



INDUSTRY 4.0 STUDENT CONTEST 2022 BY MINDSPHERE WORLD



2^a Edition of the competition dedicated to Cloud and IoT for industry, reserved for students at the Politecnico di Milano

Regulation

Foreword

MindSphere World establishes, in collaboration with the Fondazione Politecnico di Milano and the Politecnico di Milano, the second edition of the 'Industry 4.0 student contest 2022 by MindSphere World' reserved for groups of students at the Politecnico di Milano from the master's degree courses of the **School of Industrial and Information Engineering**.

1. Purpose

The competition aims to stimulate students to develop **cloud solutions that take advantage of Industry 4.0** to improve the management of a production system. The competition involves the hands-on use of **MindSphere¹, the platform on which the reference ecosystem for IoT and cloud in industry is based**. With this in mind, the competition is intended to be an experience in approaching professional challenges, valid not only from a personal training point of view, but also to bring students into contact with the digital transformation of companies facing innovation trends in Industry 4.0, factors that are accelerating the growth and diversification of applications.

2. Characteristics of projects to be developed

The realisation of a cloud application for Industry 4.0 is proposed, to be run on the Siemens MindSphere platform (see appendix A on project characteristics) using the tools available with the "Start4Free"² *freemium* plan and the open-source solutions made available by the MindSphere user community³. Students will be trained on the MindSphere platform for developing and deploying cloud applications, and will then present a project for this platform.

The official languages of the competition are Italian and English.

3. Working Groups

Students **from the School of Industrial and Information Engineering** at the Politecnico di Milano are eligible to enter the competition.

- Each project must refer to a working group, formed by a minimum number of 2 and a maximum number of 5 students from Politecnico di Milano, one of whom must be appointed as Correspondent.
- Each team can work on only one project.
- Each person may only be part of one group.

4. Choice of participation theme

The choice of theme for the contest must adhere to the scope of Industry 4.0.

¹ <https://mindsphere.io/>.

² <https://siemens.mindsphere.io/en/start>.

³ <https://opensource.mindsphere.io/>.



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The projects will be developed on the basis of the theme freely chosen by the group of students, in the context of Industry 4.0, in accordance with the modalities set out in Appendix A 'Features of the projects proposed by the students'. Ideas and suggestions on the topics will be provided to the students during the meetings scheduled in phase 1 of the competition and may come from projects in the Industry 4.0 Lab of the Politecnico di Milano, companies and institutions belonging to MindSphere World as well as from Master's degree courses.

5. Entering the competition: how and when

To participate in the competition, entries must be received no later than **24 October 2022**.

To register, simply fill in the contest form, available on the Fondazione Politecnico di Milano webpage (<https://www.fondazionepolitecnico.it/progetti/industria-4-0/mindsphere-world/>).

Type of registration: students may choose to **register individually** or in **groups** (each group member must register individually by entering his or her name, surname, e-mail and the name of the group agreed upon with the other group members).

For problems during registration, please contact info-industry40lab@polimi.it.

The organisers reserve the right to extend the registration period or cancel the competition if the number of participating groups reached is less than 10.

6. Project and contest documentation

The **Industry 4.0 student contest 2022 by MindSphere World** will take place in **2 stages**.

The **first** phase (idea challenge) will end **no later than 2 December 2022**.

In this phase the participating groups will have to elaborate and describe the concept of their project.

Projects deemed suitable by the jury will advance to the second stage.

The **second** (boost program) phase will end **no later than 15 March 2023**.

In this phase the participating groups will have to implement the presented project in practice.

In order to be accepted, **the project documentation, at the end of each phase, must be transmitted in file-sharing format** to the technical secretariat of the "**Industry 4.0 student contest 2022 by MindSphere World**" competition, in accordance with modalities that will be communicated.

The documents to be submitted can be found in the Appendix to these Regulations.

Stage 1 of the contest – idea challenge:

Each group formed after registration must, under penalty of exclusion from the contest, attend the following meetings:

- **28 October 2022: introductory event** for the contest, via Teams (or other platform to be communicated) or in the classroom, and **presentation of MindSphere World** and the **Industry 4.0 Laboratory** of the Department of Management Engineering of the Politecnico di Milano. The final composition of the groups will be announced during the event.
- **7 and 9 November 2022: introductory and basic training** in the use of MindSphere.
- **11 November 2022: visit to the Industry 4.0 laboratory at the DIG** to present the opportunities in the laboratory to students interested in the Contest.
- **3 November 2022 - 2 December 2022: Preparation of project proposal concepts by students and submission** to the secretariat.



