

MECHANICAL ENGINEERING



Description of the College of Sciences and Engineering

The College of Sciences and Engineering (Politécnico) at Universidad San Francisco de Quito USFQ trains professionals with sharp critical thinking, excellent levels of scientific and technological preparation, a comprehensive humanistic education in the liberal arts, and solid ethical principles.

Politécnico offers a wide variety of scientific and technical programs: Physics, Environmental Engineering, Civil Engineering, Agronomy Engineering, Food Engineering, Computer Science, Electronic and Automation Engineering, Industrial Engineering, Mechanical Engineering, Chemical Engineering, Applied Mathematics and Computing Engineering, and Mathematics. Additionally, Politécnico offers sub-specializations and postgraduate programs in various fields. The numerous research projects carried out by professors and students across different programs focus on both basic and applied aspects, proposing technological solutions to society's needs. The results of these projects are evidenced by the large number of specialized scientific publications, which have a high impact at the international level, as well as by the collaborations that Politécnico maintains with the local industry.

For more information, visit our website, where you can also find scholarship contests for all the programs at Politécnico to help finance your studies at the #1 University in Ecuador (<https://www.usfq.edu.ec/es/colegios-academicos/colegio-de-ciencias-e-ingenierias>).

Description of the Program

The Mechanical Engineering degree program is centered on the foundational principles of science as applied to engineering, encompassing disciplines such as physics, chemistry, and mathematics. Its primary objective is to cultivate expertise in the design of machinery and product manufacturing, the development of fluid and power systems, and the creation of control and automation systems. At USFQ, education in Mechanical Engineering is grounded in the "PBL - Project Based Learning" methodology. Throughout their academic journey, students engage in constructive projects that involve the application of fundamental design principles and rigorous calculations. USFQ's Mechanical Engineering program is dedicated to producing engineers with the capacity to apply their knowledge to the design, maintenance, and management of production and machinery systems. Graduates are well-equipped to adapt to emerging technologies, utilize cutting-edge software and hardware tools, and actively contribute to academic research. Their dedication to community and environmental needs is a core facet of their education.

Mission

The Mechanical Engineering Program at USFQ educates students to become mechanical engineers who can be leaders, entrepreneurs, creative professionals, humanists, and continuous learners.

Our students will demonstrate solid knowledge of fundamental principles, methods, practices, and tools related to the specialized area of mechanical engineering and other closely related areas.

Vision

The vision of the Mechanical Engineering Program at USFQ is to be a nationally and internationally recognized leader program through excellence in engineering education and research. The program strives to graduate mechanical engineers of the highest quality who embody the liberal arts philosophy extensively, demonstrating competences in entrepreneurship, research, and the practice of engineering.

UNIVERSIDAD SAN FRANCISCO DE QUITO USFQ

College of Sciences and Engineering

INGENIERÍA MECÁNICA / MECHANICAL ENGINEERING

ON-SITE LEARNING MODALITY - 9 SEMESTERS

PRIMER AÑO / FIRST YEAR

ID	PRIMER SEMESTRE / FIRST SEMESTER	CREDITS	ID	SEGUNDO SEMESTRE / SECOND SEMESTER	CREDITS
MAT 1201	Cálculo Diferencial + Ej <i>Differential Calculus + Pr</i>	3	ESP 1001	Escritura Académica <i>Academic Writing</i>	3
IME 2002	Ing. Mecánica: Introducción <i>Intro to Mechanical Eng.</i>	3	QUI 1003	Química General 1 + Lab/Ej <i>General Chemistry 1 + Lab/Pr</i>	3
ECN 1001	Introducción a la Economía <i>Introduction to Economics</i>	3	MAT 1202	Cálculo Integral + Ej <i>Integral Calculus + Pr</i>	3
ARL 1001	Autoconocimiento <i>Self-knowledge</i>	3	ARL 2001	Ser y Cosmos <i>The Self and The Cosmos</i>	3
ARL 1002	Cosmos <i>The Cosmos</i>	3	ARTE	Arte: ART/MUS/DAN/TEA <i>Art:ART/MUS/DAN/TEA</i>	3
ESL 0001	Inglés Nivel 1 <i>English Level I</i>	0	ESL 0003	Inglés Nivel 3 <i>English Level III</i>	0
ESL 0002	Inglés Nivel 2 <i>English Level II</i>	0	ESL 0004	Inglés Nivel 4 <i>English Level IV</i>	0
TOTAL		15	TOTAL		15

