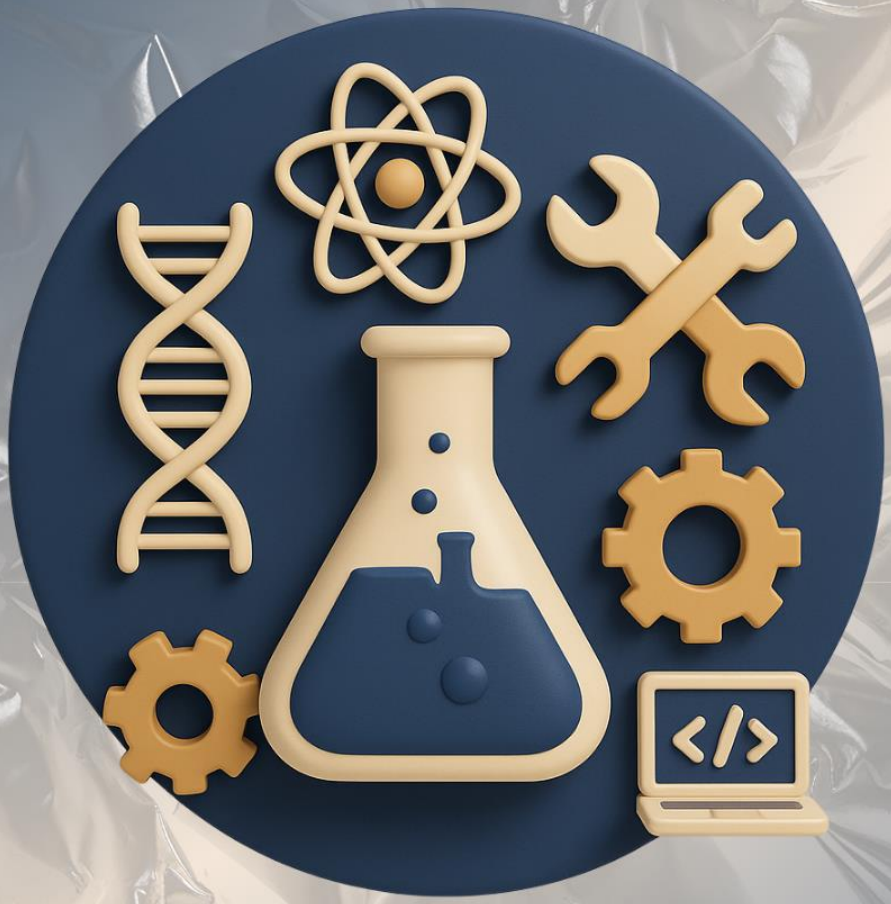
IWSC
International Walisongo Science Competition



TECHNICAL GUIDES

IWSC 2025

TECHNICAL GUIDE

INTERNATIONAL WALISONGO SCIENCE COMPETITION (IWSC)

"ADDRESSING GLOBAL CHALLENGES:
INSPIRING SCIENTIFIC CURIOSITY AND INNOVATION"

INTERNATIONAL WALISONGO SCIENCE COMPETITION (IWSC) COMMITTE
FACULTY OF SCIENCE AND TECHNOLOGY
UIN WALISONGO SEMARANG
2025

IMPLEMENTATION AND TECHNICAL INSTRUCTIONS

INTERNATIONAL WALISONGO SCIENCE COMPETITION 2025

FACULTY OF SCIENCE AND TECHNOLOGY

UIN WALISONGO SEMARANG

2025

A. NAME OF COMPETITION

The *International Walisongo Science Competition* (IWSC) 2025.

B. INTRODUCTION

In today's rapidly changing world, humanity faces an array of complex and interconnected global challenges. Climate change, environmental degradation, the depletion of natural resources, energy crises, and socio-economic inequality are just a few of the pressing issues that require immediate and long-term solutions. These global problems demand not only swift responses but also those grounded in scientific knowledge, technological innovation, and cross-disciplinary collaboration.

Science and technology play a central role in addressing these challenges by providing evidence-based solutions and driving sustainable development. Therefore, fostering scientific curiosity and innovation among the younger generation is essential in shaping a future-ready, problem-solving, and ethically conscious global community. Beyond classroom learning, meaningful scientific engagement can also be cultivated through competitions that encourage exploration, critical thinking, and creative problem-solving.

