Optional Courses in Science and Engineering 2019-1

Six Sigma

The purpose of course is study the Six Sigma methodology, which means a process improvement approach under techniques utilization, such as: problem definition, process measurement, analysis of root causes and methods of optimization. It also includes the application of control of processes and the organizational structure to support the overall improvement process.

GOALS

- To understand the meaning and impact of improvement processes within the organization, applying and developing the foundations and tools for the measurement, analysis, optimization and control of processes.
- To develop skills for identifying and solving complex problems related to process optimization with a strong focus on the customer.
- All these will be achieved through the teaching of theoretical and practical classes, classroom assessments (evaluations and practices), the realization, presentation and presentation of field work and / or research. It will also seek to promote the active participation of students in the development of the subjects.

Code: IND353
Credits: 3
Requirements: 170 credits

Instructor:

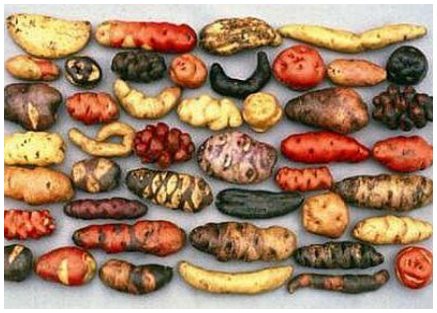
José C. Flores Molina
Ph.D. in Industrial and Systems Engineering
Florida International University
EEUU.

Optional Courses in Science and Engineering 2019-1

Integrative Ecology of the Central Andes

The central segment of western South America comprises Peru and the north of Chile and Bolivia. The region is home to dramatic altitudinal and climatic transitions which contribute to its unique biology, high biodiversity and the high degree of endemism among the species present.

The course will provide the basic concepts behind ecological theory and then proceed to review current research topics on ecosystem function, biodiversity and the human dimension in the region covering the transition from the Pacific Ocean over the Andes and into the Amazon rainforest.



A special emphasis will be placed on species interactions and their role in ecosystem services, the current and past anthropogenic influence on these ecosystems and potential biological effects of the human-mediated breakdown in the geographical barrier between east and west in central South America.

Code: ING309
Credits: 3
Requirements: (MIN) 140 credits,
(GEO) 140 credits

Instructors:

Karin Bartl
PhD in Environmental Engineering
ETH Zurich - Suiza

Fabian Drenkhan
PhD in Geography
Universidad de Stuttgart – Alemania

Optional Courses in Science and Engineering 2019-1

Conservation in the Peruvian Amazon

This is an elective course of theoretical and practical nature, which contributes to student outcomes c, f, g, h, and i. It will provide students with an overview of the biodiversity of the Peruvian Amazon, the conservation challenges facing the region, and the strategies being employed to sustainably manage Amazonian natural resources.

This course will be taught in the classroom and in the field, integrating both traditional learning techniques and hands-on activities that will emphasize key points. The goal is for students to finish the course with a broad understanding of the challenges and opportunities provided by the rapid change currently affecting the Amazon region, so that they can later apply this knowledge as leaders and decision makers in environmental fields

Code: 1ING13

Credits: 3

Requirements: (CIV229)

Methodology: It will be taught in an accelerated way, one week in Lima, and one week in Puerto Maldonado. Approximate trip cost: $400 + travel to Puerto Maldonado

Instructor:

Geoff Galice
Doctor en Entomología
University of Florida - Florida
Estados Unidos.

Optional Courses in Science and Engineering 2019-1

Sustainable Energy

The search for sustainable energy sources, that keep providing humankind with energy-derived advantages without damaging the environment, affecting societal stability, or threatening the well-being of the future generations, will dominate the twenty-first century. This course provides an introductory overview of the current major sources of energy and related environmental and societal impacts, and takes an introductory look at where the world may find sustainable energy sources in the future cleaner use of fossil fuels or renewable energy sources.

This course will expose students to the principles of sustainability and sustainable energy: a living harmony between the equitable availability of energy services to all people and the preservation of the earth for future generations.

This course is designed to increase the student understanding of role of energy in modern society, the link between energy consumption, environmental degradation, social impacts and alternative energy approaches for the future.