SEGUNDO AÑO / SECOND YEAR

ID	PRIMER SEMESTRE / FIRST SEMESTER	CREDITS	ID	SEGUNDO SEMESTRE / SECOND SEMESTER	CREDITS
MAT 2002	Ecuaciones Diferenciales <i>Differential Equations</i>	3	DEP 0010	Deportes <i>Sports</i>	1
IME 2001	Taller Mecánico <i>Mechanical Workshop</i>	3	IME 3004	Mecánica Computacional <i>Computational Mechanics</i>	3
FIS 2701	Física para Ing. 1 + Lab/Ej <i>Physics for Eng. 1 + Lab/Pr</i>	3	IME 3001	Dibujo Mecánico y CAD-CAM + Lab <i>Mechanical Drawing CAD/CAM + Lab</i>	3
MAT 2203	Cálculo Vectorial <i>Vector Calculus</i>	3	FIS 2702	Física para Ing. 2 + Lab/Ej <i>Physics for Eng. 2 + Lab/Pr</i>	3
HUM	Humanidades: LIT/FIL/ARH/ESC <i>Humanities: LIT/FIL/ARH/ESC</i>	3	PRC 2000	Aprendizaje y Servicio PASEC <i>Service Learning PASEC</i>	3
ESL 0005	Inglés Nivel 5 <i>English Level V</i>	0	ELECTIVA 1	Electiva Libre 1/2 <i>Free Elective 1/2</i>	3
ESL 0006	Inglés Nivel 6 <i>English Level VI</i>	0	TOTAL		16
TOTAL		15			

TERCER AÑO / THIRD YEAR

ID	PRIMER SEMESTRE / FIRST SEMESTER	CREDITS	ID	SEGUNDO SEMESTRE / SECOND SEMESTER	CREDITS
GST 0010	Cultura Gastronómica <i>Gastronomic Culture</i>	1	IME 3002	Dinámica y Vibraciones + Ej <i>Dynamics and Vibrations + Pr</i>	3
IEE 2001	Electrónica Básica + Lab <i>Basic Electronics + Lab</i>	3	IME 3007	Métodos Numéricos IME <i>Numerical Methods ME</i>	3
ADM 3002	Emprendimiento <i>Entrepreneurship</i>	3	IME 3005	Mecánica Materiales + Lab/Ej <i>Solid Mechanics + Lab/Pr</i>	3
IME 3101	Ciencia e Ing. Materiales + Lab <i>Materials Science and Eng. + Lab</i>	3	IME 3202	Termodinámica 2 + Lab <i>Thermodynamics II + Lab</i>	3
ICV 2001	Estática + Ej <i>Statics + Pr</i>	3	CCSS	CCSS:HIS/SOC/ANT/POL/REL/PSI	3
IME 3201	Termodinámica 1 + Ej <i>Thermodynamics 1 + Pr</i>	3		TOTAL	15
	TOTAL	16			

