

South African Mathematical Modeling Contest

SAMMC2019 Contest Rules*

Dates and timing: The contest will take place over 4 days in July. The exact dates will vary by competing institution at the discretion of the host institution. The local organiser/supervisor will make the problems available to the competing teams at 9AM on the first day. Teams must be finalised by the end of the first day (11:59PM) by sending an email to the SAMMC contest organisers at sammc@sun.ac.za along with provisional team names and choice of problem. Final reports must be submitted (details below) by 3PM on the fourth day of the contest. Late submissions will not be accepted.

Teams:

1. Each team may consist of a maximum of four undergraduate students, of which at most 66.67% may be third year students. (Special dispensation may be given by the organisers in unusual circumstances.)
2. Each student may participate on only one team.
3. Team members must be enrolled as full-time students at the host institution at the time of the contest.

Solutions: Teams may use any inanimate source of data or materials: computers, software, references, websites, books, etc. ALL SOURCES USED MUST BE CREDITED. Failure to credit a source may result in a team being disqualified from the competition. The same goes for any team believed to be intentionally manipulating their results.

Team members may not seek help from or discuss the problem with anyone except other members of the same team. (Discussion with other teams is strictly prohibited.) Input in any form from anyone other than team members is strictly forbidden. This includes email, telephone contact, personal conversation, communication via web chat or other question-answer systems, or any other form of communication.

Partial solutions are acceptable. There is no passing or failing cut-off score, and numerical scores will not be assigned. The contest judges are primarily interested in the team's approach, initiative, and methodology.

Teams have until 3PM on the final day to work on the problems. By this time they should produce:

- * Executive Summary sheet (1 page)
- * Solution Report (10-15 pages)
- * Other material specified in the problem statement

At the discretion of the host institution there may then follow a short presentation by each of the teams, explaining their chosen problem and their solution. However, this presentation will not count toward the final result.

Submission: The solution must consist entirely of written text, figures, charts, images, or other written material only. No support materials (such as computer files or software) will be accepted.

Papers must be typed in English with a readable font of at least 12 point type. Solutions may be prepared in LaTeX or Microsoft Word (or some equivalent), but should be submitted in .pdf format. Templates for the front page can be found at <https://appliedmaths.sun.ac.za/sammc/>.

Solutions should be in the form of a single .pdf or a single .zip file containing the material listed above sent to the contest organisers via email at sammc@sun.ac.za before the end of the contest.

Failure to adhere to any preparation rule is grounds for team disqualification.

* Adapted from COMAP MCM rules: <https://www.comap.com/undergraduate/contests/mcm/instructions.php>

Executive Summary sheet: The summary is an essential part of your paper. To write a good summary, imagine that a reader will choose whether to read the body of the paper based on your summary: Your concise presentation in the summary should inspire a reader to learn about the details of your work. Thus, a summary should clearly describe your approach to the problem and, most prominently, your most important conclusions. Summaries that are mere restatements of the contest problem, or are a cut-and-paste boilerplate from the Introduction are generally considered to be weak.

Solution Report: Besides the Summary Sheet, your Solution Report should contain the following:

Restatement and clarification of the problem: State in your own words what you are going to do.

Explain assumptions and justification: Emphasize the assumptions that bear on the problem.

Include your model design and justification for type model used or developed.

Describe model testing and sensitivity analysis, including error analysis, etc.

Discuss the strengths and weaknesses of your model or approach.

Suggest future work or modifications to improve the proposed model given more time..

The judges will evaluate the quality of your writing and consider the following aspects of your report:

Conciseness and organization are extremely important.

Key statements should present major ideas and results.

Present a clarification or restatement of the problem, as appropriate.

Present a clear exposition of all variables, assumptions, and hypotheses.

Present an analysis of the problem, including the motivation for the model that is used.

Include a design of the model.

Discuss how the model could be tested, including error analysis, and stability.

Discuss any apparent strengths or weaknesses in your model or approach.

Draw conclusions from any results

Prizes: Prizes are available for:

- The top three teams across all three problems (R4000/R2000/R1000 - sponsored by the DST-NRF Centre of Excellence in Mathematics and Statistical Sciences)
- The top two teams in Problem C (R3000/R2000 - industrial sponsor)
- The most innovative idea (R1000 - sponsored by Opti-Num Solutions)
- The best use of MATLAB (R1000 - sponsored by Opti-Num Solutions)*



Opti-Num
Solutions



* Teams wishing to submit an entry for the best use of MATLAB should submit their code in a separate email to sammc@sun.ac.za with the title "Best use of MATLAB by <insert Team Name here>" with a description of what the code does and why they think it is the "best".