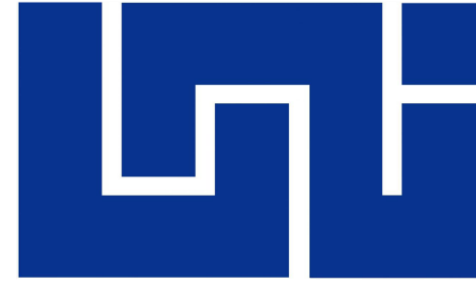




UNIVERSIDAD
NACIONAL
AUTÓNOMA DE
NICARAGUA,
MANAGUA

UNAN-MANAGUA



UNIVERSIDAD
NACIONAL DE
INGENIERÍA

Beginning and development of the physics in Nicaragua: the role of women in this history.

Mairena Elba¹, García Yasser², Montes Marcela², Torrez Katherine², Vega Shelvis¹

¹ Enseñanza de las Ciencias, UNAN-Managua, elba.mairena@unan.edu.ni, Nicaragua

² Departamento de Física, UNI-Nicaragua, yasser.garcia@fcys.uni.edu.ni, Nicaragua

² Departamento de Física, UNI-Nicaragua, katherine.torrez@fcys.uni.edu.ni, Nicaragua

² Departamento de Física, UNI-Nicaragua, marcela.montes@fcys.uni.edu.ni, Nicaragua

¹ Enseñanza de las Ciencias, UNAN-Managua, shelvaortega@gmail.com, Nicaragua

Beginning of Physics in Nicaragua

Nicaragua is a country located in Central America with an extension of 130,373 km², with 6,850,540 people and is the second poorest on the continent, after Haiti. Currently, in Nicaragua there are public, subsidized and private universities, which offer undergraduate and graduate degrees.

Evolution of the training of physicists in universities



Decade of the 60

The first physicists are trained at Universidad Nacional Autónoma de Nicaragua (UNAN-León).



Decade of the 70

The Physics degree started in the physics department of Rubén Darío University Campus (RURD) in Managua. The degree did not continue to be taught at UNAN-León.



Decade of the 80

The theoretical physics degree is consolidated in the recently created UNAN-Managua and the educational physics degree started in the education faculty.



Decade of the 90 to the present.

The training of physicists for teaching was taught only at UNAN-Managua. In 2014, the Physics degree disappeared in the Faculty of Sciences.

Theoretical Physics in Nicaragua

Since the 1980s, two physics majors have been offered in Nicaragua, one focused on science, meteorology, radiation and other applications, while the other is dedicated to the training of high school physics teachers. These professions are part of UNAN-Managua university.

Different professors were trained abroad in the 80s in places like the United States, Mexico, Germany and the USSR. When they returned, they dedicated themselves solely to teaching physics and others went to the area of radiation and meteorology. There are not many scientific publications in this area [1].

The Faculty of Sciences and Engineering of UNAN-Managua, through the Department of Physics, offered from the 1980s to 2014 the degrees of Physics, Engineering in Geology, Geophysics and Electronic Engineering. Then in 2010 Medical Physics was offered. In 2014 the Degree in Physics disappeared and in 2020 the Degree in Medical Physics disappeared as well.

Physics department

Physics and Medical Physics degrees disappeared due to low demand for them. In the 1980s, **several women graduated** who later traveled abroad to become professionals and returned to continue teaching science in Nicaragua.

The Radiation and Metrology Laboratory (LAF-RAM) was built in 2013. It has 4 specific areas: external personal dosimetry Thermoluminescent, dosimetry calibration, dosimetry by incorporation, nuclear instrumentation and X-ray diagnosis [2].

Department of Science Education

Bachelor's Degree in Educational Physics



Objective: to train professionals for the teaching of physics to perform at the high school level.

face-to-face mode.

This modality is mainly for full-time students.

