

REGULATIONS
on holding a team project competition of
Russian-African Forum of Young Scientists
"Future engineers of the World - the Foundation of Sustainable Development"
under the auspices of UNESCO

1. General provisions

1.1. These Regulations determine the procedure for organizing, holding and summarizing the results of the Russian-African forum-competition of group projects of young scientists "Future Engineers of the World - the Foundation of Sustainable Development" (hereinafter referred to as the Forum-competition).

1.2. Founders and organizers of the Contest Forum:

- Empress Catherine II St. Petersburg Mining University.
- International Competence Centre for Mining-Engineering Education under the auspices of UNESCO.
- All-African Students ' Union (AASU).
- The Consortium of Universities "Nedra".

1.3. Objectives of the Contest Forum:

- Development of Russian-African scientific and technical cooperation.
- Identify and support talented students and young scientists working on solving current engineering problems.
- Creation of an active **Russian-African Association of Young Engineers** (as a network of Forum graduates) - *"Ambassadors of Education of the Mining Engineering Corps"*.
- Formation of a bank of promising projects for potential implementation.
- Conclusion of agreements on student exchanges and joint research projects between specific universities.
- Strengthening the image of Russia as a reliable partner in the field of high-tech education and knowledge transfer.
- Increasing the brand awareness of the Empress Catherine II St. Petersburg Mining University.
- Encourage the creation of projects aimed at achieving the UN Sustainable Development Goals (SDGs) in Russia and Africa.
- Promoting the implementation of the best youth scientific initiatives.

1.4. Official languages of the Forum-competition: Russian, English.

2. Participants and project requirements

2.1. Senior students, postgraduates and young scientists (up to 35 years of age inclusive) from the Russian Federation (The Consortium of Universities "Nedra") are invited to participate in the Forum-competition) and countries of the African continent.

2.2. Team composition requirements:

Quantitative composition: **from 3 to 5 people.**

International composition: The Organizing Committee welcomes the formation of mixed (international) teams, including citizens of the Russian Federation and citizens of African countries. For such teams, an additional bonus is provided when evaluating the overall project trajectory (taken into account in the criteria "Considering the implementation context" at the full-time stage).

Allowed: formation of mono-national teams (only from an African country). In this case, when defending the project, the team must demonstrate a deep understanding of the specifics of the partner country for the successful implementation of development.

Roles in the team: it is recommended to assign roles (project leader, development engineer, analyst, implementation specialist, etc.), which should be reflected in the application.

2.3. Project directions (nominations)

Track 1. "ENERGY OF THE FUTURE": Smart Energy Solutions for Africa

Focus: Ensuring energy accessibility and reliability in African countries through a balance of traditional resources and renewable energy sources. Technical solutions.

Priority areas:

- Hybrid energy systems: optimization of resources (solar/wind + gas/coal) for autonomous facilities.
- Prospects for the development of nuclear energy and small modular reactors in Africa.
- Technological solutions in energy consumption management and transport electrification.
- Geothermal energy and "clean coal" technologies.

Track 2. "RAW MATERIALS DIPLOMACY": Economics, Law and Partnership for Sustainable Development

Focus: Legal and economic mechanisms of Russian-African cooperation in subsoil use. The role of young people in green supply chains formation.

Priority areas:

- Fair transfer of technologies and localization of production in Africa.
- ESG standards in developing markets: challenges and opportunities.
- Involvement of local communities in resource development projects.
- Project management.

Track 3. "SMART SUBSOIL": Digital Transformation and Automation in the Mineral Resources Complex

Focus: Application of end-to-end technologies (AI, Big Data, IoT) to increase the efficiency and safety of exploration, mining and processing of minerals.

Priority areas:

- Digital twins of deposits and mining enterprises.
- GIS and neural networks for predictive resource modeling.
- Industrial & labor safety.

Track 4. CLIMATE, ECOLOGICAL AND BIODIVERSITY ENGINEERING

Focus: Engineering methods for ecosystems conservation and industry adaptation to climate change. *Support for UNESCO mandate to combat climate system disturbances (SDG 6, 13, 15).*

Priority areas:

- Water management in mining (tailings store, wastewater treatment).
- Carbon polygon engineering and greenhouse gas monitoring.
- Ecosystems conservation during the development of new mines and areas.

- Minimization of the environmental footprint during the processing of difficult-to-process ores.

Track 5. "CHEMISTRY OF THE FUTURE": Chemical Technology and Deep Processing of Hydrocarbon and Mineral Raw Materials

Focus: Engineering solutions in the field of chemistry and chemical technology aimed at creating added value within African countries, developing small-scale and large-scale chemistry, as well as greening the processes of minerals and oil and gas refining.