Code: ING310
Credits: 3

Requirements:

Evaluation: the final grade will include individual assignments, essays, reading quizzes, semester project, cooperative activities, field trips and one final exam.

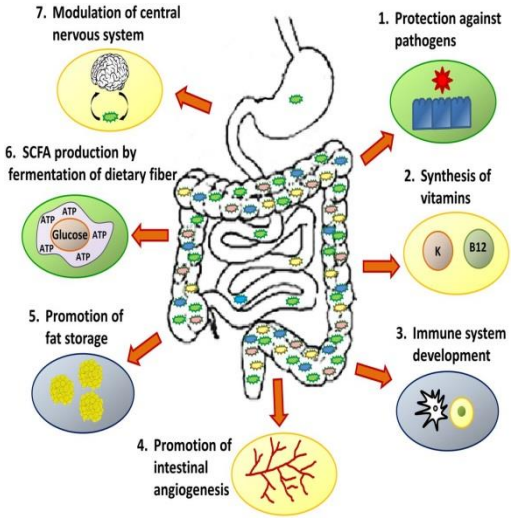
Instructor:

Ramzy Kahhat
PhD in Civil and
Environmental Engineering
Arizona State University, Tempe, Arizona - USA

Optional Courses in Science and Engineering 2019-1

Advanced Topics in Biochemistry:
Human nutrition and the microbiome

The biochemistry of nutrition, as with other topics of human biochemistry and physiology, has dealt until very recently with the study of chemical processes within human cells, tissues and organs. This view has had to shift in view of accumulating evidence for the many roles that the human microbiome plays in regulating the chemistry in our bodies. The microbiome is defined as that universe of microorganisms that live within us and that have a very direct influence on our nutrition, physiology and behavior. This course will present the basic aspects of human nutrition, from the biochemistry and physiology of nutrient assimilation to the control of the behavior associated with the acquisition of food and of satiety. It will also present the adaptations and biochemical responses of human beings to environmental alterations such as changes in diet and in physical activity. All topics will be discussed along with recent literature on the influence of the human microbial ecosystem on these processes.



Code: QUI215
Credits: 3

Methodology: The course will consist of a combination of lectures and discussion sessions of selected literature. Formal lectures will provide the basic theoretical information on each major topic after which a discussion round will be performed based on current relevant literature.

This lecture will be graded based on: Modalidad 4 (one final grade).

Requirements: None

Instructor:

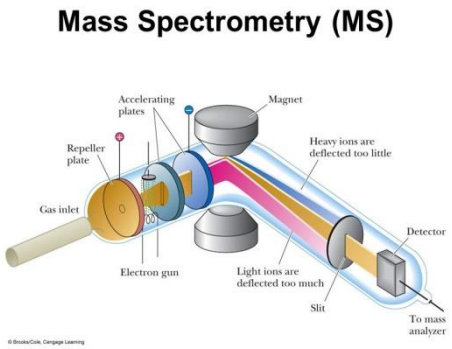
Eric Cosio
Ph.D. Botany/Plant Biochemistry
Miami University
USA

Patricia Gonzales
PhD in Biochemistry and Molecular Biophysics
University of Pennsylvania
USA

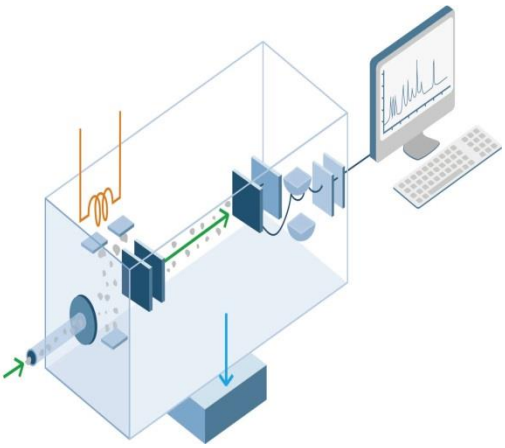
Optional Courses in Science and Engineering 2019-1

Química Analítica Orgánica
Introduction to Mass Spectrometry

Mass spectrometry is an analytical technique that can be used selectively to (sort and) detect ionized chemical species based on their mass to charge ratio. The field of mass spectrometry is extremely multidisciplinary. The course will cover fundamentals of mass spectrometry including operating principles of different mass spectrometer instrumentation, strategies for sample preparation, and data interpretation/visualization.