As an Islamic higher education institution committed to the integration of Islamic values and scientific knowledge, UIN Walisongo Semarang takes an active role in advancing science that is ethical, transformative, and contributes to global well-being. In line with this vision, International Walisongo Science Competition (IWSC) 2025 is organized as a platform for students around the world to engage in constructive scientific dialogue, intellectual challenge, and innovative thinking.

Carrying the theme “Addressing Global Challenges: Inspiring Scientific Curiosity and Innovation,” IWSC 2025 invites students to strengthen a spirit of solution-oriented and transformative scientific inquiry. The competition features six categories, including four science olympiads — Mathematics, Physics, Chemistry, and Biology — designed to

sharpen participants' logical reasoning, analytical skills, and critical thinking. In addition, IWSC also hosts two scientific writing competitions in the fields of Environmental Engineering and Start-Up Innovation, serving as platforms for the realization of creative ideas in developing applicable and sustainability-focused solutions.

The International Walisongo Science Competition (IWSC) 2025 is envisioned not merely as a competitive event, but as a formative experience to cultivate visionary, collaborative, and socially aware young scientists capable of making meaningful contributions to solving global challenges.

C. INTENTION AND PURPOSE

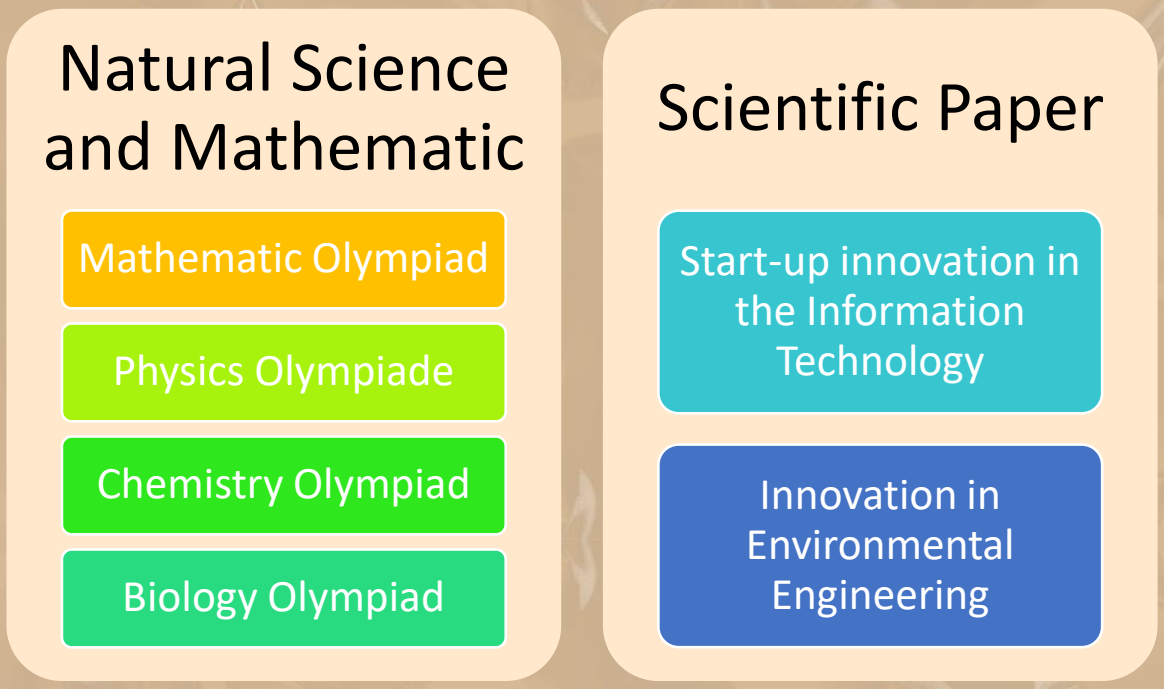
1. To raise global awareness among students regarding major challenges facing humanity, such as climate change, environmental issues, and sustainable development.
2. To promote excellence in science education by encouraging mastery of core scientific disciplines—Mathematics, Physics, Chemistry, and Biology—through academic competition.
3. To cultivate scientific curiosity and critical thinking in young minds, empowering them to explore, question, and solve real-world problems through scientific reasoning.
4. To provide a platform for creative and impactful ideas, particularly through scientific writing competitions in Environmental Engineering and Start-Up Innovation, which encourage practical, sustainable, and socially beneficial solutions.
5. To encourage interdisciplinary collaboration, allowing participants from various backgrounds and countries to share insights, knowledge, and innovations.
6. To foster future scientists, innovators, and entrepreneurs who are not only skilled in their fields but also socially responsible and ethically grounded.
7. To support international academic engagement by building networks of young scholars, educators, and institutions from around the world.
8. To integrate scientific advancement with Islamic ethical values, ensuring that innovation is aligned with integrity, compassion, and benefit for humanity.