Priority areas:

- Technologies for deep oil and gas refining on the African continent (polymers, synthetic fuels and components for the chemical industry).
- Processing of associated petroleum gas (APG) and reducing flaring in African countries.
- Catalytic processes and new catalysts for processing African oil (including high-sulfur and heavy oil).
- Chemical methods for extracting rare-earth, noble, and non-ferrous metals from complex mineral raw materials found in African deposits.

Track 6. "MINING TECHNOLOGY": Mining Engineering and Rational Subsoil Development

Focus: Engineering solutions in the field of mines of solid minerals development, ore processing and mining operations management, ensuring high efficiency, industrial safety and environmental sustainability of mining enterprises in Russia and Africa.

Priority areas:

- Modern technologies of open and underground mines development in the conditions of the African continent.
- Innovative development systems for complex-structured and deeply located ore bodies.
- Mining machines and equipment.
- Mining production transport systems.

Track 7. «OIL & GAS ENGINEERING»: Technology transfer and personnel training for projects in Africa

Focus: Training engineers for the oil and gas sector.

Priority areas:

- Development and operation of oil and gas fields in the specific conditions of Africa (shelf, deserts, tropics).
- Design and operation of pipeline transport systems and oil and gas storage facilities, taking into account logistics and the continent's climate.
- Technology for drilling oil and gas wells in complex geological conditions of Africa.
- Modern methods and techniques for exploration of mineral mines (seismic surveys, GIS) applied to African basins.
- Machinery and equipment for oil and gas fields: adaptation of Russian equipment to tropical climates and remote facilities.

Track 8. "MECHANICAL ENGINEERING": Subsoil equipment and full-cycle engineering

Focus: Development and implementation of engineering and logistics solutions for industry and transport.

Priority areas:

- Automation of mechanical engineering and production technologies.
- Engineering of equipment.
- Transportation management and transport systems.
- Reliability of automotive equipment and transport technologies.

Track 9. "GEOLOGY": Global competencies for the future resource base

Focus: Training worldwide geologists specializing in the geological study of the African continent, and forming a personnel reserve for implementing joint international projects.

Priority areas:

- Regional geology, geological surveying and forecasting of solid mineral deposits.
- Hydrogeology: search and exploration of groundwater.
- Engineering geological surveys to ensure the safety of infrastructure projects.
- Applied geochemistry, mineralogy and gemological expertise.
- Petroleum Geology and geochemistry.
- Applied geophysics: modern methods of searching and exploration of deposits.

Track 10. " CIVIL CONSTRUCTION": Engineering solutions for mining industry and infrastructure in Russia and Africa

Focus: Development and implementation of specialized engineering solutions for the construction of mining enterprises, underground structures and infrastructure facilities in the unique natural, climatic and geological conditions of the African continent.

Priority areas:

- Industrial and civil construction in a tropical climate.
- Geotechnics and construction of underground structures for various purposes.
- Design and construction of high-rise and large-span buildings and structures.
- Construction of mining enterprises and objects of mining infrastructure.
- Architectural design based on regional characteristics.

Track 11. SOCIOLOGY in engineering projects

Focus: Humanitarian training of engineers to effectively interact with local communities and take into account social and cultural factors when implementing resource projects in Africa.

Priority areas:

- Sociology and anthropology of African communities.
- Social support of resource projects (Community Relations).
- Assessment of social risks and impacts on the local population.
- Cross-cultural communication and adaptation of engineering solutions.
- Humanities in the system of engineering education.

2.4. The project should be focused on solving practical problems and take into account the specifics of its application in the conditions of the Russian Federation and / or African countries.

3. Procedure and terms of the event

The Forum-competition is held in two stages.

3.1. First stage (correspondence) - Qualification selection:

- **Dates:** 01.04.2026-01.07.2026.
- **Procedure:** Participants send a package of documents to the Organizing Committee, including:
 - ✓ The application form (*Appendix 1 of the Regulations*).
 - ✓ Project abstracts (up to 3 pages long, designed according to the template);
 - ✓ Project presentation in PDF format, up to 10 slides, designed according to the template (*Appendix 2 of the Regulations*).
 - ✓ A certificate of scientific novelty (optional).
- **Examination:** The submitted works are evaluated by the expert commission in absentia within 15 days after the deadline for accepting applications.