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- **12 December 2022:** Announcement of the **top 10 groups**, of which **5 finalist** will have the possibility to enter the boost program.
- **23 January 2023:** “idea challenge” public award ceremony (date to be confirmed)

Stage 2 of the contest – boost program:

All groups participating to the boost program must, under penalty of exclusion from the contest:

- **15 December 2022 - 15 January 2023:** take part in the **first part of the MindSphere-specific training**, which will take place in a manner agreed with the finalist groups on the basis of at least 1 day (virtual or in-person depending on possibilities).
- **16 January 2023 - 28 February 2023:**
 - o participate in the **second part of the specific MindSphere training**, which will take place in a manner agreed with the finalist groups on an indicative basis of 2 half-day classroom sessions (virtual or face-to-face depending on possibilities) as required.
 - o **elaborate the project proposed in phase 1:**
 - through the material provided by the Industry 4.0 Lab, MindSphere World companies or projects related to master's degree courses; with regard to the data collected by the lab, the research team makes itself available to solve any technical problems and to support in making the solutions proposed by the groups work, with regard to the lab equipment.
 - With the support of MindSphere World, and any related companies, for the realisation of the prototype to ensure its operation in a real industrial environment.
 - in case of difficulties with the MindSphere platform, the groups can refer:
 - to the MindSphere website: documentation.mindsphere.io;
 - to the MindSphere community at: <https://siemens.mindsphere.io/en/developer>;
 - to the MindSphere World association (e-mail: info@mindsphereworld.it) via its experts.
- **Spring 2023:**
 - o Present work during webinars and national/international seminars.

7. Selection Committee

The awards of the "**Industry 4.0 student contest 2022 by MindSphere World**" will be assigned by a **Judging Committee**, composed of experts from MindSphere World and representatives from the Fondazione Politecnico di Milano and the Politecnico di Milano.

During the project evaluation phase, the experts of the Selection Committee may make use of the possibility of contacting the group and its members in order to ascertain and understand the proposed solution in detail.

The judgement of the Selection Committee is final.

8. Awards

The best 10 projects of the first phase (idea challenge) will be awarded a prize⁴ of € 200 each.

⁴ Not subject to VAT ex art. 2 of D.P.R. n. 633/72, lettera m



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The 5 projects of the second phase (boost program) will be awarded the following prizes⁵:

1st classified group: Amazon vouchers with a total value to the group of € 1.200,00.

2nd classified group: Amazon vouchers with a total value to the group of € 800.00.

3rd classified group: Amazon vouchers with a total value to the group of € 500,00.

4th classified group: Amazon vouchers with a total value to the group of € 250.00.

5th classified group: Amazon vouchers with a total value to the group of € 250,00

The total value of the vouchers will be divided equally between the members of each ranked group.

In addition to the above-mentioned prizes, MindSphere World will issue the following awards:

Students admitted to the finals and who have submitted a complete project in all its parts, regardless of whether it was deemed worthy of a prize, will be awarded a certificate of Finalists of the 'MindSphere World student contest 2022'.

9. Non-awarding of prizes

The Jury reserves the right, at its sole discretion, not to award all or part of the prizes if it considers that the projects submitted have not reached a minimum quality level.

10. Notification of winners

The competition secretariat will inform the winning groups **by 30 March 2023**.

11. Award Ceremony (idea challenge)

The Industry 4.0 student contest 2022 by MindSphere World will be awarded by January 2023 at the Politecnico di Milano.

The Award Ceremony will be presided over by the top management of MindSphere World, the Fondazione Politecnico di Milano and the Politecnico di Milano, the press and personalities from companies or organisations and associations.

12. Information on registration and contest meetings

In matters relating to registration and meetings for the 'Industry 4.0 student contest 2022 by MindSphere World', you can request information and assistance from the following e-mail: info-industry40lab@polimi.it.

