IMMC 2019 Instructions and Rules - Greater China

To participate in the International Mathematical Modeling Challenge (IMMC or IM²C), all team members must be coming from the same school. There are several steps that a team advisor must go through before, during and after the contest. Please read this instructions and rules 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 IMMC.

Contest Rules

1. A team may consist of 2-4 secondary school students, enrolled in the same school. There must be at least 1 faculty teacher from that school as an advisor. There is no limit of the number of participating teams from one school.

2. Participating teams in IMMC from all over the world will be selected by a national/regional selection process before they enter the IMMC International Round. Teams from Mainland, Taiwan, Hong Kong and Macau of China will firstly be selected by the IMMC Greater China Round.

The International Mathematical Modeling Challenge (Zhonghua) Committee, a non-profit and charitable institution of public character incorporated in Hong Kong SAR (charity certificate no. 91/14657), is authorized exclusively by the organizer of IMMC for the adjudication, team selection, recognition of awards and other academic affairs in Greater China region. The Academic/Advisory Committee and Expert Panel established by the organizer are composed of leading academics and experts from well-known universities, research institutions and industries.

In order to cater for the diversity in school calendar across Greater China, there are two alternative contest seasons (autumn and winter) for the Greater China Round. Team can participate in either or both seasons of contest, the team’s best result will be used to compete in the Greater China finalist award recognition and be qualified for the International Round.

Participating teams from Greater China region can choose: 1) to work on a problem created by the Problem Setting Committee of IM²C Greater China; 2) alternatively, register for a self-challenging problem, i.e., the team can choose freely a problem set by the team members themselves. Note that such problem must be a real world problem defined by the team.

3. Teams who work on the Committee-Set-Problem must complete and submit the solution paper within 96 consecutive hours at the assigned period of time. Teams working on the Self-Chosen Problem can decide on their own about the starting time and schedule; however, they must complete and submit their solution paper of modeling on or before the deadline of the seasonal contest in Greater China. Solution papers of the two categories will be judged separately. Teams whose papers are judged as among the top 20% of the two categories of papers respectively will automatically proceed to the International Round of IM²C 2019.
4. **Registration process, downloading problem/control sheet and uploading papers/materials for participation in Greater China should be performed on the online contest system: [www.istem.info](http://www.istem.info)** Teams who participate 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 authorization by and on behalf of parents/guardians.)

5. Each participating team must pay a registration fee US$55 for participating in IMMC 2019 (It covers both Greater China Round and International Round. Teams who are selected to proceed to the International Round are not required to pay extra registration fee). If the team needs an individual review report of their solution paper, they should pay extra US$50 when registering. The fees are used for cost sharing and non-profit purpose only.

6. Teams who choose **Committee-Set-Problem** can start at 8:00 p.m. on Friday 16 November 2018 (GMT/UTC +8 time zone) for the autumn contest; and/or 8:00 p.m. on Tuesday 29 January 2019 (GMT/UTC +8 time zone) for the winter contest. Teams must complete and submit a solution paper on the problem within the consecutive 96 hours. For the teams who choose **Self-Chosen Problem**, they can decide the starting time and the work schedule by themselves. All teams (of both Committee-Set-Problem and Self-Chosen Problem) must submit their papers on or before the deadline - 8:00 p.m. on Tuesday 20 November 2018 (GMT/UTC +8 time zone) of autumn contest; 8:00 p.m. on Saturday 2 February 2019 (GMT/UTC +8 time zone) of the winter contest.

7. The IM2C 2019 International Round for Greater China region will be held between 8:00 p.m. on Tuesday 12 March 2019 (GMT/UTC +8 time zone) and 8:00 p.m. on Sunday 17 March 2019 (GMT/UTC +8 time zone). The participating teams must complete and submit a solution paper on the problem created by the IMMC International Expert Panel within consecutive 120 hours. Team must complete the contest at the end of the 5th consecutive day.

8. Contest problems can be downloaded by logging into the IMMC Greater China website before the start of the competition.

9. Team advisors must ensure that there should have no any change made after the end of the contest (no later than 8:00 p.m. on 20 November 2018 for the autumn contest; no later than 8:00 p.m. on 2 February 2019 for the winter contest; no later than 8:00 p.m. on 17 March 2019 for the International Round contest).

The advisor is responsible for collection of the solution paper from the participating team and upload the paper (in PDF format) and control sheet (in PDF format) to the IMMC Greater China contest system at www.istem.info for the regional Expert Panel to review. Do not submit any program or software as they will not be used in the judging process except that it is required to do so. Only submit one paper from the
team for each upload. Each team is required one file in the submission that includes both summary and full solution. During the competition period, the team can upload the solution as many times as they wish. Only the last version of the uploaded solution will be saved. The names of the students, advisor or school 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.**

10. The deadline of paper submission: no later than 8:00 p.m. on 20 November 2018 (GMT/UTC +8 time zone) for the autumn contest; no later than 8:00 p.m. on 2 February 2019 (GMT/UTC +8 time zone) for the winter contest; no later than 8:00 p.m. on 17 March 2019 (GMT/UTC +8 time zone) for the International Round contest.