3.2. Second stage (full-time) - Final (Project defense):

- **Dates of the event:** 14.10.2026 – 16.10.2026.
- **Place:** Empress Catherine II St. Petersburg Mining University
- **Format of the event:**
 - ✓ Project oral presentation (up to 7 minutes).
 - ✓ «Q&A» session with members of the expert jury and forum participants (up to 5 minutes).

4. Expert Jury of the Forum-competition

4.1. The Expert Jury is formed by the Organizing Committee consisting of leading Russian and African scientists, representatives of industrial partners (engineering companies), relevant ministries, the diplomatic community, etc.

4.2. The Expert Jury provides:

- Evaluation of team projects according to the criteria.
- Determination of winners and laureates.
- Recommendations for further support of the best projects.

5. Evaluation criteria

Project evaluation provided based on 5-point scale according to the criteria (*Appendix 3 of the Regulations*).

6. Summing up and awarding

6.1. Overall team' result is formed as **the sum of the points of the correspondence and full-time stages**.

Maximum number of points: 50.

6.2. The winners are determined in each category (direction).

6.3. The prize fund:

- Diplomas of the Grand Prix, I, II, III degrees.

6.4. **Special prizes from partners:**

- "Best engineering solution".
- "The best youth startup".

APPLICATION FORM

(To be filled in the language of the Forum-competition)

Registration number (to be filled by the Organizing Committee)	_____	Date of receipt	_____
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SECTION 1. Team Members

1.1. Team Leader (Team Captain)

Team Leader's Full Name	
Date of Birth	
Gender	
Citizenship	
Country of Residence	
University / Organization	
Faculty / Department	
Current level of education	
E-mail	
Contact Phone Number	
Scopus ID / ORCID	
Scientific and Academic Achievements (list key scientific-practical events where you were a winner or prize-winner previously, number of scientific publications, etc.)	

1.2. Team Members (add lines as necessary, minimum 3, maximum 5)

	Participant 2	Participant 3	Participant 4	Participant 5
Full Name				
Country				
Organization				

	Participant 2	Participant 3	Participant 4	Participant 5
Educational Level				

SECTION 2. Project information

Full project name	
Conference track	
Keywords (3-5 words)	
Language of presentation	

SECTION 3. Project information

Problem solved by the project (up to 500 characters)	
Solution idea / Main scientific hypothesis (up to 500 characters)	
Innovation (how it differs from current alternatives) (up to 300 characters)	
Contribution to Sustainable Development Goals (SDGs) (indicate up to 3 SDGs supported by the project)	
Implementation prospects	

SECTION 4. CONSENT AND SIGNATURES

I confirm that all provided information is accurate. The team has been familiarized with the Forum regulations. -

Attachments:

1. Abstracts
2. Presentation

Team Leader:

_____ / _____ / (Signature, Full Name)

Date: « ___ » _____ 2026 г.

STRUCTURE OF PRESENTATION

SLIDE 1. TITLE PAGE

Required elements:

- Logos of the organizers
 - Full name of the contest forum
 - **Project name**(large and legible)
 - Category (scientific track)
 - Logo of the organization of team members
 - Year and city
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SLIDE 2. PRESENTATION OF THE TEAM COMPOSITION

Content:

- Team members: Full names of all participants, countries, universities
- Team photo

Roles and competencies:

- Development Engineer
 - Regional specialist / linguist (for mixed teams)
 - Economist / Marketer
 - Supervisor (if any)
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- Why will this particular team handle the project?
 - Presentations of academic experience, achievements, and publications are welcome
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SLIDE 3. RELEVANCE OF THE STUDY

Content:

- Analysis of the research topic: relevance, prospects, problems:
 - What is the problem in Russia / Africa?
 - Why is this important right now?
 - Statistics, facts, data visualization (graphs, infographics)
 - Photos of the region/problem (for example, drought, lack of light, traffic jams)
-

SLIDE 4. ANALYSIS OF EXISTING SOLUTIONS

Content:

- Analysis of source data and existing literature: key parameters, characteristics, and features.
- What already exists in the world / in Russia / in Africa to solve this problem?
- A brief overview of 2-3 main competitors/analogues.
- Comparison table: "We&They" (by key parameters: price, efficiency, reliability, environmental friendliness).

Conclusion: What makes your project fundamentally better/cheaper/more efficient.

SLIDE 5. SOLUTION DEVELOPMENT / CONCEPT

Content:

- Justification of the research novelty
- Description of the operating principle

- Flowchart / infographic / 3D model of the device

Important: Avoid complex formulas on this slide. The main thing is that even a non-specialist in the jury understands the idea.

