

International Nanotechnology Olympiad (INO) Regulation

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1. Description of the competition and Important Dates

International Nanotechnology Olympiad (INO) is a competition among university students from different participating countries being held annually in member economies. Participants propose their competitive ideas and plans as nanotechnology based solutions for problems related to global challenges. In line with the long term vision of INO as outlined in section 10, INO will aim to fully exploit potentials of nanotechnology in all possible application areas.

2. INO Objectives

The major objectives of INO can be summarized as follows:

- 2.1. To enhance the motivation of students towards gaining deeper knowledge of nanotechnology and acquiring skills for solving industrial challenges and fulfilling today's innovative applications
- 2.2. To improve the participants' basic knowledge and skills in innovation and commercialization processes
- 2.3. To reinforce the spirit of team work among the participants
- 2.4. To favorably affect the nanoscience and nanotechnology education in the participating economies
- 2.5. To create an international network of the contestants and participant institutions
- 2.6. To raise awareness about nanoscience and nanotechnology at national level in member economies and the international level in the future

- 2.7. To broaden the cross-cultural and international networking experiences among students
- 2.8. To create a self-sustainable system of educational material generation and new educational approaches in the field of nanoscience and nanotechnology
- 2.9. To foster and support the young and talented elites in the area of nanoscience and nanotechnology all over the world
- 2.10. To create a professional network of students, professors, government authorities, and enterprise companies with the aim to commercialize the innovative technological ideas
- 2.11. To assist the creation of a broad spectrum of new emerging businesses based on nanotechnology for students of participating economies
- 2.12. To familiarize the students with trade and business areas and how it works at the international level

3. Procedures and Time Schedule

- 3.1. INO will be held in two stages. At the first stage, each participating economy is responsible for announcing a national level call. After assessment and evaluation of teams by their national authorities, one team from each economy will be introduced to participate in the second stage of the competition.
- 3.2. INO important dates are given below:

Table 1. INO time schedule	
Date	Events
Before Jul. 1 of the year of contest	Specifying INO main theme(s)
Before Aug. 1 of the year of contest	Formal declaration of readiness by Interested economies
Sep 1 to Jan. 1 of the year of contest	• INO National announcement (INO 1st Stage) • National level teams selection
Jan. 20 of the year of contest	Deadline of teams' registration and submission of teams' plans
Mar. 15 of the year of contest	INO Jury members approval by INOStC
March 20	• Teams' Project Report Submission
Apr. 10	• INO second stage opening ceremony
Day 2	Boot Camping, Workshops & Visits
Day 3	Boot Camping, Workshops & Visits
Day 4	Demo Day and Appeal
Day 5	Tour
Last Day	Results announcement and award ceremony

4. Participation in INO

4.1. Participant teams should consist of up to four members and one supervisor. The team members are selected according to rules settled by national INO committees. Each economy has the right to suggest two Jury members and also a member of an INO scientific committee to be approved by the INO steering committee. Only teams suggested officially by the member economies are allowed to participate.

4.2. Participants should be qualified and meet the following requirements:

4.2.1. They should be a university student in undergraduate or graduate or PhD level.

4.2.2. They should have their own countries' passport and be covered by their health, travel, and accident insurances authorized by their own countries' assurance companies at the time of being in the host economy.

4.2.3. The members should have relevant knowledge/experience of nanoscience or nanotechnology-related fields and business-related areas.

4.2.4. They are expected to present innovative ideas which can contribute considerably to a product or service development process in a field pertinent to INO annually selected topics.

4.2.5. Participants cannot register in competition on their own; they should be introduced by credible institutions (such as a university/research centers, and other relevant local organizations) with approval of the teams by all steering committee members.

4.3. The works of the selected teams proposed for the second stage should be original and not disclosed previously.

4.4. Each team needs a supervisor assigned by the local national committee. The supervisor of a team should be fluent in English. Moreover, he/she should be at least an assistant professor in one of the nanotechnology- or business-related fields. As an alternative option, the supervisor can be a business owner (a chief manager or member of a management board) involved in fields related to the INO annually selected theme. The supervisor of the team acts as a connective link with the host economy and is responsible on behalf of the economy for the fulfillment of the current regulations by the team.

