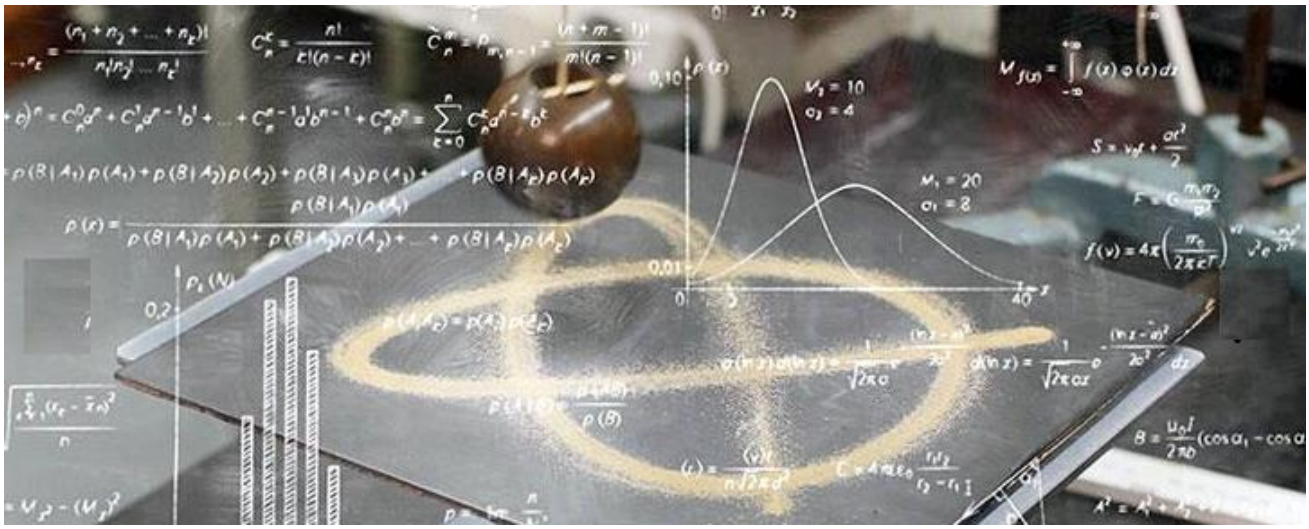

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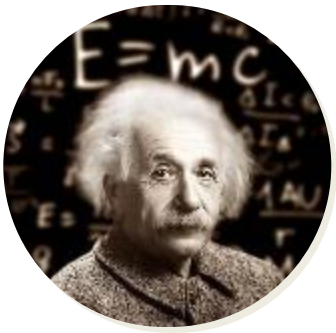

COLEGIO INTERNACIONAL DE PROFESIONISTAS

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WORLD CONGRESS OF KNOWLEDGE
MEXICO 2020

WORLD BACHELOR'S COMPETITION AND PHYSICAL UNIVERSITY LEVEL

Invitation to students from all over the world: The International College of Professionals C&C invites Physics students worldwide to register and submit their final year projects. The winners will be selected by a professional international jury made up of the best physicists in the world who will evaluate the work of all participants.

The Jaguar Guerrero International Award for Excellence of the International College of Professionals C&C is an initiative whose objective is to promote the profession of Physics in academic and professional fields.

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As an analogy one can imagine an intelligent amoeba with a good memory. As time progresses the amoeba is constantly splitting, each time the resulting amoebas having the same memories as the parent. Our amoeba hence does not have a life line, but a life tree.

(Hugh Everett)

A wonderful portal to expose the works and creativity of young people, have the opportunity to establish networking, knowledge sharing and teaching methods.
The recognition of experts around the world and the opportunity to appreciate the best works.

The global talent awards are celebrated and celebrated, encouraging them to be better by implementing the most avant-garde in all communities.
By recognizing the talent at the beginning of the participants' career and by offering them the opportunity to collaborate and support each other, this award empowers a generation of new young physicists.
Jury.- The jury of the Prize for Excellence of the International Association of Professional Physics division will be composed of internationally renowned physicists with masters and doctorates.
Voluntary contributions are those that hold the C&C International College of Professionals Award of Excellence and affirm support for the culture of excellence for which we fight. The funds for the Excellence Award come from academic institutions, foundations and international organizations. Several donor companies have generously committed to achieve this goal.

