

## Application Form for the Organisation of an ITTC

NATIONAL VACUUM SOCIETY: **Asociación Física Argentina (AFA)**

COURSE TITLE: **Introduction to Vacuum Science, Technology, and Applications: from Nano science to outer space**

LOCATION: **UNSAM (Universidad Nacional de San Martín) CAMPUS MIGUELETE, Av. 25 de Mayo & Francia, San Martín, Buenos Aires, Argentina; Website: <http://www.unsam.edu.ar/english/index.asp>**

DATE OF COURSE: **From 18/05/2020 to 22/05/2020**

STAND-ALONE COURSE OR PART OF A CONFERENCE or WORKSHOP: **STAND-ALONE COURSE**

OBJECT OF THE COURSE: **The target of this course is to introduce basic concepts related to vacuum technologies to attenders with very little or no knowledge in the field. The program will cover vacuum generation, control measurements and safe handling/operation and maintenance of vacuum systems of several complexity. Particularly, the call to participants is addressed to student interested in scientific and technological activities in which vacuum plays a crucial role. The long terms aim is to link and share knowledge among academics, representatives of vacuum companies and sectors of practical vacuum users, promoting and effective collaborative work between these sectors.**

LANGUAGE: **Spanish**

COURSE OUTLINE ATTACHED:

EXPECTED EDUCATIONAL AND JOB LEVEL OF STUDENTS:

EXPECTED AVERAGE NUMBER OF STUDENTS PER COURSE:

**Under and graduate students, researchers, and technicians. Not particular background in vacuum will be required to attend the ITTC**

FINANCES:

Cost per course in Euros, CHF, or US\$;

Sources and total amount of support;

IUVSTA contribution requested and how will it be used. **2500 €**

PROVISIONAL BUDGET ATTACHED:

REPORT

The Society (the recipient of the grant) is required (within 1 month after ITTC completion) to send a Report to the IUVSTA Scientific Secretary which should include the following information:


- Title, location, and date of the TSC
- Intent of the course, language of the course
- List of teachers and attendants (with affiliations)
- Names of beneficiaries of the IUVSTA support, with spending specifications

I agree to fulfil all the points of the above

Name: **Romualdo Alejandro Ferreyra**

Position: **IUVSTA Surface Engineering Division representative of Argentina Association of Physics.  
Member of Instituto de Ciencias Físicas UNSAM (National University of San Martín)  
Associated Profesor at Universidad de San Martín. Website UNSAM: <http://www.unsam.edu.ar>  
CONICET (Researcher of Consejo Nacional de Investigaciones Científicas y Técnicas)**

Date and Signature:

04/02/2020 

**On behalf of the Asociación Física Argentina (AFA) for the IUVSTA  
Dr. Miguel Darío Sánchez**

Date and sign

05/02/2020 

	<b>TITLE:</b>		Introduction to Vacuum Science, Technology, and Applications: from Nanoscience to outer space	
	<b>DATE:</b>		18 <sup>th</sup> - 22 <sup>th</sup> May 2020	
	<b>VENUE:</b>		Universidad Nacional de San Martín, Argentina	
<b>Income</b>	<b>Unit cost (EUR)</b>	<b>Quantity</b>	<b>Sub-Total (EUR)</b>	<b>Remarks</b>
Registration Fee (per person)	50	20	1000	Total 35 registered participants, adding the 15 invited participants, which do not pay inscription)
Asociacion de Física Argentina	1000	1	1000	
IUVSTA contribution	2500	1	2500	
<b>Total (EUR) INCOME</b>			<b>4500</b>	
<b>Expenditures</b>	<b>Unit cost (EUR)</b>	<b>Quantity</b>	<b>Sub-Total (EUR)</b>	<b>Remarks</b>
Coffee breaks (3 per day x 4 days)	100	12	1200	
Meals (4 days per person and 50 participants)	20	50	1000	Lunch will be served at the instalations of the event
Hotel Rooms (5 nights per tutors)	550	2	1100	Accomodation for (2) invited tutors
Student travel support For students from outside Bs. As. metropolitan area (per person)	100	8	800	
Transportation (From the Universidad Nacional de San Martín to Centro Atómico Constituyentes - Comisión Nacional de Energía Atómica-Buenos Aires)	400	1	400	
<b>Total (EUR) EXPENSES</b>			<b>4500</b>	