4.5. The local national committee/credible institution is responsible for providing International travel costs for its participants. After their arrival, the host economy is in charge of expenditures including transportation, accommodation, meals (breakfasts, lunch, dinner, and snacks) and recreations during INO. The host economy is not responsible for providing medical and visa costs.

5. Thematic Focus of INO

5.1. The Thematic focus of INO is determined in accordance with the new emerging applications of nanotechnology related to global social, environmental or industrial challenges. Participants seek innovative solutions in the areas suggested by INO Steering Committee in each period. Initially the following themes are being considered:

- ❖ Water and Wastewater Treatment
- ❖ Agriculture, Food and Packaging
- ❖ Alternative Energies
- ❖ Drugs & Medication
- ❖ Information and Communication

5.2. The host economy has the privilege to propose the next theme to the steering committee which will positively consider the proposal and will be responsible for approving and announcing the selected theme through the INO website officially.

6. INO Organization and Governance

INO structure is comprised of the steering committee, scientific committee, jury, permanent secretariat and executive secretariat. As shown in figure 1, international partners and sponsors are also a part of INO organizational structure. Each part of INO is explained below.

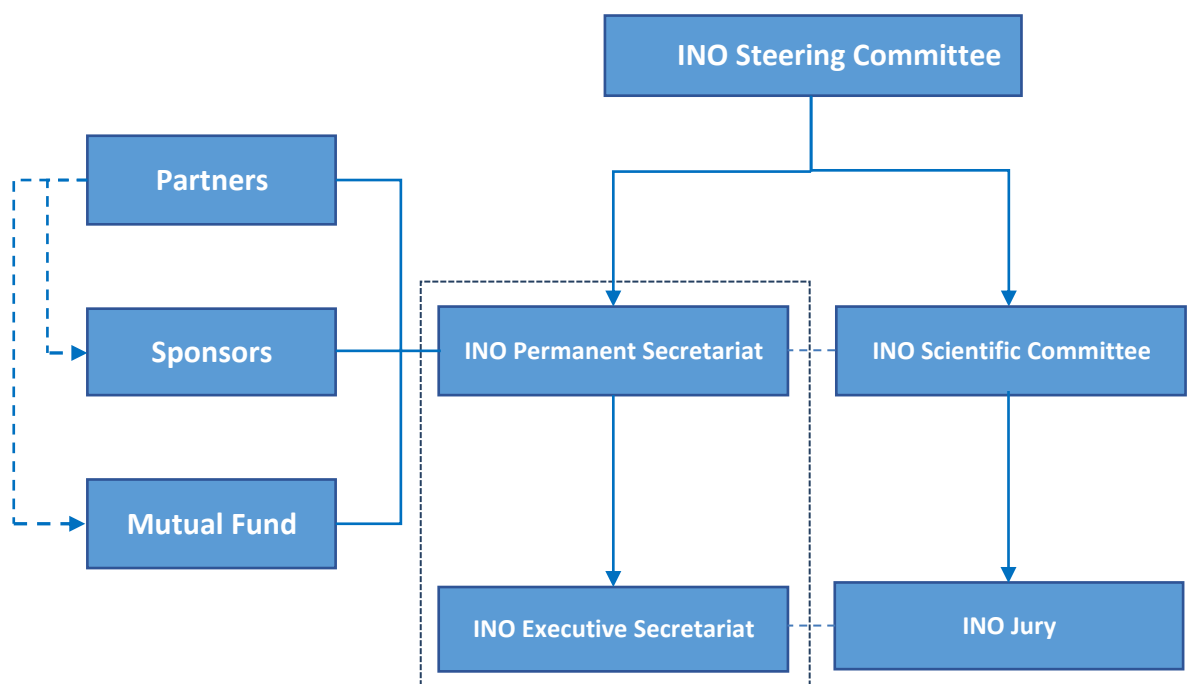


Figure 1. The organizational structure of the INO

6.1. INO Steering Committee (INOSTC)

The INO steering committee includes representatives of founding member institutions. Representatives of Iran, South Korea, Russia, Taiwan as the founders of INO are the initial members of INOStC. One economy, one vote policy is adopted in INOStC. Adding a new economy to INOStC needs all members' positive votes.