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Grandezas Básicas

$$Vm = \frac{\Delta x}{\Delta t} \qquad a = \frac{\Delta v}{\Delta t}$$

M.R.U.V.

$$x = x_0 + v_0 t + \frac{at^2}{2}$$

$$v^2 = {v_0}^2 + 2a\Delta x$$

Queda livre

$$h_{max} = \frac{{v_{0y}}^2}{2g} \qquad t_{h\_max} = \frac{v_{0y}}{g}$$

World Physics Contest HIGHER MIDDLE LEVEL

The World Physics Competition is a contest for students. The first of these competitions was organized by Prof. Czeskaw Sciskowski in Warsaw in 1967. Since then, the Olympics have been held year after year (except in 1973, 1978 and 1980) in different countries.

In this global competition, the teams of each country will consist of five students who have not turned 20 before June 30 of the year of the competition and who have not completed any subject at any university or institute of higher education. What makes up the 1st. Category.

The competition is divided into two sessions: a theoretical one, in which competitors must solve three physics problems and a practice in which one or two experimental problems must be solved. The theoretical and experimental sessions are scheduled for each one to last five hours. Both are held on different days, having to mediate at least twenty-four hours between both exams.

The problems of the Olympics are proposed to the international jury by a special committee of the International College of Professionals C&C Physical Division. The theoretical problems must cover at least four areas of the competition agenda.

The special committee for the elaboration of problems, in a private session, announces its proposals to the international jury. This committee previously establishes an evaluation score for each stage of solution of each problem. The three theoretical problems, together, are assigned a maximum of thirty qualification points, and the experimental problems, twenty. In this way, the maximum grade that any participant can obtain is fifty points. It is up to the international jury to discuss the problems, their content, their statement, the score for each stage and, finally, their approval

Before starting the first international jury meeting, the Students of each team are isolated from their respective committees until after the first test (usually the theoretical test) is carried out. This is intended to ensure that no student can know through their committees the content of the exam and its solution before the theoretical test.

It is up to each country's own committees to rate their own students. Simultaneously exams are also scored by the local organizing committee. After the test, the committees meet with the organizing committee and compare qualifications until an agreement is reached. Sometimes it is possible and allowed for the Students to meet with their respective committees to discuss the content of their exam responses, so that the representatives can more easily grade the exam and gather arguments to raise some points in the discussion before the organizing committee. The same procedure is followed in the case of the experimental test.

The scores obtained in the theoretical and experimental problems are added, thus establishing the qualification of each participant.

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Nobel Prize in Physics 2018 for advances in the field of laser physics

Arthur Ashkin, Gérard Mourou and Donna Strickland have received the 2018 Nobel Prize in Physics "for their revolutionary inventions in the field of laser physics"; Strickland is the third woman to win the Nobel Prize in Physics

As a rule, competitors who add more than 90% of the average of the three best scores get the gold medal; the silver medal is assigned to students who add 78% to 90% of that average; the bronze who get between 65% and 78%. Students who accumulate 50% to 65% of the above average are given an honorable mention and the rest, a certificate of participation. The student or students with the highest score receive a special award.
There is no official team classification. This competition is between individuals and not between nations. The statutes do not establish any way to define results by teams, although some people have tried to do so through different procedures: adding the scores of the members of each team, or the results of the three best participants of each entourage; and taking the three best results of each problem or the best classified in each country. In this worldwide competition, the results of the competitors who obtain medallion or honorable mention will be made public.
Integration of the National Team.
The 15 finalists of the national competition are called to the training for the international physics Olympiad. None of them should be enrolled in the university or any higher education institute the following school year, which makes them eligible to participate in the international Competition In the event that some students do not meet the requirement, students who have occupied lower places in the national competition classification will be summoned up to 15 selected.
Training takes place in the months prior to the international event.