CUARTO AÑO / FOURTH YEAR

ID	PRIMER SEMESTRE / FIRST SEMESTER	CREDITS	ID	SEGUNDO SEMESTRE / SECOND SEMESTER	CREDITS
IME 4001	Mecánica de Fluidos + Lab/Ej <i>Fluid Mechanics + Lab/Pr</i>	3	ING 0001	Coloquios <i>Colloquium</i>	1
IME 4003E	Heat Transfer + Lab/Pr <i>Heat Transfer + Lab/Pr</i>	3	IME 3003	Dinámica Sistemas/Control + Lab <i>Systems Dynamics and Control + Lab</i>	3
IME 4002	Procesamiento Materiales + Lab <i>Materials Processing + Lab</i>	3	IME 4004	Elementos Finitos + Lab <i>Finite Element Method +Lab</i>	3
IME 4301	Diseño Mecánico <i>Mechanical Design</i>	3	IIN 4011	Proyectos: Gerencia <i>Project Management</i>	3
MAT 2008	Probabilidad y Estadística + Ej <i>Statistics and Probability + Pr</i>	3	IME 4006/7	Diseño Sist.Energéticos / Manufa Designe Elective (Energy/Manufacturing)	3
	TOTAL	15	OPT 1	Optativa 1/2 <i>ME Elective 1/2</i>	3
				TOTAL	16
ID	VERANO / SUMMER	CREDITS			
PAS 4000	Práctica Pre-Profesional PASEM <i>PASEM Professional Practicum</i>	5			
	TOTAL	5			

QUINTO AÑO / FIFTH YEAR

ID	PRIMER SEMESTRE / FIRST SEMESTER	CREDITS
IME 5001	Automatización Industrial + Lab <i>Industrial Automation + Lab</i>	3
ELECTIVA 2	Electiva Libre 2/2 <i>Free Elective 2/2</i>	3
OPT 2	Optativa 2/2 <i>ME Elective 2/2</i>	3
IME 5992	Proyecto Integrador IME <i>Senior Project</i>	5
	TOTAL	14

TOTAL CREDITS: 142

3 credits are equivalent to 144 hours

This curriculum may be subject to non-substantial changes in accordance with Article 110 of the Academic Regulations, issued by the Higher Education Council (CES). The curriculum applicable to each student will be the one in effect at the time of their graduation. Any changes that are processed will be made to this digital version published on the website of the University to which the student of USFQ must refer

INGENIERÍA MECÁNICA / MECHANICAL ENGINEERING

ON-SITE LEARNING MODALITY - 9 SEMESTERS

The sequence of subjects in the curriculum from the second semester onward is a recommendation considering that some subjects are prerequisites for subsequent subjects. The system is calibrated so that students can register for the number of credits listed in the curriculum.

GENERAL COLLEGE COURSES AND GRADUATION REQUIREMENTS

Some General College courses are fulfilled with designated courses for this purpose by each major. When a major designates a particular subject to meet the General College requirement, that subject requires a passing grade of C.

English as a Second Language Levels ESL (B2 Common European Framework)

Students are assigned an English level (English as a Second Language ESL) based on the proficiency test taken during the admission process. Students can also validate their English knowledge with international certificates detailed in the Foreign Language Learning Proficiency: English section of the Student Handbook. To meet the mandatory graduation requirements, all students must demonstrate English proficiency by achieving the required score on USFQs proficiency test, presenting an international certificate of English validated by USFQ, or completing USFQs ESL levels through Level 6.

To take courses in any academic area in English and courses in other languages, ESL requirements must have been formally and successfully completed.

Academic Writing (ESP 1001)

Students are encouraged to take Academic Writing early in their career. The minimum passing grade for this General College requirement is C.

Mathematics

The General College MATHEMATICS requirement is met with the course MAT 1201 Differential Calculus + Pr. The minimum passing grade for this General College requirement for this major is C.

Sciences

The General College SCIENCES requirement is met with the course QUI 1003 General Chemistry 1 + Lab/Pr. The minimum passing grade for this General College requirement for this major is C.

In some cases, to meet General College requirements, students must choose a subject from various academic areas (check in the curriculum and see details below).

Arts

The ART requirement is met by passing any course in the academic areas detailed below. The minimum passing grade for this General College requirement for this major is D.