6.1.1. INOStC is the superior body for decision making and responsible for determining and updating the overall perspective of INO, strategy development, drafting and compilation of INO's Regulation, determination of thematic focus, model and content of the competition, determination of INO organizational structure, as well as supervising financial aspects.

6.1.2. INOStC can invite observers including the head of INO executive secretariat, representative of Asia Nano Forum, and other pertinent international or regional organizations to attend INOStC meetings. In special cases, INOStC may consider a vote right for observers subject to approval by all the INOStC members.

6.1.3. The chairman of INOStC is elected by an annual polling among INOStC members. The host economy has the privilege to nominate the next INOStC chairman. The official responsibilities of the chairman are as follows:

6.1.3.1. The management of decision making meeting and taking its minutes

6.1.3.2. Organizing in-person and online meetings of INOStC

6.1.3.3. Signing all of the letters and official documents in association with INOStC

6.1.3.4. Attending the international INO-related events as the representative of INOStC

6.1.3.5. The management and supervision of all official and organizational activities in INOStC

6.1.3.6. In the absence of INOStC chairman, the vice-chairman should follow the scheduled works. The vice-chairman is selected by the INOStC chairman among the INOStC members and is the subject to be approved by all the INOStC members.

6.1.4. The presence of two-thirds of INOStC members in decision making meetings is required. The final approval of all decisions needs positive vote of at least a half of the attending members. In the case of equal votes, the steering committee's chairman will adopt the final decision.

6.1.5. The working language of INOStC is English.

6.1.6. INOStC will hold at least two in-person meetings annually.

6.1.7. Other responsibilities of INOStC are as follows:

6.1.7.1. The supervision of the execution of INO in accordance with the regulations

6.1.7.2. The assurance of proper and fair evaluation of team's performance by interacting with the INO Jury

6.1.7.3. The final confirmation of the competition results after approval the results of the INO Jury work

6.1.7.4. The selection of a host economy for future competitions

6.1.7.5. The decision making about the committed infractions and different ways to deal with them such as permanent or temporary exclusion of wrongdoer or its economy from INO

6.1.7.6. The accreditation of member economies' representatives in INOStC

6.1.7.7. The increment in the number of INOStC

6.1.7.8. The accreditation of the INO scientific committee

6.2. INO Permanent Secretariat (INOPS)

6.2.1. By the confirmation of INOStC, Iran Nanotechnology Initiative Council (INIC) is selected for the official management of INO permanent secretariat (INOPS). This secretariat contributes to organization and fulfilling the long-term goals of INO and facilitating the connection between the INOStC and the host economy. The management and the progress of the INOPS is reviewed annually by the INOStC with the aim to match with its missions.

6.2.2. The head of INOPS is proposed by INIC and would initiate her/his activities after the official confirmation of INOStC.

6.2.3. Other responsibilities of INOPS are as follows:

6.2.3.1. Collection and publication of previous documents according to the disclosure rules related to the documents

6.2.3.2. Management and supervision of the INO official website

6.2.3.3. Establishing distance education platform

6.2.3.4. Supervision of INO executive secretariat's activity from the beginning of INO first stage to the final stage and reporting to INOStC

6.2.3.5. Consideration of the official requests of interested economies to host the competition, evaluating the qualification

of applicant economies, and presenting a report about their competency to INOStC to be approved by this committee

6.2.3.6. Preparing the final report about holding the INO at most two months after the end of INO and presenting it then to INOStC for discussion and planning the further work

6.2.3.7. Facilitating of INO networking with other active and effective organizations

6.2.3.8. Interacting with other international/ financial/ educational organizations in order to achieve INO goals under supervision of INOStC.

6.2.4. To facilitate initiation of INOPS activities, INIC will cover the permanent secretariat costs until the end of the first INO. However, for long term financing of the INOPS activities, it is assumed to establish a fund and financing mechanisms.