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National Contest Agenda

Generalities

a) The extensive use of the calculation (differential and integral) and the handling of complex numbers or solution of differential equations is not required for the solution of the problems.

b) The questions may contain concepts and phenomena not included in the agenda, but sufficient information is provided in them, so that participants without prior knowledge of these topics are not disadvantaged.

c) Participants must know the International System of Units (SI)

PROGRAM

I. Mechanics.

a) Fundamentals of the kinematics of a specific mass. Vector description of the position of a point mass; Vector speed and acceleration.

b) Newton's laws, inertial systems. Variable mass problems can be established. Variable density problems will not apply.

c) Open and closed systems, moment, energy, work and power.

d) Energy conservation, momentum and conservation of linear momentum

e) Elastic forces, frictional forces, the law of universal gravitation, potential energy and work in the gravitational field. Hooke's Law, coefficients of friction (constant F / R), static and dynamic friction forces, zero selection of potential energy.

f) Centripetal acceleration, Kepler laws.

2. Rigid body mechanics

a) Static, center of mass, torque. Force pairs, equilibrium conditions of the bodies.

b) Movement of rigid bodies, translation, rotation, angular velocity, angular acceleration, conservation of angular momentum. Conservation of angular momentum around a fixed axis only.

c) External and internal forces, equation of rigid body movement around a fixed axis, moment of inertia, kinetic energy of a rotating body. Parallel axis theorem (Steiner's theorem), addition of moment of inertia.

d) Accelerated reference systems, inertial forces.

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3.Hydromechanics.

a) Pressure, continuity equation, Bernoulli equation, Archimedes principle.

4 Thermodynamics

a) Internal energy, work, heat, first and second laws of thermodynamics. Thermal equilibrium, state dependent quantities and process dependent quantities.

b) Model of an ideal gas, pressure and molecular kinetic energy, Avogadro number, equation of state of an ideal gas, absolute temperature.

Molecular approach to simple phenomena in liquids and solids such as boiling, fusion, etc.

c) Work done by the expansion of a gas subject to isothermal and adiabatic processes. Demonstration of the equation of adiabatic processes is not required.

d) Carnot cycle, thermodynamic efficiency, reversible and irreversible processes, entropy (statistical approach). Boltzmann factor.

Entropy as an independent function of the path followed, entropy and reversibility changes, quasi-static processes.

5. Oscillations and Waves.

a) Harmonic oscillations, harmonic oscillation equation. Solution of the equation for harmonic movement, attenuation and resonance (qualitatively).

b) Harmonic waves, wave propagation, longitudinal and transverse waves, linear polarization, classical Doppler effect, sound waves. Displacement in a progressive wave and understanding of the graphic representation of the wave, measurements of the speed of sound and light. Doppler effect in one dimension, wave propagation in homogeneous and isotropic media, reflection and retraction, Fermat principle.

c) Superposition of harmonic waves, coherent waves, interference, pulses, standing waves.

Understanding that the intensity of the wave is proportional to the square of the amplitude. Fourier analysis is not required, but students should have some knowledge that complex waves can form from the superposition of sinus waves of different frequencies. Interference due to thin films and other simple systems, wave superimposition of secondary sources {diffraction).

6. Electric charge and electric field. a) Conservation of electric charge, Coulomb's law.
b) Electric field, potential, Gauss's law. Ganes Law applied to simple symmetric systems such as spheres, cylinders, plates, etc. Electric dipole moment.
c) Capacitors, capacitance, dielectric constant, energy density of the electric field.

7.Current and magnetic field
a) Current, resistance, internal resistance of a source, Ohm's law, Kirchhoff's laws, work and power of direct and alternating current. Joule's Law. Simple cases of circuits with non-ohmic elements of known V-I characteristics.
b) Magnetic field B of a current, current in a magnetic field, Lorentz force.