ART - Art
DAN - Dance
TEA - Theater
MUS - Music

Social Sciences

The SOCIAL SCIENCES requirement is met by passing any course in the academic areas detailed below. The minimum passing grade for this General College requirement for this major is D.

ANT - Anthropology
EDU - Education
HIS - History
REL - International Relations
POL - Political Science
SOC - Sociology
PSI - Psychology

Humanities

The HUMANITIES requirement is met by passing any course in the academic areas detailed below. The minimum passing grade for this General College requirement for this major is D.

LIT - Literature
FIL - Philosophy
ESC - Creative Writing
ARH - Art History

Community Service Learning and Service PASEC (PRC 2000)

Community service is fulfilled through the LEARNING AND SERVICE PASEC seminar. Students must attend classes and also complete community service hours.

Professional Practicum PASEM (PAS 4000)

The students can start completing PASEMs Professional Practicum requirements from the sixth semester and/or with 75 approved credits, they must complete a minimum of 240 hours. Students must enroll in PASEM in the last summer according to their curriculum, the class is approved with the internship hours and the

theory component of the class. The student must ensure that the class end date coincides with his/her last semester.

Sports (DEP 0010)

Every student must choose a SPORTS class from the various options offered each semester.

Gastronomic Culture (GST 0010)

Every student must take a GASTRONOMIC CULTURE seminar from the second semester onward.

Colloquiums

The Colloquium requirement varies by major. Check with the Academic Dean of each College.

Course in English

The student must register in any course taught in English, either from their major or from the General College. Courses with a code ending in (E), (e.g., ADM 1001E), are taught in English. Any course taught in English will have ESL 0006 English Level 6 as a prerequisite.

Writing Intensive

The student must pass any course with the Writing Intensive attribute. To register for a Writing Intensive course, students must have passed all ESL levels. Writing Intensive courses can be identified with a specific icon in the Offered Courses Catalog each semester.

Free Electives

Any subject that is not a mandatory requirement in the curriculum can serve as a Free Elective for General College. Free Electives can be used to meet the demands of a second major or a minor.

Ser Dragón (COL 2000)

Ser Dragón is an accompaniment seminar for first-semester students that aims to facilitate the transition from high school to university life. Every student who has enrolled from semester 202210 onward must take and pass COL 2000. The passing grade for this requirement is P.

GUIDE FOR TECHNICAL ELECTIVE COURSES

All courses offered by the College of Sciences and Engineering must be passed with a minimum grade of C.

Electives

- The IME electives requirement is fulfilled by passing two courses from the following list:

IME 4083 - Turbomachinery

IME 5082 - Refrigeration, Air Conditioning

IME 4084 - Aerodynamics

IME 4082 - Automotive Engineering

IME 4081 - Wear, Corrosion, and Failure

IME 5302 - Mechanical Design 2

IME 5083 - Renewable Energies

IME 4086 - Vibrations

IME 4085 - Mechanisms

IME 5080 - Design of Steel Structures

Design Courses Mechanical Engineering

To fulfill the design component offered by the Mechanical Engineering program, students may take either IME 4006 Energy Systems Design or IME 4007 Manufacturing Design.

ME 4006 Energy Systems Design

This course is focused on the design of energy systems using fluid mechanics, thermodynamics, and heat transfer concepts. Topics covered include analysis and selection of thermal energy system components, as well as the simulation and optimization of different systems and energy components.

IME 4007 Design for Manufacturability

The lecture portion of the course covers a variety of issues including: the design process, material and manufacturing considerations, design for assembly, quality, robust design, and life cycle engineering. The lectures will be augmented with laboratory projects in the area of tolerancing, assembly, and manufacturability including an industry related project where the students will redesign an actual product, generate a prototype, and obtain feedback from the industry concerning manufacturability.