6.2.5. The URL link of INO official website is www.Nanoolympiad.org. The registration of participants, online education, online consultation about the ideas, presentation of project status review, and announcement of all competition-related news will be done through the INO official website. The INO permanent website is a platform for announcement of sponsors, partners and supporters of each period of INO. Each team has its own webpage on the website for INO-related activities such as “results announcements”, “objection to INO Jury decisions”, “receiving consultations”, “education”, and “registration”. The webpages of the teams will be archived after releasing the annual / final results.

6.3. INO Executive Secretariat (INOES)

6.3.1. National nanotechnology development bodies (like public sector institutes, S&T Parks and so forth), the Ministry of Science (Universities etc.), or other pertinent organizations in the host economy have the overall responsibility for organization and arrangement of INO as INO executive secretariat.

6.3.2. The official responsibilities of INOES are as follows:

6.3.2.1. Performing online and in-person education for selected teams from the beginning to the end of the period in each stage by coordination with INOPS (Appendix 1 includes the Proposed curriculum educational content. It should be confirmed by the INO scientific committee).

6.3.2.2. Carrying out the Olympiad in accordance with the regulations.

6.3.2.3. Time planning and management before, during, and after INO.

6.3.2.4. Providing the regulations and the customs of the host economy and actual contacts (the address, telephone number, fax, the email etc.) of INO authorities before the start of INO for participants.

6.3.2.5. Providing the proper information for INOPS in order to update INO permanent website contents.

6.3.2.6. Facilitating the process of applying for visa including invitation letters.

6.3.2.7. Providing the medals, certificates, and awards.

- 6.3.2.8. Financial support (as defined in section 4.5) of the participant teams as they enter the host economy until they leave it out.
- 6.3.2.9. The investment attraction and financial support for holding INO.
- 6.3.2.10. Provision of security for all INO teams and guests.
- 6.3.2.11. Public announcement of official results in the closing ceremony
- 6.3.2.12. Holding the opening and closing ceremony of INO
- 6.3.2.13. Development and providing of documentation of the INO final stage including collection of photos and videos
- 6.3.3. The following requirements should be met till one economy is capable of hosting INO:
 - 6.3.3.1. Capable of provision of security and safety for participants.
 - 6.3.3.2. The applicant economy should be able to provide proper educational, operational, infrastructural facilities.
- 6.3.4. The applicant economy should be ready to raise a fund for running INO and financial support of teams, their representative and jury members.
- 6.3.5. If no economy volunteers for hosting INO is suggested, INOStC will choose one of their members as the future host. The economy which has not been the host for a long time will be given priority to be chosen as the next host.

6.3.6. In the case of force majeure condition in the host economy, it is obliged that INOES inform INOPS within a week. Under such conditions, a special meeting in INOStC will be held and one of the following decisions will be made:

- INO will not be held in a certain period.
- As the first priority, the holding of INO will be delegated to a volunteer economy and as the second priority, to the next host economy holding of competition might be postponed to another date in these conditions.

6.4. INO Scientific Committee and Jury

6.4.1. INO Scientific Committee (INOScC) members are proposed by the INOStC members annually and are confirmed in INOStC meetings. Once the INOScC members are assigned, INOPS sets an INOScC meeting.

6.4.2. The chairman of INOScC is annually elected by its members followed by approval by the INOStC. His/her presence is obligatory in all official meetings of INO Jury.

6.4.3. Responsibilities of INOScC are as follows:

6.4.3.1. Evaluation and modification of criteria for judgment in the regulation.

6.4.3.2. Declaration of the technical results of competition to INOStC.

6.4.4. INO Jury is responsible for the judgment of the team reports/works of the competition based on the criteria and indicators verified by INOScC. The jury members will be proposed by INOScC and approved by INOStC. The expertise of the jury should cover at least the following areas:

- ❖ Science
- ❖ Technology
- ❖ Market and business
- ❖ Skills

6.4.5. Annually the INOScC will determine the specific educated curriculum in accordance with the annual theme of the INO.

6.4.6. INOScC decides about the number of members of the INO jury annually (6 to 10 members).

6.4.7. Every year, INOES is responsible for funding all/local costs of INO Jury (for supporting local expenditures like accommodation costs and etc.).