Bachelor's Degree in Educational Physics-Mathematics



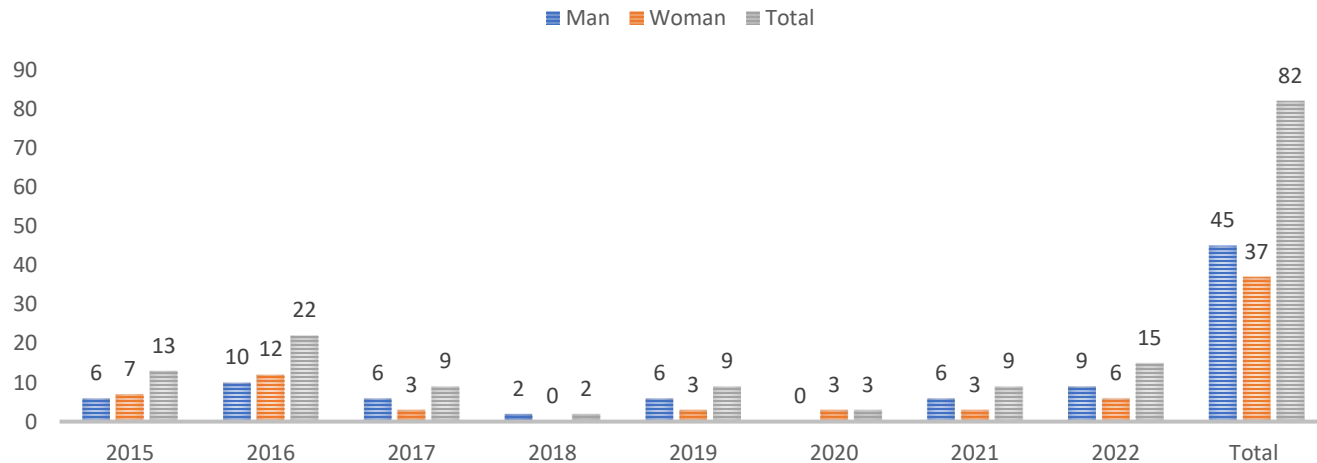
Objective: to train professionals to teach physics and mathematics to perform at the high school level.

Professionalization mode and face to face mode.

This modality is for teachers who work in rural, suburban and urban schools of the country's departments.

Department of Science Education

GRADUATES OF THE EDUCATIONAL PHYSICS DEGREES (2015-2022)



Professors

Two with PhD.

five with mastery.

Three with degrees of education physics.

In the current context, the demand for the degree is declining because each year only an average of 40 students start majoring, of which only 40% achieve promotion to the following year, where 60% represent desertion due to lack of interest towards the teaching of the discipline and its complexity.

In the current year, 2023, the degree did not get the required enrollment, creating special concern with the future of the education of this discipline in the country.

Challenges of Physics in Nicaragua

Training

- To organize workshops and scientific meetings.
- Discipline update.
- To promote and develop research.
- To participate in international conferences.
- To carry out postgraduate studies and research stays in other countries.

Equipment

- To manage technological resources for teachers and students.
- To upgrade laboratory equipment and get more equipment for different physics topics.

Promotion

- To organize science fairs in schools and promote the participation of girls, boys and young people.
- Dissemination of physics by different media.
- Physics Olympics in high school.
- To retake the Nicaraguan Society of Physicists.

Teaching



Laboratory and extension



Bibliography

[1] Munguía-Mena M. Gamero . Picado A. (2021) Análisis bibliométrico de las publicaciones científicas nicaragüenses en la Web of Science (2015-2020). *NEXO*. 36 (6), 1658-1666.

[2] González, B. (22 al 26 de noviembre de 2015). Educación nuclear en Nicaragua. Simposio Internacional sobre Educación, Capacitación y Gestión del Conocimiento en Energía Nuclear y sus Aplicaciones. Cusco, Perú.

[3] Taller Iberoamericano de Enseñanza de la Física Universitaria: libro de actas: Facultad de Física, Universidad de La Habana. Ciudad de La Habana (Cuba), 20-24 (enero de 1997).

Acknowledgements

We thank MEXCITEG and Dr. Lilia Meza Montes for giving us the opportunity to participate.

We thank the organizers and facilitators of the International Conference on Women in Physics event.

We thank the universities UNAN-Managua and UNI-Nicaragua.

We thank the retired professors for their contributions to learning about the history of physics in Nicaragua.

Thank you