SLIDE 6. TECHNICAL IMPLEMENTATION

Content:

- The solution proposed by your team for implementation:
- technological measures to achieve the set goals
- justification, calculations, characteristics and indicators of the proposed option
- drawings, diagrams, calculations

Visualization: Photos of the layout, prototype, and laboratory tests (if available).

SLIDE 7. SUSTAINABLE DEVELOPMENT

Content:

- What Sustainable Development Goals (SDGs) does the project meet?
- Environmental impact (reduction of emissions, cleaning, recycling)
- Social impact (new jobs, improved quality of life)
- Economic impact (accessibility for the local population)

Visualization: UN SDG icons and effect diagrams.

SLIDE 8. TARGET AUDIENCE AND MARKET ASSESSMENT

Content:

- Who will use the results? (end users)
- Who are the potential customers / investors?
- Scale estimation (how many people/companies/regions need a solution)

Visualization: Map of the problem distribution, portrait of the consumer.

SLIDE 9. ADAPTATION TO REGIONAL CONDITIONS

Content:

Russia?

- How does the project take into account the realities of Africa / remote regions of

- Hot / humid climate?
- Dust, sand?
- Unstable electricity?
- Low qualification of the staff?
- Solutions: autonomy, protection, ease of repair, localization of production.

Key question: *Why would it work there and not just in the lab?*

SLIDE 10. IMPLEMENTATION PLAN AND ECONOMICS

Content:

- Project implementation stages (next 1-2-3 years)
 - Estimated implementation cost (budget)
 - Potential payback (if applicable)
 - Required resources and partners (who do you need to launch?)
-

SLIDE 11. CONCLUSION AND INVITATION TO DIALOGUE

Content:

- Short summary (1-2 sentences)
- What does the team need right now?
- Team captain's contacts (e-mail, phone)

Closing phrase: We are ready to answer your questions.

SLIDE 12. (OPTIONAL) BACKUP / ADDITIONAL MATERIALS

This slide is not shown in the main speech, but it can be useful for answering questions from the jury.

- Detailed calculations
 - Detailed drawings
 - List of team publications by topic
 - Support letters from potential customers (if any)
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MEMO FOR PARTICIPANTS (Checklist)

Before submitting your presentation, check:

- **The project name** and names of participants are given without errors.
- On the title slide there are **logos of the organizers**.
- The presentation includes a **slide about adapting to the conditions of Africa/the region** (critical for the jury).
- **All graphs and drawings are signed** and readable.
- The text is easy to read from a distance (check on a projector or PDF with 50% zoom).
- The presentation is saved in **PDF format** (so that the fonts don't move out).
- The file is named according to the template: **Last name capitana_Project**

Name_Number directories_Country. pdf (for example:

Ivanov_WaterPurification_4_RussiaAfrica.pdf)

Criteria for team projects evaluation

I. STAGE 1: CORRESPONDENCE (Evaluation of project and abstracts)

The goal of the stage: To determine the range of projects allowed for the full-time stage, based on the assessment of technical viability, relevance to the forum topic and the depth of idea development.

Maximum amount of points for an absentee stage: 25

No	Criteria	Description	Rating scale (1-5)
1	Relevance and country-specific	How important is the problem solved by the project for countries in Africa and / or Russia? Are the climatic, resource, infrastructural, and social characteristics of the region taken into account?	<p>1– the topic is not relevant</p> <p>2– the topic is mentioned, but not disclosed in relation to the region</p> <p>3– the topic is relevant in general, but without reference to the specifics of the continent / region</p> <p>4–the problem is relevant, the specifics of the region are taken into account superficially</p> <p>5–the project solves an acute problem that is in demand in Russia/Question</p>
2	Innovativeness and novelty	Does the project contain new engineering / technical solutions, or is it an adaptation of existing technologies?	<p>1–a well-known solution, complete lack of novelty</p> <p>2–compilation of known solutions without significant processing</p> <p>3–improvement of existing analogues (modernization)</p> <p>4–an original combination of known technologies</p> <p>5– fundamentally new approach or technology</p>
3.1	<i>for technical projects</i> Scientific and technical elaboration	Quality of the methodology description, availability of calculations, diagrams, specifications, justification for the choice of materials/technologies.	<p>1- only general words, no technical details</p> <p>2–the technical part is fragmentary, no calculations are available</p> <p>3- there is a description of the principle of operation, partial calculations</p> <p>4–there are all the necessary calculations and diagrams, but there is no justification for the choice</p> <p>5–depth analysis, full engineering justification</p>
3.2.	<i>for social/ humanitarian projects</i>	The quality of the description of the research methodology, the logic of constructing	<p>1–there is no methodology, the conclusions are not justified</p> <p>2–the methodology is described</p>