7. Competition model

7.1. After announcing INO main themes for the year, the interested economies have at most a one-month period of time to declare their readiness for attending the competition to INOPS.

7.2. INO will be held at two stages. In all of two stages, the participant teams are looking for solving a problem related to a global challenge using nanotechnology (nanoscience). In addition to the scientific and technical issues, the participants should also empower their business and teamwork skills.

7.3. The first stage of competition will last for 4 months. The second stage of INO consists of about 3 months of local project development and 5-7 days in-person competition in the host economy.

7.4. At the first stage of INO, every economy will announce a call at the national level and invite the participants to present their technological ideas and plans with the aim to address the problems and challenges of interest. The way the participants should disclose their ideas depends solely on the overall policies of the participant economy. It is allowed to provide a fundamental idea and its possible practical implementations or an industrial / laboratory prototype. The ultimate outcome of this stage will highlight the selected teams which are eligible for their entrance to the Final stage.

7.5. The teams who are eligible to attend the Final stage of the competition should register on the official INO website and fill the required forms which include their proposed plan.

7.6. The Final stage of competition will be held in-person for 5 - 7 days in the host economy. Teams must prepare a presentation file and present it to the jury.

7.7.The presented plans/works at least should have the technology readiness level (TRL) 2 and manufacturing readiness level (MRL) 1.

[A definition for these can be find here: http://www.nextflex.us/wp-content/uploads/2016/05/NextFlex_PC2.0_MRL-TRL_Definitions.pdf]

8. Competition Judgment

8.1.The competition judgment is based on judgment criteria as follows:

1) Core Concept/Idea Novelty & Impact (40/120)

		Score
Novelty	○ Patent Analysis ○ Literature review	20
Impact	○ Social & Environmental Impact	20

2) Scientific/Technological Aspects (40/120)

General	○ Problem framing ○ Solution design process, background and originality	10
Scientific	○ Scientific novelty, sound basics and consistency ○ Nanotechnology role in the proposed product/technology ○ Modeling verification ○ Experimental lab scale verification	10
Technological	○ Technological novelty ○ Technical feasibility ○ Technical risk assessment ○ Safety and environmental risk consideration if applicable ○ Regulation/certificates ○ TRL analysis ○ Supporting technologies	10
Industrial aspects	○ Production process novelty ○ Prototyping ○ Field tests ○ MRL analysis	10

	○ Scale-up potentials/raw material accessibility ○ Production technology availability ○ Manufacturing related EHS issues	
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3) Business Aspects (40/120)

General	○ Business novelty ○ Business model ○ Business Risks	10
Competitiveness	○ Cost/Quality	5
Market	○ Market Trend/Size/Share ○ Early Adopters (identification/survey) ○ Competitors	5
Teamwork and organizing	○ Structure and coordination ○ Presentation and Pitching Skills	10
Finance	○ Cost/ Revenue analysis ○ Proposed investment plan	10

8.2. The judgment is based on the proposal, the project report and final pitch of each team.

8.3. In case of any objection, the supervisor of each team is allowed to appeal the decision of the Jury to INOScC which will vote for the final decision. In case of equal votes, the chairman of INOScC will make the final decision. After the results are confirmed by INOSTC, the overall ranking of teams will be announced and then cannot be objected / changed.

9. Awards

9.1. The awards for the final stage of INO include medals/statues and a prize for the superior teams suggested by the host and approved by the INOSTC.

9.2. In total four awards will be granted as follows:

9.2.1. The team with the most novel and highest impact idea

9.2.2. The team with the best project in terms of scientific and technical development

9.2.3. The team with the best project in terms of business development aspects

9.2.4. The team with the best total score from the three aspects

9.3. The four selected teams will receive prizes worth from 2000 to 3000, euros.

9.4. The participant teams who have not won the competition should receive official honorary diploma.

9.5. Each team may attract the investors in the demo day and receives a seed fund or job offer for his plans.

10. Long Term Vision

10.1. Initially, INO is inclined towards promotion and education. As time proceeds, the importance of solving problems (in particular, environmental and industrial issues), commercialization, and business aspect will be highlighted. It is also envisaged that the expected technology readiness level and manufacturing readiness level of each teams' plans will be increased. TRL 5 and MRL 4 may be targeted for later INO periods.