Within this course, we will dissect and describe the different parts of the different commercially-available mass spectrometers. Unique features of each mass spectrometer will be illustrated through practical examples of their applications in different fields, such as – but not limited to – clinical studies, environmental sciences, chemistry, biology, food sciences, etc.



The course is an introduction to the field of Mass Spectrometry, and it is characterized by having a theoretical-practical methodology. During the course, students will be encouraged to solve real problems with the use of mass spectrometry. The course covers topics of design, construction and application (use) of mass spectrometers.

Code: QUI308
Credits: 3

Evaluation: This lecture will be graded based on: Modalidad 4 (one final grade).

Requirements: 140 credits

Instructor:

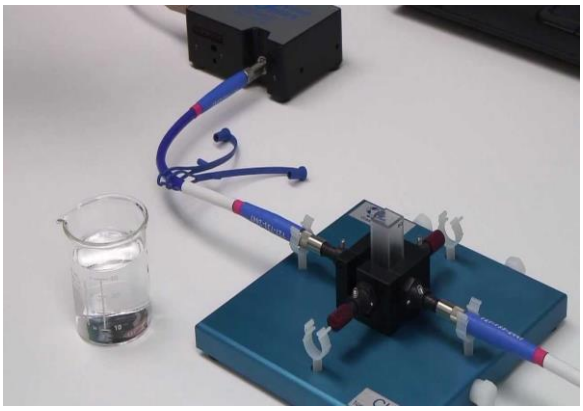
Alfredo Ibáñez
Dr. rer. nat.
Friedrich-Schiller-Universität Jena.

Madina Mansurova
Dr. rer.nat
Universidad de Leipzig

Fanny Casado
PhD in Toxicology
University of Rochester
New York - USA

Optional Courses in Science and Engineering 2019-1

Espectroscopia Molecular



This course “Structural Biology of Sensory Receptors” (by X-ray diffraction, NMR and Cryo-electron microscopy)” will cover recent advances in the structural analysis at atomic resolution of biological macromolecules, including water-soluble proteins, membrane proteins and protein assemblies.

The ultimate goal is elucidating the molecular mechanisms underlying the operation of biological Nano machines. Further, the course will include strategies for the design of the next generation of drugs directed against these Nano machines.

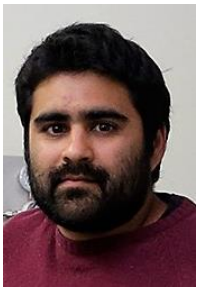
Code: QUI357
Credits: 3

Evaluation: This lecture will be graded based on: Modalidad 4 (one final grade).

Requirements: QUI249

Instructors:

Javier Navarro
Ph.D. en Fisiología y Biofísica,
Universidad de Boston - USA



Juan Manuel López Smith
Doctorado en Biomoléculas
Farmacología y Terapéutica
Universidad de Ciencias y Tecnologías de Lille, Francia.

Optional Courses in Science and Engineering 2019-1

TEMAS EN INGENIERÍA MECÁNICA B
(THE IMPACT OF MATERIALS ON SOCIETY)

The development of materials has greatly impacted human history and societies. New technologies and products derived from innovation in materials science and engineering have changed the way we communicate, the clothes we use, the way we work, our transportation system, medical treatments, etc., dramatically improving the quality of our life.

This course is dedicated to present materials in a historical, technical, and interdisciplinary context, and to discuss their technological, economic, social, and environmental impacts. Particularly, materials and technologies devoted to face the society s current challenges: energy, health, security, infrastructure and environmental contamination, will be analyzed. In addition, the role of materials in novel industries such as nanotechnology and biotechnology will be reviewed.

Code: MEC36B
Credits: 3
Requirements: 160 credits

Evaluation: This course will be graded using the evaluation mode 4 or special assessment, which states that the instructor will submit only one grade to the Faculty of Sciences and Engineering.

Instructors:

Francisco Rumiche
PhD. Materials Engineering
University of Illinois at Chicago - USA

Rolf Grieseler
Doktor-Ingenieur
Technische Universitaet Ilmenau - Alemania