similar to this in the future.