11. 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.

12. School should address students’ learning and living needs due to the participation in the IMMC contest. All accommodations relative to learning conditions for individual students would follow the accommodations used as part of the local school program in an affected student's daily learning. If specialized staff is required by local regulation and law, the school bears the responsibility for providing any specialized assistance as required by law or regulation.

**Please Keep Connected Online**

Each participating team will receive a control number via 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. Please read the IMMC Instructions and Rules carefully before joining the competition. For more information and sample problems of the contest, please visit [www.istem.info](http://www.istem.info), [immchallenge.org.hk](http://immchallenge.org.hk) or [immchallenge.org](http://immchallenge.org). 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 computing and model both graphs and geometric relationships.

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 IMMC professional.
development activities. Additionally, should their team be designated as an Outstanding or other award winner, the student's solution paper (or solution abstract) will 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.

Preparing a Solution Paper

1. When teams are ready for the contest, the team advisor may login to the IMMC Greater China website after the starting time to download the problem and distribute it to the team. The problem of IMMC 2019 (Great China Round) for Committee-Set Problem will be released at 8:00 p.m. on 16 November 2018 for autumn contest and 8:00 p.m. on 29 January 2019 for winter contest on the IMMC Greater China website. For teams who choose Self-Chosen Problem, they can decide the start date and the work schedule by themselves, but need to submit their solution paper before the deadline of the contest. The IMMC International Round will start at 8:00 p.m. on 12 March 2019 and by the same time, the problem can be downloaded from the IMMC Greater China website.

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. Whether teams choose Committee-Set Problem or Self-Chosen Problem, they may not use any person (other than team members) to discuss or obtain ideas for solving their problem 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 team's approach and methods and also how the team defines a problem and solves the problem (especially for Self-Chosen Problem).

5. For the IMMC (Greater China Round and International Round), teams can submit the paper and deliver finalist presentation in English or Chinese. However, papers submitted to the International Expert Panel via the International Round must be in English or translated into English. Papers must be typed and in English with a readable font of at least 12-point type. That means, if a paper in Chinese is selected by the Greater China Expert Panel and will represent the region to join the international judging, the paper must have been translated into English. Note: Teams from Mainland, Taiwan, Hong Kong and Macau of China can submit papers in Chinese at the International Round on 17 March 2019, but papers selected for review by the International Expert Panel must be submitted in English translation on before 4 May 2019. The teacher advisor must ensure that any translation is of the actual paper submitted, i.e. no changes have been made during the time it takes to translate the
paper. The translation must be a word for word translation and no improvements may be made.

6. The paper you submit should include a one-page summary sheet which should be the first page of your solution paper. Your full solution should be no more than 21 pages with summary page, excluding appendices and references). The summary is a very important part of your IMMC paper. The judges place considerable weight on the summary; the winning papers are always distinguished from other papers based on the quality of the summary. A summary is a first step for judges 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. No non-paper support such as computer disks will be accepted except that materials such as computer program 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 # IMMC19020201 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 grounds for disqualification.

11. Teams should keep in mind the following guidelines while preparing their solution papers:

- Conciseness and organization are extremely important. Key statements should present major ideas and results.
- For Committee-Set Problem, you should present a clarification or restatement of the problem as appropriate in your paper. For Self-Chosen Problem, it is required to state the problem and background that it is extended, improved or deepened on the basis of the literature and research by others; or define clearly the problem that is originally identified by the team.
- 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. Summarize 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 8:00 p.m. (GMT/UTC +8 time zones) on 20 November 2018 for IMMC 2019 Greater China Round Autumn contest; 8:00 p.m. (GMT/UTC +8 time zones) on 2 February 2019 for IMMC 2019 Greater China Round winter contest, and 8:00 p.m. (GMT/UTC +8 time zones) on 17 March 2019 for IMMC 2019 International Round.