D. THEME

The theme of this competition is "Addressing Global Challenges: Inspiring Scientific Curiosity and Innovation".

E. FORM ACTIVITY

IWSC activities consist of Olympiads in the field of Natural Science and Scientific Papers in the field of technology.



F. TIMELINE

There are three stages in this competition, namely the preliminary elimination stage, semifinal stage, and final stage. Details of activities as shown in the table below.

Timeline	date
Registration	10-30 June 2025
Administrative Selection	2-3 July 2025
Announcement of Participant Passing Administration	4 July 2025
Simulation/ Scientific Paper Submission	7 July 2025
Elimination Round (CBT)/preliminary elimination stage	**8 July 2025**
Semifinalist Announcement	11 July 2025
Video Project Submission	13-18 July 2025
Semifinalis Assesment (Video Project)	**19 July 2025**
Finalist Announcement	21 July 2025

Video Like Collection Time *(favorit)*	21-24 July 2025
Technical Meeting	24 July 2025
Final Round	**26 July 2025**

G. COMPETITION MECHANISM (SELECTION) IN NATURAL SCIENCE COMPETITION

1. Participants register online through the website address **http://iwsc.walisongo.ac.id** from 10 June-30 June 2025.
2. The committee conducts administrative selection on 2-3 July 2025.
3. The committee announces participants who pass the administrative selection through the website **http://iwsc.walisongo.ac.id** on 4 July 2025.
4. Participants take part in the elimination stage with a total of 40 multiple choice question within 90 minutes via the website **http://iwsc.walisongo.ac.id** on 8 July 2025. Before the test, participant have to join CBT simulation on 7 July 2025.
5. Participants with top 10 scores on each competition category eligible to compete in the semifinal round.
6. Semifinalist must send a science project video with the maximum duration of 15 minutes as part of the semifinal assessment process through the website **http://iwsc.walisongo.ac.id** from 13-18 July 2025.
7. Semifinalists are disqualified if they do not submit video projects.
8. The committee will post the semifinalists' video to the IWSC YouTube account.
9. Evaluation of the video by the internal jury will be held on 19 July 2025.
10. Semifinalist ranking 1 to 6 in each competition category eligible to compete in final round and will be announced on 21 July 2025 on the website: **http://iwsc.walisongo.ac.id**.
11. Semifinalist rank 7 to 10 will get bronze medals.
12. Participants who have passed the final round must attend the technical meeting (TM) on 24 July 2025 and take part in the final round on 26 July 2025.
13. In the final stages, the finalist will present the video content of the video for a maximum of 7 minutes, then each jury conducts a question-and-answer session on the finalists for a maximum of 10 minutes.

14. The jury determines the participants in the first to six place from each competition category.
15. The most favorite video among the ten semifinalists will be selected based on the number of likes (♥) on the IWSC YouTube channel and completion of the form, available from July 21 at 12.00 (UTC+7) and closing on July 24, 2025, at 12:00 (UTC+7).

