

Mathematical Modelling Competition for Secondary Students (MMCSS), 2022

Instructions and Rules

There are several steps that a team advisor must go through before, during and after the contest. Please read the instructions and rules below carefully and ensure to complete all the procedures involved. It is the teacher advisor's responsibility to make sure that the team will follow all steps required for participation in MMCSS.

Contest Rules

1. Teams who work on the Contest *Problem* must complete and submit the solution paper within required consecutive hours (5 days) at the assigned period of time. Teams must complete and submit their solution paper of modelling on or before the deadline of the contest. Solution papers will be adjudicated by Expert Panel of Judges.
2. Registration process, downloading problem / control sheet and uploading papers/materials for participation in the contest event should be performed on the online contest system: [Log in](http://istem.info/web/login.php) the competition system (<http://istem.info/web/login.php>). Teams who use the system for the first time have to sign up to the system to create their account with username (valid email address) and password. By logging in with the email address and password, the team can register for the ongoing contest under the “Event” column. Successful registration will grant the team a Control Number for the chosen contest. (Note: Signatures of parents/guardians is not required on the control sheet; but their names must be filled. The teacher advisor is required to sign off the control sheet with authorisation by and on behalf of parents/guardians.)
3. The contest problem can be downloaded by logging into the IMMC contest system after the start of the competition.
4. Team advisors must ensure that there should have no any change made after the end of the contest.

The advisor is responsible for ensuring the collection of the solution paper from the participating team and uploading the paper (in PDF format) and control sheet to the IMMC contest system for the Expert Panel of Judges to review. Only submit one paper from the team for each upload.

The names of the students, advisor or school/institution must not appear on any page of the solution. The paper must not contain any identifying information other than the team control number. The first page of the paper should be the summary of the paper.

5. Each student must sign the control sheet, pledging that they have abided by the contest rules and instructions. The advisor must also obtain the consent from their parents/guardians of each student so that advisor can sign the control sheet on behalf of them. The advisor must upload the signed control sheet to the contest system in PDF or JPEG/PNG format along with the paper submission.

Please Keep Connected Online

Each participating team will receive a control number via the system email after successfully registering the contest. The control number is the only identity of the team for each contest/activity and the paper submitted.

IMPORTANT! Please make sure that you register with a VALID email address so that we can reach you at any point before, during and after the contest, if necessary.

Preparing a Team

1. Providing the necessary training and coaching for students before the contest is allowed and beneficial.
2. Ensure that students have access to computers that enable them to word process, use a spreadsheet and relevant software, and dynamically compute and model both graphs and geometric relationships. In addition, students should have access to graphing calculators.
3. The advisor is required to obtain the consent from parents/guardians of all students of the participating team and sign on the control sheet on behalf of them. By signing the form, parents/guardians agree their child's work are available (with confidentiality assurance) for use as model paper and training materials for mathematical modelling related professional development activities. Additionally, should their team be designated as an Outstanding or other award winner, the student's solution paper (or solution abstract) may be published. Signed form should be submitted in PDF or JPEG/PNG format along with the solution paper for review by the Expert Panel judges.

Language Policy

MMCSS adopts a bilingual policy. The solution paper and presentation can be written and conducted in either Chinese or English.

Preparing a Solution Paper

1. When teams are ready for the contest, the team advisors may login to the IMMC competition system after the starting time to download the problem and distribute it to the team.
2. Teams may use any inanimate source of data, materials, computers, software, references, websites, books, etc. However, all sources must be credited properly in the paper.
3. Teams may not allow anyone outside the team to discuss or obtain ideas for solving their problem nor may they seek help in obtaining an answer from the teams' advisor or anyone else. Any team that discusses the problem with anyone in a position to supply them with information reflecting experience or professional expertise will be disqualified. The relevant issue is one of intent: each team of students is expected to develop all of its substantive analysis without the help of others.
4. Partial solutions are acceptable. There is no passing or failing cut-off score, nor will numerical scores be assigned. The judges are primarily interested in a teams' approach and methods and also how the team defines, analyses and solves the problem.
5. Teams may submit the paper and deliver finalist presentation in English or Chinese.
6. The paper the team submits should include a one-page summary sheet which should be the first page of the solution paper. The full solution should be no more than 21 pages (with summary page, excluding appendices and references). The summary is a very important part of the paper. The judges place considerable weight on the summary; the winning papers are often distinguished from other papers based on the quality of the summary. A summary is a first step for readers to decide whether they will continue the

reading of the paper. Thus, a summary should clearly describe your approach to address the problem and, most prominently and what your most important conclusions were. Your concise presentation of the summary should inspire a reader to learn the details of your work. 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.