2. Submit paper via IMMC Greater China website www.istem.info:
   A. All teams are required to submit electronic copy of the solution papers and completed control sheets through the Greater China Regional contest system.
      a. Submissions must be completed by 8:00 p.m. (GMT/UTC +8 time zones) on 20 November 2018 for IMMC 2019 Greater China Autumn; 8:00 p.m. (GMT/UTC +8 time zones) on 2 February 2019 for IMMC 2019 Greater China Winter and 8:00 p.m. (GMT/UTC +8 time zones) on 17 March 2019 for IMMC 2019 International Round.
      b. Failure in completion of submission before the deadline above will result in automatic disqualification in related contest.
      c. If the solution paper submitted to the International Round is in Chinese and is selected to proceed for International Expert Panel’s review, the corresponding team is required to translate the paper into English and submit the English paper by 4 May 2019. The content in the English and Chinese versions should be the same; team shall not make any further modifications, enhancements, additions or improvements of the content. Papers in Chinese and English will be cross-checked for the consistency; any changes of content will cause disqualification of the contest.
   B. Name your solution paper and control sheet with your team’s Control Number.
   C. IMMC will accept only an PDF or Microsoft Word file (If in Microsoft Word format, please compress your file as Zip or Rar format). Document size should be less than 17MB. DO NOT include programs 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 - emphasize 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 via the Greater China Regional contest system (immchallenge.org.cn or immchallenge.org.hk). 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.

IM²C2019 Finalist Presentation, Summit and Award Ceremony

1. The participating teams from Greater China region will have the chance to be recognised with different awards at both regional and international levels. Each team will have the opportunity to obtain regional and international awards including Outstanding, Finalist, Meritorious, Honourable Mention and Successful Participant.

2. IMMC is fair for each participating team and student. Paper of Committee-Set Problem and Self-Chosen Problem in Greater China Round and Problem in International Round will be judged separately. All papers will have a chance to be recognised with awards for regional and international contest in the Greater China region.

3. For both Greater China Round and International Round, selected teams will be invited by the organizer to proceed to the Finalist Presentation to be held in Hong Kong on 26-27 April 2019. Selected team for Greater China Round and International Round will be judged in front of the Grand Jury of Greater China, respectively.

4. The best two papers from each area (Mainland, Taiwan, Hong Kong and Macau) in the International Round (totally 8 papers) will be selected by the IMMC Committee Greater China for recommendation to the International Expert Panel. (Other participating country/region will select the best two papers too for the International Panel’s Judgement. The final judging by the International Expert Panel will be completed in June 2019. The selected solutions will be recognized as Successful Participant, Honourable Mention, Meritorious, or Outstanding.

5. The results of the Greater China Round and International Round Competition will be announced on the IMMMC website. News release on the results of the contest will be published in local and international media and publications.

6. The outstanding paper (or summary) from Greater China region and International Round will have the opportunity to be published. Recognition information will also be sent to local and international newspapers and radio/television outlets.
7. The IMMC 2019 Greater China Region Awards Ceremony cum Summit will be held in Hong Kong in the summer of 2019. Greater China teams who are recognised with Outstanding award in the Great China Round or/and International Round will be invited to deliver Plenary Speech in the summit/ceremony. The Outstanding winners in the International Final Judgement (or the Global Top5 Teams) will also be invited to attend the International Awards Ceremony on the 19th International Conference on the Teaching of Mathematical Modelling and Applications (ICTMA-19, www.ictma19.org) in Hong Kong.

8. If the award-winning team wish to publish their award-winning paper outside IMMC platforms, the team should first inform IMMC and obtain consent from the IMMC.

9. Teams attending the Finalist Presentation are responsible for all of their expenses of transportation and accommodation. IMMC organizer (COMAP and NeoUnion) will cover the transportation and accommodation expenses for Outstanding winner teams from International Final Judgement to attend the International Awards Ceremony and events.

10. Please note that if you need to apply for a Hong Kong visa, your passport needs to be valid for 6 months beyond the intended period of stay.

IMMC 2019 Schedule

The schedule of the 5th International Mathematical Modelling Challenge (IMMC 2019) in the Greater China region is as follows:

<table>
<thead>
<tr>
<th>Event</th>
<th>Dates</th>
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<tbody>
<tr>
<td>Registration</td>
<td>Deadline is 16 November 2018 (Autumn Contest)</td>
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<tr>
<td></td>
<td>20 November 2018 to 29 January 2019 (Winter Contest)</td>
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<tr>
<td>The Greater China Round</td>
<td>16 November to 20 November 2018 (Autumn Contest)</td>
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<td>(20 November is also the deadline for submission of Self-Chosen Problem paper)</td>
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<tr>
<td></td>
<td>29 January to 2 February 2019 (Winter Contest)</td>
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<td>(2 February is also the deadline for submission of Self-Chosen Problem paper)</td>
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<tr>
<td>International Round</td>
<td>12 March to 17 March 2019</td>
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<tr>
<td>Finalist Presentation</td>
<td>26-27 April 2019, Hong Kong</td>
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<tr>
<td>IMMC Greater China Awards Presentation cum Summit and International Awards Ceremony</td>
<td>mid-late July 2019, Hong Kong</td>
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