H. COMPETITION MECHANISM (SELECTION) IN SCIENTIFIC PAPER

1. Participants register online through the website address **http://iwsc.walisongo.ac.id** from 10 June-30 June 2025 (only the team leader register).
2. The number of group members participating is 1-4 students.
3. The committee conducts administrative selection on 2-3 July 2025.
4. The committee announces participants who pass the administrative selection through the website **http://iwsc.walisongo.ac.id** on 4 July 2023.
5. Participants upload a scientific paper on the topic of start-up innovation in Information Technology and Environmental Engineering to the website **http://iwsc.walisongo.ac.id**, no later than 7 July 2025 at 23.59. The paper must be prepared according to the rules of scientific writing, at least containing an introduction, literature review/previous works, methods, results and discussion, conclusions, and references. The paper will be assessed by a panel of judges.
6. Participants with top 10 scores are eligible to compete in the semifinal round and announcement on 11 July 2025.
7. Semifinalist must send a project video related to the scientific paper with the maximum duration of 15 minutes as part of the semifinal assessment process through the website **http://iwsc.walisongo.ac.id** from 13-18 July 2025.
8. Semifinalists are disqualified if they do not submit video projects.
9. The committee will post the semifinalists' video to the IWSC YouTube account.
10. Evaluation of the video by the internal jury will be held on 19 July 2025.
11. Semifinalist ranking 1 to 6 in each competition category eligible to compete in final round and will be announced on 21 July 2025 on the website: **http://iwsc.walisongo.ac.id**.
12. Semifinalists rank 7 to 10 will get bronze medals.

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I. PARTICIPANT REQUIREMENTS

The requirements for participating in this competition are as follows:

1. All participants are active students at the S1 (Undergraduate) or D3/D4 (vocational) level as shown by a scan of a valid Student Identity Card from their university.
2. If any fraud is found by the committee, either before, during, or after the competition takes place, the participant will be disqualified.

J. SCOPE IN NATURAL SCIENCE OLYMPIADS AND SCIENTIFIC PAPER

Category	Main Topics	Sub-Topics
Mathematics	Abstract Algebra	1) Group Theory (Group, Subgroup, Group Homomorphism, Quotient Group) 2) Ring Theory (Ring, Subring, Ideal, Ring Homomorphism, Quotient Ring, Euclidean Domain, Principal Ideal Domain, Unique Factorization Domain, Polynomial Ring)
	Linear Algebra	1) Linear Equation System 2) Vector Space (Subspace, Bases and Dimension) 3) Linear Transformation (Kernel, Image, Rank, Change of Bases, Similarity of Matrices) Quotient Spaces, Dual Bases, Annihilator

Combinatorics and Discreet Mathematics	1) Fundamental Principle of Counting (Rule of Sum, Rule of Product, Permutation, Combination) 2) Properties of Integers 3) The Principle of Inclusion-Exclusion 4) Pigeon Hole Principle 5) Generating Functions 6) Recurrence Relations 7) Graph Theory
Differential Equations	1) First-Order Differential Equation (Separable, Homogeneous, Exact, Linear, Bernoulli) 2) Second-Order Linear Homogeneous Differential Equations with Constant Coefficients 3) nth-Order Linear Homogeneous Differential Equations with Constant Coefficients 4) Laplace Transform
Calculus	1) The Number Systems 2) Functions 3) Limits 4) Continuity 5) Derivatives 6) Integrals 7) Sequences 8) Series 9) Vector-valued Functions 10) Multivariable Functions 11) Partial Derivatives 12) Multiple and Triple Integrals
Real Analysis	1) Real Numbers Syatem 2) Sequences and Series 3) Limit of Functions 4) Continuity 5) Derivative

		6) The Riemann Integral 7) Sequence of Functions 8) Metric Space
	Statistical Mathematics	1) Analyzing Categoric Data 2) Dispalying and Comparing Quantitative Data 3) Modeling Data Distributions 4) Probability 5) Counting, Permutations, and Combinations 6) Sampling Distributions 7) Significance Test (Hypothesis Testing) 8) Convidence Intervals 9) Linear Regretions
	Complex Analysis	1) Complex Numbers System 2) Topology on Complex Numbers System 3) Analytic Functions 4) Elementary Functions 5) Complex Integral 6) Series 7) Residues and Poles
Physics	Mechanics	1) Kinematics 2) Statics 3) Dynamics 4) Celestial mechanics 5) Hydrodynamics
	Electromagnetic Fields	1) Maxwell's equations 2) Interaction of matter with electric and magnetic fields 3) Circuits
	Oscillation and Waves	1) Oscillator 2) Waves 3) Interference and diffraction