Particles in a magnetic field, simple applications such as cyclotron, magnetic dipole.
c) Ampere Law.
Magnetic field of simple symmetric systems such as straight wires, circular loops and long solenoids.
d) Law of electromagnetic induction, magnetic flux, Lenz's law, self-inductance, inductance, impermeability, energy density of the magnetic field.
e) Alternating current, resistors, inductances and capacitors in AC circuits. Resonances of voltage and current (in series and parallel). Simple AC circuits, time constants.

8 electromagnetic waves
a) Oscillating circuits, frequency of oscillations, feedback generation and resonance.
b) Wave optics, diffraction by one or two slits, diffraction grating, resolution power of a grating. Bragg reflection.
c) Dispersion and diffraction spectra, gas spectral lines.
d) Electromagnetic waves such as transverse waves, reflection polarization, polaroids. Polarized wave overlay.
e) Resolution power of an image system.
f) Black body, Stefan-Boltzmann law. Planck's formula is not

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INTERNATIONAL AGENDA

The agenda of the International Competition includes, in addition to the points already indicated in the "Agenda of the National Competition" section, the following topics:

9. Quantum Physics

a) Photoelectric effect, energy and impulse of a photon. Einstein's formula is required.

b) De Broglie wavelength, Heisemberg uncertainty principle.

10. Relativity

a) Principle of Relativity, sum of speeds and relativistic Doppler effect.

b) Relativistic equation of motion.

11. Energy

a) Relationship between energy and mass, conservation of energy and momentum.

Matter

a) Simple applications of Bragg's law.

b) Energy levels of atoms and molecules (qualitatively), emission, absorption and spectra of hydrogen atoms

c) Core energy levels (qualitatively); alpha, beta and gamma decays; radiation absorption; exponential decay and half-life; core components. Mass defect and nuclear reactions.

Experimental Part

The international competition includes an experimental part. The theoretical part of the syllabus provides the basis for all experimental problems, which require participants to make experimental measurements.

Additional requirements.

1. Contestants must be aware that the instruments affect the measurements.

2. Knowledge of common experimental techniques for measuring the physical quantities mentioned in the theoretical agenda.

3. Knowledge of simple instruments commonly used in the laboratory, such as: vernier, thermometers, simple multimeters, ammeters, voltmeters, ohms, potentiometers, diodes, transistors, simple optical arrays, etc.

4. Ability to use, with the appropriate support of the instructions, some more elaborate instruments and arrangements, such as the double trace oscilloscope, counters, climbers, signal and function generators, analog-digital converters connected to a computer, amplifier, integrator , differentiator, power source, voltmeters, etc.

UNIVERSITY AND FREE COMPETITION

The Competition seeks to stimulate interest in Physics, identify students with special abilities for Physics to stimulate and support them in their studies, continue the training of students who have participated in Physics Olympics at a pre-university level and encourage exchange between students and Teachers from different countries.

The Competition will be held in coordination with the partner Universities. Only students enrolled in a university degree may participate. The contest consists of the realization of an exam with contents of General Physics of university level with 5 problems elaborated by recognized professors and researchers.

Each participating university will designate a professor in charge of organizing the Competition in their institution, enrolling interested students, reproducing the exams in the necessary amounts, applying them at the scheduled time and sending them to the organizing committee for their qualification.

Participation requirements.- Category A▪ Participation requirements You can participate if you meet the following conditions: You (if you participate as an individual) or your team members (if you participate as a team) are expected to present your project to the committee or graduate between on 01/09/2019 and on 31/08/2020 *. ▪ Participants can submit work done only in their last year of study, regardless of the nature, program, budget and scale of the project (students can send graduation projects or any other design project of the last year, as long as you have completed in your last year of study). ▪ If a team or person wishes to submit more than one project, then each presentation must be registered as a separate entry. ▪ Finalists will be asked to provide proof of their status as seniors and graduate during the specified period.

Category B can be any student at the university level of any semester.

Category C All Teachers of different grades, at the bachelor's, master's and doctoral levels.

Free category: All qualified professionals who practice.

Rules of the Jaguar Guerrero International Prize

This is an anonymous competition and the Unique Registration Number is the only means of identification. ▪ The official language of the prize is English ▪ The registration fee is $ 200 USD for students and 350 for the other categories.