7. The solution must consist entirely of written text and possibly figures, charts, or other written material only. Supporting materials such as computer disks will not be accepted except that materials such as computer programmes are required specifically and clearly.
8. Each page of the solution paper must contain the team's Control Number and the page number at the top of the page; we suggest using a page header on each page for example: Team # IMMC20220101 page 8 of 18.
9. **The names of the students, advisor, or school/institution must not appear on any page of the solution. The solution must not contain any identifying information except the team control number.**
10. Any rule not followed is ground for disqualification.
11. Teams should keep in mind the following guidelines while preparing their solution papers:
 - Conciseness and organisation are extremely important. Key statements should present major ideas and results.
 - For the competition *problem*, you should present a clarification or restatement of the problem as appropriate in your paper.
 - Present a clear exposition of all variables, assumptions, and hypotheses.
 - Present an analysis of the problem, motivating or justifying the modelling to be used.
 - Include a design of the model. Discuss how the model could be tested.
 - Discuss any apparent strengths or weaknesses to your model or approach.
 - Incorporate lengthy derivations, computations, or illustrative examples in appendices. Summarise these in the main report. Results must be explicitly stated in the body of the report.

Submitting a Solution Paper

1. Teams must end all work on the solution paper by the end time of the contest.
2. Submit paper via IMMC contest system: [Log in](http://istem.info/web/login.php) the competition system (<http://istem.info/web/login.php>)
 - 2.1. All teams are required to submit electronic copy of the solution papers and completed control sheets through the contest system.
 - (1). Submissions must be completed by the end of the contest.
 - (2). Failure in completion of submission before the deadline will result in automatic disqualification in related contest.
 - 2.2. Name your solution paper and control sheet with your teams' Control Number only.
 - 2.3. The Expert Panel of Judges will accept only a PDF file as the paper. Document size should be **less than 17MB**. DO NOT include programmes or software with your file as they will not be used in the judging process except that it is required specifically. The names of the students, advisor or institution should not appear on any page of the electronic solution. Page 1 of the electronic solution paper should be the summary.

3. The advisor shall ensure that each member of the team (including the advisor) signs the control sheet, pledging that they have abided by the contest rules and instructions.

Summary of submission:

1. Solution Paper:
 - Restatement Clarification of the Problem - state in your own words what you are going to do;
 - Assumptions with Rationale/Justification - emphasise those assumptions that bear on the problem;
 - List clearly all variables used in your model;
 - Model Design and Justification for type model used/developed;
 - Model Testing and Sensitivity Analysis, including error analysis, etc.;
 - Discuss strengths and weakness to your model or approach;
 - Provide algorithms in words, figures, or flow charts (as a step by step algorithmic approach) for all computer codes developed.
2. The electronic file of the paper should be submitted by [Logging in](#) the competition system (<http://istem.info/web/login.php>). See point 2 in the “Submitting a Solution Paper” section.
3. The first page of the solution paper should be a summary page. Solution paper and control sheet should be submitted in this order: control sheet; solution paper (including the summary page).
4. The advisor must obtain the consent from parents/guardians of all students of the participating team and sign the control sheet on behalf of parents/guardians. The signed control sheet should be submitted to the contest system in PDF format or photo format (JPEG or PNG format) along with the solution paper.

Presentation and Recognition

1. Each team will have the opportunity to be recognised with awards as Outstanding, Meritorious, Honourable Mention or Successful Participant.
2. If public health condition permits during the Covid-19 period, selected teams will be invited to present their solution paper in person in front of the Expert Panel of Judges.
3. The Awards Presentation Ceremony will be held on the interview day.
4. The results of the contest will be announced on the Education Bureau’s website.

For enquiries, please contact Ms Esther Cheng of IMMC Committee (Zhonghua) Ltd on 3521 1296.