		4) Interaction of electromagnetic waves with matter 5) Geometrical optics and photometry
	Relativity	1) Principle of relativity and Lorentz transformations 2) Relativistic equation of motion
	Quantum Physics	1) Probability waves Structure of matter
	Thermodynamics	1) Classical thermodynamics 2) Heat transfer and phase transitions 3) Statistical physics
Chemistry	Anorganic Chemistry	1) Atomic structure and molecular structure 2) Solid state chemistry, metallic and ionic crystal structure, lattice energy, molecular simetry, molecular orbital theory 3) Electronic configuration, trend of periodic table 4) Stochiometry, blok s, p, dan d 5) Coordination chemistry
	Physical chemistry	1) Chemical and phase equilibrium, liquid, and colloids 2) Kinetics of chemical reaction 3) Thermodynamic 4) Hydrogen atom, quantum number, term symbol, schrodinger equation 5) Orbital configuration, diatomic molecule, bond order, Huckel theory, and atomic and molecular spectroscopy (rotation, vibration, dan electronic)
	Organic Chemistry and Biochemistry	1) Functional groups and stereochemistry

		2) Reactivity and reaction mechanism of organic compounds, structure elucidation of organic compounds, and synthesis of organic compounds 3) Macromolecules, polymer, enzymatic reaction, and bioteknology
	Analytical Chemistry and Environmental Chemistry	1) Qualitative analysis of cations and anions: general reaction (Ksp, buffer pH, hidrolisis, salt hydrolysis,complex equilibrium, redox), identification of cations and anions. 2) Quantitative analysis: volumetry (acid base titration, complexometric titration, argentometry titration, oxidimetric/reductive titration), gravimetry, dan electrometry (potensiometry; voltammetry; amperometry). 3) Chemical separation: extraction, distillation, electrochemistry 4) Instrumental analysis: spectrophotometry UV-Vis, AAS, FT-IR, XRD, NMR, MS), chromatography (HPLC dan GC/GC/MS). 5) Proximate analysis. 6) Chemometry. 7) Environmental chemistry: *green chemistry*, current issue.
Biology	Cell biology	1) Structure and function of cells • Chemical components • Organelles • Cell metabolism • Protein synthesis • Transport through membranes • Mitosis and meiosis 2) Microbiology

		• Prokaryotic cell organization • Morphology • Phototrophy and chemotrophy 3) Biotechnology • Fermentation • Genetic manipulation of organisms
	Plant anatomy and physiology	Structure and function of tissues and organs involved in: 1) Photosynthesis, transpiration and gas exchange 2) Transport of water, minerals and assimilates 3) Growth and development 4) Reproduction (ferns and mosses included)
	Animal anatomy and physiology	Structure and function of organs and tissues involved in 1) Digestion and nutrition 2) Respiration 3) Circulation 4) Excretion 5) Regulation (neural and hormonal) 6) Reproduction and development 7) Immunity
	Animal anatomy and physiology	1) Methodology of Ethology 2) Innate and Learned Behaviour 3) Communication and Social Organization 4) Foraging Behaviour
	Genetics and Evolution	1) Variation : mutation and modification 2) Multiple allelism, recombination, sex linkage 3) Mechanism of evolution

	Ecology	1) Individual Organisms 2) Population 3) Biotic Communities 4) Ecosystems 5) Biosphere and man
	Biosystematics	Structure and function, evolutionary and ecological relationships among typical organisms in the following groups.
Environmental Engineering	Environment	1) Wastewater Treatment 2) Water Treatment 3) Hazardous & Solid Waste Treatment 4) Air Pollution Control
Information Technology	Information Technology	Start-Up Innovation for Information Technology

K. ASSESMENT IN NATURAL SCIENCE OLYMPIAD

The scoring mechanism for this competition is as follows:

1. In the elimination stage: correct answer (+4), incorrect answer (-1), and no answer (0).
2. In the final stage, the percentage of the video science project assessment is 40% and the presentation score is 60%.