ADDITIONAL ACTIVITIES OF THE PROGRAM

Additional Activities Contributing to the level of Attainment to Student Outcomes

The Mechanical Engineering program at USFQ is accredited by the Engineering Accreditation Commission(s) of ABET, under the General Criteria and the Mechanical Engineering and Similarly Named Engineering Programs Criteria, since 2018. The Mechanical Engineering Program offers various alternatives and opportunities to enrich the learning experience and reinforce the knowledge acquired by our students. These goals are achieved through diverse activities that encompass academic, scientific, social, and technical experiences. These additional activities are integrated throughout the coursework journey and are designed to strengthen students' technical backgrounds, reinforce their knowledge, and improve their abilities and skills.

Our undergraduate students have various opportunities to enhance their education. For instance, they can participate in research projects conducted by faculty members and join one of our five student chapters affiliated with professional societies recognized and supported by ABET. Additionally, our students engage in practical learning in every subject of the major through the Project-Based Learning (PBL) approach implemented throughout the entire Mechanical Engineering coursework.

Scholarships

The Mechanical Engineering (ME) Program at USFQ offers two scholarships for academic excellence, known as the James Watt Scholarships. These scholarships are available each academic year to competitive high school seniors. The objective of these scholarships is to promote the profession of mechanical engineering by stimulating intellectual development, scientific research, and technological advancement, as well as fostering leadership among the awardees.

Mechanical Engineering Fair

The Mechanical Engineering (ME) Program at USFQ has implemented Project-Based Learning (PBL) methodologies to enhance practical education. Every semester, the program organizes an Engineering Fair, providing students with the opportunity to present and demonstrate their course projects and capstone projects (senior design projects). This event showcases over a hundred projects annually, covering areas such as energy, design, modeling, simulations, reverse engineering, vibrations, and structures.

The Mechanical Engineering Fair is a vibrant event open to the entire campus community, including nearby high school and middle school students, industry representatives, and anyone interested in engineering and technology. This inclusive environment fosters networking, inspiration, and collaboration among participants and attendees.

During the fair, program faculty and special guests evaluate the projects, selecting the best ones in various categories and awarding certificates of recognition to the winners. This recognition not only motivates students but also highlights the high-quality work being done within the program.

In addition to project presentations, the fair features multiple exciting competitions, including robot battles, tower crane constructions, wood bridge building, trebuchet catapult contests, Computer-Aided Design (CAD) challenges and others. These competitions encourage students to apply their theoretical knowledge to practical problems, promoting creativity, teamwork, and problem-solving skills.

The event also serves as a platform for industry representatives to identify potential talent and for students to explore career opportunities. Special guests and speakers from the engineering field often attend, providing valuable insights and professional guidance to the students.

Another highlight of the fair is the alumni presentations sharing their experiences and career trajectories, explaining their journey from classrooms to graduate studies or professional experiences, with the intention to motivate and inspire young aspiring engineers on their Mechanical Engineering path. Alumni speakers add a valuable dimension to the fair, providing students with real-world perspectives and role models to emulate as they navigate their own educational and professional journeys.

Overall, the Mechanical Engineering Fair is a cornerstone of the ME Program, embodying its commitment to hands-on learning, innovation, and excellence in engineering education.

Student Chapters

For our students, the opportunity to participate in various student chapters as part of professional societies in different fields of study within mechanical engineering is available. We have very active and participative groups, including:

- ASME (American Society of Mechanical Engineers)
- MA (Material Advantage) of ASM (American Society of Materials)
- ASHRAE (American Society of Heating, Refrigerating, and Air Conditioning Engineers)
- SAE (Society of Automotive Engineers)
- SWE (Society of Women Engineers)

Faculty members serve as affiliated members and advisors to students in each group, offering guidance and support as students engage in activities, events, and initiatives organized by these chapters. This involvement provides students with valuable opportunities for broad education, networking, professional development, and hands-on experience in their respective fields of interest within mechanical engineering.