## **COURSE OUTLINE ATTACHED: IUVSTA TTC- Argentine 2020**

Length: 5 days

Part I: Fundamentals on vacuum production (4 h):

- Fundamental Notions: Atmospheric pressure, Units Equivalences, Pressure Unit Conversion Table, Atmospheric pressure and its variation with the Height, Barometer, Absolute and Relative Pressure, Manometers, Vacuum gauges, and Manovacuumeters, Vapor pressure, Water Vapor Pressure.
- States of the mater: Gaseous State, Vacuum gas characteristics, Middle Free Path, Equation of Ideal Gases, Dalton's Law.
- Vacuum: Definition, Applications, Vacuum Ranges, Final pressure in a Vacuum System, Flow and Total flow of gases to be evacuated, Degassing, Most used Materials in vacuum technology, Average Degassing Rate, Pumping Speed, Pump Characteristic Curves, Flows, Flows according to Vacuum Ranges, Flow Conductance, Diagram of a Classic Pumping System, Pressure ranges for: Designation, CLM and Flow.

Part II: Equipment to obtain vacuum (2 h):

- Vacuum Pump Operation Ranges, Vacuum pumps: Diaphragm or Membrane (Dry), Rotary (with oils) - Gas ballast, Piston Rotary (Dry), Roots (Dry), Roots (Dry), Diffusion (with oils) – Liquid Nitrogen Cryotrap, Turbomolecular (Dry), Titanium sublimation (Dry), Ionic (Dry), Cryogenic (Dry).

Part III: Vacuum measurement Devices (2 h):

- Application Intervals, Bourdon, Capacitive, McLeod, Pirani, Thermocouple, Cold cathode "Penning", Hot cathode "Bayard-Alpert", Molecular Drag.

Part IV: Experimental Lab (8 h):

- Pedagogical vacuum system: demonstration of incremental vacuum level, plasma generation.
- Leaking detection Techniques
- Visit to research labs at Universidad Nacional de San Martin (UNSAM) and Centro Atómico Constituyente (CAC-CNEA): Lab of Applied Crystallography, PLD Lab, Nano and Micro technology Lab, Accelerator TANDAR.

Part V: Applications of vacuum in Science and Technology (12 h):

- Selected Real cases of vacuum applications in various research groups in UNSAM and CAC-CNEA.
- Industrial vacuum application presented by argentine local vacuum company representatives.

## **Goals of the course**

The proposed Technical Course will be oriented to under and graduate students, researchers, and technicians need or have to learn the basis of vacuum for their daily work, a specific application, research, or because would like to expand their spectrum of knowledge. Along the course strong emphasize o the good practices that conduct to a safe handling/operation, and maintenance of vacuum systems will be made.

It is expected that attendees of the course grasp and/or strength the fundamentals of the physical process involved with the vacuum realm e.g. its technology, production, measurement, practical knowledge on the operation of vacuum system through experimental lab. Also, because the host institution, Universidad Nacional de San Martin (UNSAM) sits on the technological-scientific parks, participants of the course will be introduced via talks delivered by researcher and engineers and visits to research and Tech labs to a wide diversity of scientific and technological field make use of vacuum. From the interaction between trainees and expositor and instructors it is expected to result in successful networking. Potentially stablishing tight bound among the technical, technological and scientific communities. Efforts are addressed to achieve the endorsement of School board of UNSAM to designate the course as eligibly for gaining academic credits previous test evaluation at the end of the event which could be beneficial for UNSAM student attending the course. Additional all participants of the course will receive assistance certificate issued by the UNSAM and Argentinean Physical Society.

# Labocluster building - Campus Miguelete - UNSAM



## From Ezeiza

### International Airport (EZE)

↓ Shuttle Bus (Tienda Leon): 40 min.

- Terminal Madero

↓ Taxi

- Retiro Train Station -Line Mitre  
(Final Destination Jose Leon Suarez)

↓ Train: 32 min.

- Miguelete Station  
(Campus Miguelete - UNSAM)

↓ Walk: 10 min.

- Edificio Labocluster - UNSAM

## From Ciudad Autonoma de Buenos Aires

- Retiro Train Station -Line Mitre  
(Final Destination Jose Leon Suarez)

↓ Train: 32 min.

- Miguelete Station  
(Campus Miguelete - UNSAM)

↓ Walk: 10 min.

- Edificio Labocluster - UNSAM