13. Dates to remember

24 October 2022 - Closing date for entries

2 December 2022 - Date of submission of project concept proposals phase 1 – idea challenge

23 January 2023 – Award Date (idea challenge)

15 March 2023 - Submission date for projects phase 2 – boost program

30 March 2023 - Winners announced

April 2023 - Award Date (boost program)

14. Obligations of Participating Students

By registering for the "Industry 4.0 student contest 2022 by MindSphere World" the Students make the following commitments: the finalists will personally attend the Award Ceremony, in the manner and at the times indicated in these Regulations or communicated later. Any travel and/or accommodation expenses will not be recognised. Registration and

⁵ Not subject to VAT ex art. 2 of D.P.R. n. 633/72, lettera m



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submission of the project implies acceptance of all the rules and procedures set out in these Rules and Regulations, under penalty of forfeiture from the Competition itself.

This competition may in no way be construed as an offer of employment or the establishment of an employment relationship with the promoting organisations and participating companies.

Participants who are not winners may not make any financial claims whatsoever against the promoters and participating companies.

By registering for the Industry 4.0 student contest 2022 by MindSphere World, students assign the exclusive, proprietary and non-proprietary rights of use of the submitted work.

15. Project Dissemination

The organisers are authorised by the students, upon registration, to disclose to the press, or publish freely, all the Projects received, the names of the authors without any charge. The editorial copyright for the dissemination of the projects' contents is owned by MindSphere World, valid worldwide and cannot be transferred to third parties by the students. Submitted materials will not be returned.

16. Promotion of the competition

The secretariat of the "Industry 4.0 student contest 2022 by MindSphere World" also fulfils the task of disseminating the Rules and Regulations among the study courses of the Politecnico di Milano referred to in the preamble of these regulations and of promoting the diffusion of the news related to the contest participation, the notification of the winners and the organisation of the awarding phase. The planned actions are aimed at fostering the achievement of the main objective, which is to bring students closer to the use of the IoT and cloud ecosystem in the MindSphere industry.

17. Processing of personal data

MindSphere World, Fondazione Politecnico di Milano and Politecnico di Milano are autonomous data controllers for the competition.

As far as Fondazione Politecnico di Milano is concerned, each student registering for the competition must fill in the relevant information sheet (available on the Fondazione Politecnico di Milano website, on the competition page) and send it to: privacy@fondazione.polimi.it.



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Appendix A - Characteristics of the projects proposed by the students

The topic under Industry 4.0 themes chosen by the students must propose the realisation of an actual Industry 4.0 application development project, compulsorily created using the MindSphere solution.

The chosen Industry 4.0 theme must be checked for its applicability to the facilities of the Industry 4.0 Laboratory of the School of Management of the Politecnico di Milano, if the project fits into this context. Please note that project opportunities may also arise from MindSphere World companies and institutions, projects in Master's degree courses or dissertations.

Project proposals (idea challenge) will have to be detailed and meet specific requirements for delivery on 12 December 2022 as detailed below:

Detailed features of project proposal concepts and specific requirements for the delivery for the idea challenge

In order to be considered valid, each submitted project concept proposal must consist of 10 slides illustrating the proposal of a real application project for Industry 4.0, highlighting the MindSphere functions involved, and also carrying out a "pre-feasibility" assessment. Optionally, a video explaining the concept may be included in the presentation.

The final projects must have detailed features and meet specific requirements for delivery on 15 March 2023 as detailed below:

Detailed project characteristics and specific requirements for final delivery of the boost program

In order to be considered valid, each submitted project must comply with the following characteristics:

- *The project must be a **real application project for Industry 4.0** and must be created in its entirety by the team in an original way.*
- *The project, which **must be developed in the MindSphere environment**, will be realised using the solutions available under the MindSphere 'Start for Free' plan, Open Source software and resources made available by the Laboratory as part of the contest.*
- *Evaluation criteria will include creativity, innovation, originality, applicability, comprehensibility and completeness as well as the quality of the documentation.*

The project must be accompanied by:

- a) Comprehensive description of the project and its operation (including any explanatory drawings), indicating team members, courses of study, a concise and representative title and objective of what has been developed.*
- b) The software programme for the project - which must be capable of performing the tasks set out in the project description, and be able to function perfectly - must be provided with comments and must also list any additional functions and packages required for its operation.*
- (c) Explanatory table of the variables and signals used.*
- d) Any documents and videos considered useful to complete the project. Such additions to the final delivery are to be considered optional, but recommended in order to improve the understanding of the project in its entirety and/or for specific passages.*