L. SCIENTIFIC PAPERS : INNOVATION IN ENVIRONMENTAL ENGINEERING AND START-UP INNOVATION OF INFORMATION TECHNOLOGY

1. Purpose
    - To encourage and stimulate interest in undergraduate research in environmental engineering subject and information technology
    - To provide an opportunity for undergraduate students to organize and present their original research through oral presentations
2. Competition Descriptions and Specific Guidelines
    - Abstracts must not exceed five hundred (500) words in length, and should include the study objective, methodology, results, and significance and

implications of results. At least five (5) pertinent references must be incuded. References are not included in the word count and must follow APA style.

- Two versions of the abstract must be submitted. One must include the paper title, as well as the name and address of all the authors. The second must only include the paper title, do not put your name on the abstract itself or within its file name.

3. Judging of Abstracts

Abstracts will be judged based on the criteria below.

Abstract judging criteria	Points
Adherence to rules of competition	5
Presentation of research importance and relevance	20
Explanation of objectives and background	15
Presentation and explanation of experimental methodology	15
Presentation and explanation of results	15
Explanation and soundness of conclusions	15
Professionalism, organization, and style	15
Total	100

4. Oral Presentation

Finalists will present their research during the IWSC 2025. The presentation is limited to ten (10) minutes per speaker, plus and additional five (5) minutes to answer questions from judges. The presentation should outline the scope of the research, study methodology and design, results, and significance of the results, and will be judged based on the criteria below. Presentation aids such as PowerPoint slides may be used during the presentation so long as they fulfill the content guidelines and the time limit.

Oral presentation judging criteria	Points
Presentation and explanation of research importance, relevance, and significance	10
Presentation and explanation of research methodology, results, and conclusions	15
Professionalism and scholarship of presentation	15
Ability to answer judges' questions	10
Total	50

M. JURY MEMBERS

Each competition category has three judges with the following details:

1. One lecturer from foreign university/college (outside Indonesia)
2. One lecturer from university/college outside UIN Walisongo Semarang
3. One lecturer from UIN Walisongo Semarang

N. WINNER AWARDS

1. The first to third highest-scoring participants will receive a **gold medal, certificate, and a coaching fund prize**.
2. The fourth to sixth highest-scoring participants will receive a silver medal and certificate.
3. Bronze medals and certificates will be awarded to semifinalists who do not advance to the final round.

O. REGISTRATION FEE PAYMENT PROCEDURE

All participants who register for the International Walisongo Science Competition (IWSC) 2025 are required to complete the payment of the registration fee through a bank transfer. The technical details of the payment are as follows:

Bank Name: Bank Tabungan Negara (BTN)
Branch: Syariah Semarang
Account Number: 7141003120
Account Name: RPL 134 BLU UIN WS UTK DK 1

Transfer Description: [Full Name] – [Institution] – [Competition Category]
(Example: Ahmad Zain – UIN Walisongo – Physics Olympiad)

After completing the transfer, participants are required to upload the payment proof during the registration process on the official IWSC website at http://iwsc.walisongo.ac.id.

⚠ Please ensure that the name and category match the data used during registration to avoid any administrative issues.

P. SECRETARIAT

Office	:	Faculty of Science and Technology UIN Walisongo Semarang Jl. Prof. Dr. Hamka KM.2 Semarang Telp.024 76433366
Contact Person	**:**	Participant outside Indonesia : Ayus Riana (+62 813 2958 0263) Participants from Indonesia : Muji Suwarno (+62 8967 2428 585)
Website	:	http://iwsc.walisongo.ac.id
Email	:	i_wsc@walisongo.ac.id
IG & TikTok	:	@international_wsc
YouTube	:	International Walisongo Science Competition

CLOSING

The success of holding the International Walisongo Science Competition (IWSC) in 2025 is determined by all elements with an interest in carrying out selection activities in an orderly, orderly, disciplined, and high sense of responsibility.

By understanding these guidelines, it is hoped that the committee and all related parties can carry out their duties as well as possible, so as to achieve optimal results. Recognizing that there are still many shortcomings in this guide, we expect criticism and suggestions as input for the implementation of the selection in the coming years. Hopefully this guideline can be used as a reference so that this selection activity can be carried out properly, effectively, and efficiently.

IWSC Chief Committe

Agus Wayan Yulianto, M.Sc.