ASME American Society of Mechanical Engineers

The ASME student chapter at Universidad San Francisco de Quito (USFQ) comprises approximately 50 members who are encouraged to engage actively in the fields of design, energy, and materials throughout their course of study. This encouragement is facilitated through a variety of extracurricular activities, including competitions, courses, training sessions, technical visits, and field trips. ASME student chapter's principal aim is to provide students with opportunities for professional development, networking, and engagement in activities related to mechanical engineering. Some examples of the main events organized by ASME USFQ Student Chapter include:

- Engineering Equation Solver course, conducted in collaboration with USFQ's Learning Center.
- MECHTALKS, featuring talks from professors and alumni of the Mechanical Engineering Program.
- EFx (2019).

In addition to these events, our members have had the opportunity to represent USFQ in ASME E-Fest, an international contest, in 2019. They achieved remarkable success, winning first place in the region and third place worldwide. Furthermore, ASME members have been recipients of various prestigious scholarships, including the Christopher L. Hoffmann Memorial Scholarship, Garland Duncan Scholarship, and ASME Petroleum Division Scholarship.

MA Materials Advantage

The Materials Advantage (MA) chapter at Universidad San Francisco de Quito (USFQ) plays a vital role in fostering a strong connection between students and materials science and engineering, thereby enriching the mechanical engineering niche in Ecuador. Notably, it stands as the sole chapter recognized by the organization throughout the country. By participating in Material Advantage chapters, students can enhance their understanding of materials science and engineering concepts, build valuable connections with peers and professionals in the materials studies field, and gain practical experience that complements their academic studies

The MA chapter organizes several key events, including:

- **Materials biannual Conference-CIMA (Materials Research Conference):** This academic conference delves into topics related to coatings, additive manufacturing, and emerging materials, featuring panelists from various parts of the world.
- **Materials Bowl:** Annual competition designed to test students' knowledge of materials through trivia challenges.

Membership in the MA chapter provides affiliation with prestigious organizations such as:

- ACerS (American Ceramic Society)
- AIST (Association for Iron & Steel Technology)
- ASM (Materials Information Society)
- TMS (The Minerals, Metals and Materials Society).

ASHRAE American Society of Heating Refrigerating and Air Conditioning

This student's chapter was officially authorized in 2019. This branch started with more than 20 students from multiple semesters, focusing on promoting the understanding and advancement of heating, ventilation, air conditioning, and refrigeration (HVAC&R) engineering and energy management systems (EMS). Every semester the branch organizes training events, seminars, and student competitions to promote HVAC-R and EMS.

SAE Society of Automotive Engineers

The SAE chapter primary objective is to provide students with opportunities to engage in activities related to automotive engineering, including professional development, networking, and hands-on projects. Participation in SAE competitions like Formula SAE are a long-term objective for our program. SAE student chapters often organize events such as guest lectures, workshops, and industry visits to enhance students' understanding of automotive engineering concepts and facilitate connections with professionals in the field. The chapter plays a vital role in supplementing students' academic experience with practical skills and industry exposure, preparing them for careers in the automotive industry.

SWE Society of Women Engineers

The Society of Women Engineers (SWE) chapter at Universidad San Francisco de Quito (USFQ) was recently established in November 2023, motivated by the Mechanical Engineering (ME) program's commitment to supporting and expanding the participation of female students in STEM majors. Recognizing that the number of women in ME programs around the globe is significantly lower compared to other engineering and technical majors, the SWE chapter aims to address this disparity and foster an inclusive environment.

- **Promote Diversity and Inclusion:** SWE actively works to increase the representation of women in engineering and technology, advocating for diversity and inclusion within the field.
- **Professional Development:** The chapter offers workshops, seminars, and networking events to help members develop essential professional skills and connect with industry leaders.
- **Mentorship and Support:** SWE provides mentorship opportunities, pairing experienced professionals and alumni with current students to offer guidance, support, and career advice.
- **Community Engagement:** SWE members engage in outreach activities to inspire young girls to pursue careers in STEM, conducting workshops, presentations, and hands-on activities at local schools and community events.

