

## Formulation and analysis

		Exemplary (5)	Satisfactory (4)	Developing (2)	Unsatisfactory (0)	Weight
C1	Identifying the problem	Clearly describes the problem; provides sufficient background information	Describes the problem adequately though some key details may be missing; provides limited background information and motivation for studying the problem	Description of problem is unclear or missing key details; background information or motivation is insufficient	Description of problem is missing; background information or motivation is insufficient or missing	1.0
C2	Describing the modeling framework  *See project-specific standards	Chooses an appropriate modeling framework and identifies key components of the model	Chooses an appropriate modeling framework but does not specify model components	Does not choose an appropriate modeling framework	Chooses a modeling framework that does not use operations research techniques	1.0
C3	Describing, wrangling, and analyzing the input data	Provides a clear and detailed description of the input data used; wrangles the input data into a form suitable for the model; presents a correct analysis of the input data (e. g. distribution fitting) if appropriate	Provides an adequate description of the input data used; a few minor details are missing; wrangles the input data into a form suitable for the model; presents a correct analysis of the input data if appropriate	Description of the input data used is unclear or missing key details; data wrangling or input data analysis has errors	Description of input data is missing; data wrangling or input data analysis is missing	1.5
C4	Correctness and complexity of model  *See project-specific standards	Model correctly captures major features and some subtleties of the problem; recognizes and properly justifies all assumptions	Model correctly captures major features of problem; identifies key assumptions	Model incorrectly incorporates at least one important feature of the problem; model involves at least one oversimplifying assumption	Model does not give useful information; does not state or include necessary assumptions	1.5
C5	Implementing the model	Correctly implements the model using appropriate computational tools; considers and runs multiple alternatives	Correctly implements the model using appropriate computational tools	Implements the model using appropriate computational tools but does not run due to errors	Fails to implement the model	1.5
C6	Reporting outputs	Correctly describes and emphasizes the important aspects of the model output in a clear and easily digestible manner, incorporating tables and graphics as appropriate	Correctly describes the important aspects of the model output.	Correctly describes some aspects of the model output, but fails to highlight the important aspects necessary to understanding the model output.	Incorrectly describes the model output.	1.5
C7	Interpreting outputs	Provides a correct and detailed interpretation of the model outputs for all alternatives; provides a reasonable recommendation	Provides a correct interpretation of the model outputs; provides a reasonable recommendation	Provides a flawed interpretation of the outputs; provides a flawed recommendation based on the output	Fails to interpret the outputs at all; does not provide a recommendation based on the output	1.5
C8	Limitations and extensions	Identifies important limitations resulting from modeling assumptions, data collection, etc., and suggests reasonable extensions to address these limitations	Identifies important limitations resulting from modeling assumptions and suggests reasonable extensions to address these limitations	Fails to identify at least one key limitation of the study; does not address how the study can be extended to address the limitations	Does not address limitations of the study	1.0

**Written report**

		<b>Exemplary (5)</b>	<b>Satisfactory (4)</b>	<b>Developing (2)</b>	<b>Unsatisfactory (0)</b>	<b>Weight</b>
D1	Grammar, spelling, punctuation (GSP)	Text contains no GSP errors	Text has a few minor GSP errors	Text has serious GSP errors or a distracting number of minor GSP errors	Text is not understandable in current form due to GSP errors	1.0
D2	Organization	Presents ideas in a logical order; report organized into sections as taught in class	Presents ideas in a mostly logical order; report organized into sections as taught in class	Report organized into sections as taught in class; ideas in individual sections are not organized	No organization present in paper	1.0
D3	Clarity	Text is clear and concise	Text is clear and readable for the most part	Text is wordy or awkward	Text is unclear	1.0
D4	Completeness	Text provides good depth and detail; ideas are fully developed and supported; describes all parts of the project, including: background and motivation, problem description, data summary, model description, results, recommendations and limitations	Text provides adequate depth; a few needed details or ideas are omitted; major ideas are adequately developed and supported	Additional depth is needed in places; at least one major idea is not adequately developed and supported	Important details or ideas are often omitted, not developed, or not supported	1.5
D5	Tone	Appropriate for an academic journal or professional memo	Appropriate for a student paper	Appropriate for a student paper but with sections of informality	Too informal	1.0
D6	Technical language	All technical language is used correctly, including terminology related to formulation and analysis; all mathematical symbols and variable names are correctly explained in words	Most technical language is used correctly; most mathematical symbols and variable names are correctly explained in words	Many errors in technical language; many mathematical symbols and variables names are not correctly explained in words	Technical language is consistently incorrect or imprecise; mathematical symbols and variables are not explained in words at all	1.5
D7	Citations and references	All sources are correctly documented; in-text citations and reference list follow APA style exactly	Most sources are correctly documented; in-text citations and reference list have a few minor errors in following APA style	Most sources are correctly documented; in-text citations and reference list do not follow APA style	Fails to correctly document sources, in-text citations and reference list have major errors and do not follow APA style	1.0
D8	Appearance and formatting (AF)	Consistent and professional appearance throughout: font sizes for text, captions, and section headings are appropriate and consistent; equations are properly formatted	Report has a few minor AF issues	Report has consistent AF issues such as missing captions, missing titles and axes labels on graphs; a distracting number of minor AF issues	Report has serious AF issues	1.5