It is not refundable.

▪ It is forbidden to contact the jury.

▪ The International College of Professionals C&C, as the organizer of the award, reserves the right to modify the awards program if deemed necessary. ▪ Entries will not be reviewed if any of the rules or shipping requirements are omitted.

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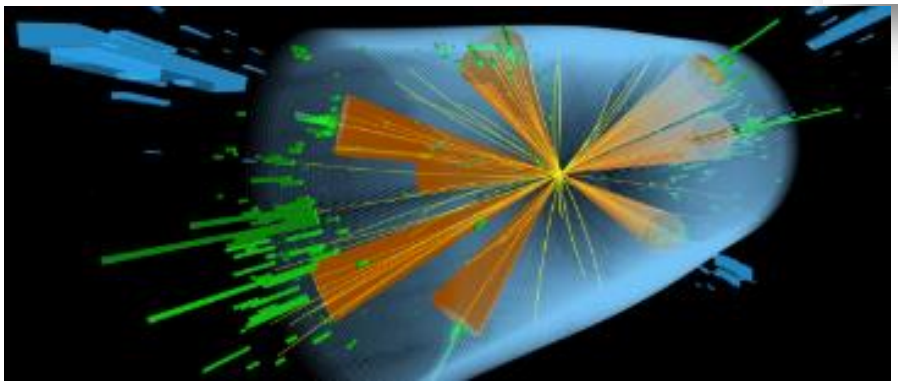

▪ **Participants should send the link of their work to the following email: dinamicaecc@gmail.com**

Awards:

1st. Place A trip to Germany with all expenses paid for 15 days + Medal of the International College of Professionals C & C + Delivery of the Jaguar Warrior First Prize + Invitation to attend the awards ceremony + Honorable Mention.

To the academic director with the majority of the registrations registered and that are among the 20 best Medal of the International College of Professionals C&C + Certified as academic director of the Year A $ 1500 scholarship to travel and attend the awards ceremony. * Second place A trip to the Bahamas with all expenses paid for 7 days + Medal of the International College of Professionals C & C + Award delivery for 2nd Prize + Invitation to attend the awards ceremony + Recognition of honorary member.

and Third Prizes A trip to Los Cabos with all expenses paid for 3 days and 2 nights + Medal of the International College of Professionals C & C + Award delivery for 3rd Prize + Invitation to attend the awards ceremony + Recognition of honorary member.

The winning project and the university with the highest number of entries in the top 10 Medal of the International College of Professionals C&C Guerrero Jaguar University of the year will be awarded to the university. An invitation to the Rector and his companion to attend the annual ceremony of the C&C Guerrero Jaguar International Association of Professionals for the winners of the TOP 3 mentioned above (flight and accommodation costs will be covered by the organizers of the award through the grant of travel). The Ceremony Prizes are per entry. For team entries, prizes will be divided among team members evenly. * If the winner of the second or third prize lives in a place where the ceremony and workshop are held, they will receive the prizes in cash.

COLEGIO INTERNACIONAL DE PROFESIONISTAS C&C

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▪ **Evaluation Criteria: We are looking for aspirational and transformative projects that address local and global challenges, containing in turn a high level understanding and resolution.**

RELEVANCE: A statement of the conditions that establishes the contextual parameters of the proposal.

ANSWER: Aspirational, transformative and original works with a programmatic response to

REGISTRATION The deadline for registration is June 22, 2020.

Institutions: This option is open to institutions interested in sponsoring their students to participate in the Jaguar Guerrero International Prize. This type of enrollment is suitable for institutions interested in showing their students' work on a global platform. Please contact us if you are a representative of your university or believe that your university may be interested in sponsoring your students to participate in the Jaguar Guerrero International Prize.

National Sponsors:

If you or your organization are interested in sponsoring students from your country as part of a Corporate Social Responsibility program to support young graduates of your country, please contact us and we can talk with you about the benefits of such sponsorship. By becoming a National Sponsor, it means that it gives all young Physicists in your country the opportunity to participate in this international award.