10.2. Creation of an international acceleration network among member economies is a part of the long term vision. The objectives behind this network are as follows:

- 10.2.1. The identification of venture investors and making a connection between them and winners of the competition.
- 10.2.2. The identification of technology buyers
- 10.2.3. The familiarity with industrial challenges through categorized information of related organizations and using them as central topics in INO.

11. Validity of regulation

- 11.1. The content of this regulation is amendable and can be changed only by the INO steering committee. All of the probable changes will be available on the INO official website.
- 11.2. This version of regulation is revised and approved during the second meeting of INO steering committee in Tehran on 19 and 20 April 2017.
- 11.3. The participants of INO and other authorities must obey the regulation. Therefore, the violation of any prescription of that regulation might give rise to the expulsion of a part or whole the team by INO steering committee.

Signature of the representative of economies

Appendix 1: Judgment Criteria Guidelines

1) Core Concept/Idea Novelty & Impact (40/120)

Novelty	○ Patent Analysis ● A report on patents related to the provided solution ○ Literature review ● An overall review of previous works in the same field from technical and application perspectives
Impact	○ Social & Environmental Impact ● Evaluation of the social and environmental impact of the proposed solution based on facts and figures

2) Scientific/Technological Aspects (40/120)

General	○ Problem framing ● Clear definition of the targeted problem and its dimensions ○ Solution design process, background and originality ● A description of the process which has led to the proposed solution
Scientific	○ Scientific novelty, sound basics and consistency ● Explaining the scientific basis of the solution and provision of possible scientific novelty if any ○ Nanotechnology role in the proposed product/technology ● Explaining the role of nanotechnology in any enhancement or novel properties in the solution ○ Modeling verification ● Verification of the solution features or product characteristics through (computational) modeling ○ Experimental lab scale verification ● Verification of the solution features or product characteristics through laboratory tests
Technological	○ Technological novelty ● Explaining technical novelty if any ○ Technical feasibility ● Provision of facts supporting feasibility of the proposed technology in real application from technical aspects ○ Technical risk assessment ● Describing possible technical risk for the further development of the idea/project ○ Safety and environmental risk consideration if applicable

	• A report on possible safety and environmental risks of application of the technology in the specific field of application ○ Regulation/certificates • Consideration of the relevant regulation and certificates for use of the technology ○ TRL analysis • Assessment of the technology readiness level ○ Supporting technologies • Considering other supporting technologies required for the further developments
Industrial aspects	○ Production process novelty • Description of any novelty in the process of production ○ Prototyping • Description of any activity in building prototypes and testing it ○ Field tests • Description of any field test ○ MRL analysis • Report on manufacturing readiness level ○ Scale-up potentials/raw material accessibility • Description of potentials or challenges of scale up in production ○ Production technology availability • Description of the availability of the production technologies ○ Manufacturing related EHS issues • Report on EHS issues related to manufacturing

3) Business Aspects (40/120)

General	○ Business novelty • Description of novelty in business model and other business aspects ○ Business model • Description of the business model comprised of added value for customers, revenue channels, market channels etc. ○ Business Risks • Description of possible business risks like need to high investment etc.
Competitiveness	○ Cost/Quality

	• Description of the core competitive advantages including lower cost or higher quality of the final product/service
Market	○ Market Trend/Size/Share • Description of market trend, market size and estimated share of the new product in the market ○ Early Adopters (identification/survey) • Description of the early adopters and activities which have been done for connecting to them ○ Competitors • Description of any study done on the competitors in the targeted market sector
Teamwork and organizing	○ Structure and coordination • Description of the designed structure and organizing activities and proving a good understanding of the challenges ○ Presentation and Pitching Skills • The quality of the team presentation and pitching
Finance	○ Cost/ Revenue analysis • A report explaining the cost and revenue analysis ○ Proposed investment plan • Provision of an investment plan including the required level of investment and the proposed investment model to further develop the idea and make it a business