Currently, the SWE chapter at USFQ has 16 active members. The chapter is dedicated to creating an inclusive and supportive community where female students can thrive academically, professionally, and personally, while also working to inspire the next generation of women engineers.

Industrial Visits and Field Trips

Both for academic purposes and outreach learning and collaboration, students participate in industry visits, providing them with firsthand learning experiences of real-life applications of their studies. The correlation between class topics and industrial applications is an enriching experience that opens the possibility for a better understanding and analysis of new and effective possibilities that could be implemented in the industry for more efficient production.

Interactions with professionals in the field bring valuable insights for the practical implementation of theoretical concepts, expanding students' understanding of engineering principles and practices in real-life scenarios. Moreover, significant contributions to student outcomes (SO) are identified through observing the implementation of concepts and engineering knowledge in real-life settings. This allows students to interpret and address the challenges faced on an industrial scale.

Transfer Agreement ERAU

Engineering students at USFQ could start their Aerospace Engineering major in Ecuador and finish the undergraduate program at the prestigious Embry-Riddle Aeronautical University (ERAU) in the USA, ranked as the top five university to study aerospace engineering in the USA.

Course work:

1. Study at USFQ: Students begin their studies at USFQ for three years, sharing classes with Mechanical Engineering peers.
2. Study at ERAU: Students then study at ERAU for three semesters and a summer, as stipulated by the agreement between the two institutions.

After completing all graduation requirements, students will receive a bachelor's degree in Aerospace Engineering from ERAU. In addition to Aerospace Engineering at ERAU, students can choose to specialize in either Astronautics or Propulsion Engineering. This extended study will take four semesters instead of three.

Research

Research and development are crucial components of our Mechanical Engineering program. Faculty-led research opportunities, although uncommon in undergraduate programs, significantly benefit our students by enhancing their knowledge and skills, with approximately 30% of pursuing graduate studies, a testament to the quality of our research initiatives. Research topics are closely aligned with faculty interests and expertise, ensuring cutting-edge and relevant investigations.

Our program also emphasizes the importance of national and international collaborations. We partner with local companies such as Novacero, SLB, and Lundin Gold, fostering industry-academia linkages that provide practical insights and applications. Internationally, we collaborate with prestigious research centers, including the Oak Ridge National Lab (ORNL) in Tennessee, USA; the Center for Thermal Spray Research (CTSR) in New York, USA; and the Centro de Investigación y de Estudios Avanzados del Instituto Politécnico Nacional (CINVESTAV) in Queretaro, Mexico.

Furthermore, we maintain strong ties and collaboration with leading universities worldwide. Our partners include Stony Brook University, Columbia University, Stanford University, Universidade Federal do Rio de Janeiro (UFRJ), Universidad de Costa Rica (UCR). These collaborations expand the horizons of our research endeavours and provide our students with diverse opportunities for learning and development.

Outreach Programs

Participation in outreach programs is essential to bridge the gap between the university and the broader community. Outreach is important for our students' holistic development, offering educational growth opportunities, valuable learning experiences, promoting cultural understanding, and contributing meaningfully to communities and society at large.

Our outreach programs focus on helping the community from different perspectives. For example:

1. **UBUNTU Respira:** This project developed a low-cost mechanical ventilator to assist patients during the COVID-19 health emergencies.
2. **Mechanimals:** This initiative provides prostheses for disabled animals, particularly dogs, to improve their mobility.
3. **Simiatug Initiative:** This project aims to improve air quality and food security for indigenous communities in the highlands near the Chimborazo volcano. It involves providing improved wooden stoves to significantly lower fume exposure while still allowing the heating of houses. Air quality is also monitored.

These programs address various societal needs, enhancing health, nutrition, and quality of life. Our students are actively involved in these activities, gaining hands-on experience and making a positive impact on society.