No	Criteria	Description	Rating scale (1-5)
	The quality of development and validity of the decision	evidence, the depth of analysis of sources, the validity of conclusions and suggestions.	superficially, the sources are not relevant 3 -there is a description of the methods, but the logic of evidence is weak, the conclusions are partially justified 4 -clear methodology, good source base, but insufficient argumentation 5 -impeccable logic, deep study, conclusions are fully justified and supported by data
4	Contribution into sustainable development	How does the project correspond with the UN Sustainable Development Goals (SDGs)? Does it solve problems, social or economic problems without compromising the future?	1 -does not comply with the principles of sustainable development 2 - compliance is declared, but not confirmed by calculations 3 -indirectly contributes to one of the aspects of sustainability 4 -the project is aimed at solving a specific problem of sustainable development 5 - the project is directly aimed at solving economic, technical or social problems
5	Quality of abstracts and text	Clarity of presentation, logical structure, visibility (graphics, drawings), compliance with the design requirements.	1 -the text is chaotic, there is no understanding of the essence 2 -the structure is broken, there are no conclusions, there are errors 3 -there is a structure, but it is difficult to read, there are errors 4 -good language, all sections are in place, there are minor flaws 5 -perfect language, professional graphics, clear conclusions

II. STAGE 2: FULL-TIME (Project defense)

The goal of the stage is to assess the depth of development and realism of the project implementation, the team's ability to communicate and the implementation potential.

Maximum amount of points for a full-time stage: 25

No	Criteria	Description	Rating scale (1-5)
1	Presentation quality and visualization	How well does the presentation reflect the essence of the work? Are graphs easy to read; are there any prototypes/layouts	1 -solid text, no illustrations, graphs or diagrams 2 -there are illustrations, but they are not related to the project text 3 - there are illustrations, but they are overloaded

No	Criteria	Description	Rating scale (1-5)
		(photos/videos), diagrams?	<p>4-good design, clear diagrams, but there is no demonstration of the layout</p> <p>5-perfect balance of text and visual, demonstration of the layout / model</p>
2	Convincing defense and communication	The team's ability to clearly and concisely convey the essence of the project, engage the audience and the expert jury.	<p>1-the speaker does not know the material, reads from a sheet</p> <p>2- reading from a sheet, uncertainty, exceeding the time limit</p> <p>3-the material is presented, but uncertainly or monotonously</p> <p>4-good contact with the audience, clear speech</p> <p>5-lively, energetic presentation, professional terminology, teamwork</p>
3	Answers to questions	Depth of the topic understanding, the ability to reasonably defend one's point of view, reaction to criticism.	<p>1-the team is unable to answer questions or does not answer in substance</p> <p>2- answers only to elementary questions, confusion in terms</p> <p>3-confident answers to general questions, but difficulties in delving into details or highly specialized aspects</p> <p>4-confident answers to most questions, but lack of depth</p> <p>5-clear, reasoned answers, demonstration of expert level</p>
4	Practical feasibility and business potential	Is it possible to implement in Africa/Russia "here and now" or in the near future? Is there an estimate of the implementation cost and availability of materials?	<p>1-a fantastic project that cannot be implemented in the current conditions</p> <p>2-feasibility is very doubtful, there is no project economy</p> <p>3- we will implement it with significant investments/complex logistics</p> <p>4-we will implement it in the medium term, there is an understanding of the market</p> <p>5-a startup ready for implementation, cheap, simple technology</p>
5	Consideration of the implementation context and resistance to external factors	Has the impact of the external environment (natural, infrastructural, social) on the project implementation been assessed? Are possible limitations (resource, personnel, and logistics) taken into account and are there mechanisms for adapting	<p>1-The project is presented without taking into account real condition, can be exist only in the "ideal" model</p> <p>2-External conditions are mentioned, but their impact to the project is not analyzed and technically not taken into account</p> <p>3-Partial consideration of individual factors (for example, energy supply), but a comprehensive analysis of the environmental impact has not been conducted</p>

No	Criteria	Description	Rating scale (1-5)
		the technology to different conditions?	<p>4 - Key external risks analysis was provided, technical or organizational solutions are proposed for most of them</p> <p>5. The project was initially developed taking into account the variability of conditions: flexible architecture, scalability, the ability to adapt to local resources and human resources</p>

FINAL RESULT

The total score from two stages determine the winners. **Maximum: 50 points.**