



Bioengineering

Duration

Eleven semesters

Degree

Bioengineer

Objectives

1. To train professionals with solid knowledge in different areas of engineering and biology, allowing them to participate in the design, manufacturing, maintenance, verification and commercialization of medical technology.
2. To develop creativity and promote self-learning, both in adapting the acquired knowledge to solve common problems in healthcare institutions and in the generation of new biomedical technologies.
3. To build competencies for facilitating interdisciplinary work with healthcare professionals, affirming their ethical commitment to the preservation of human life and the environment.

Occupational Field

Bioengineering offers a broad occupational field for professionals that involves several areas and activities: in biomedical technology companies (equipment design and development; technical equipment service; quality control and consultancy), in healthcare centers (technical advice in technology acquisition, design of new spaces with high-complexity technology, technology management and maintenance, support for diagnostic, treatment, or rehabilitation medical practices), in Regulatory Agencies (national and provincial Ministries of Health; ANMAT, Certification Laboratories), and in research (generating new tools to contribute to the diagnosis and treatment of different pathologies, designing new products to support tele-assistance and patient inclusion).



Professional Profile

The Bioengineer is capable of:

1. Designing, calculating, and projecting:
 - a. Installations, instruments, equipment, blocks, and/or complete systems and subsystems of biomedical technology used in the field of human and animal health;
 - b. Software, instruments, equipment, blocks, and/or complete systems and subsystems used in the acquisition and processing of biological signals and images, as well as the measurement of physical or chemical quantities, especially those generated or related to humans, animals, or the environment;
 - c. Materials, elements, components, blocks, and/or complete systems and subsystems of prostheses, orthoses, artificial organs, as well as maintenance systems or supports for improving the quality of life, usable in humans and animals.
2. Processing and analyzing biological signals and images.
3. Planning, directing, controlling, and evaluating the construction, operation, and maintenance of items 1 and 2 above.
4. Managing the technical activities of sterilization services.
5. Establishing, directing, and controlling the technical activities of production, preservation, and distribution of medical products.
6. Participating in the development, modification, evaluation, verification of the adequacy with regulations related to what is described in items 1 and 2 above.
7. Advising on the processes of developing purchasing programs, drafting regulations and acquisition specifications, and verifying goods and/or supplies acquired from biomedical technology equipment, systems and system components, their complements and accessories, installations and related devices necessary for their purposes.
8. Planning, directing, and evaluating aspects related to hygiene and safety in their professional activity.
9. Providing advice on matters related to hospital hygiene and safety, as well as the management of waste related to their professional activity.
10. Training and managing human resources in Bioengineering-related topics.



11. Developing, advising, and directing research and development programs, projects, and tasks in the field of Bioengineering.
12. Designing and implementing protocols and procedures applied to different areas of bioengineering.

Requirements

To enroll in the Bioengineering program, the applicant must have completed secondary education and/or meet the requirements set by the U.N.S.J. for admission to undergraduate programs.

Curriculum 2023:

| SEM | N° AC | CURRICULAR AREA | STUDY PLAN AREA | WEEKLY CREDITS | TOTAL SEM. CREDIT |
|-----|-------|------------------------------------|-----------------|----------------|-------------------|
| 1 | 1 | Introduction to Bioengineering | Complementary | 4,2 | 63 |
| | 2 | Algebra and Analytical Geometry | Basic Sciences | 6,8 | 102 |
| | 3 | Calculus I | Basic Sciences | 6,8 | 102 |
| | 4 | Informatics I | Basic Sciences | 4,2 | 63 |
| 2 | 5 | Chemistry I | Basic Sciences | 6,8 | 102 |
| | 6 | Physics I | Basic Sciences | 8,4 | 126 |
| | 7 | Drawing and Representation Systems | Basic Sciences | 5,2 | 78 |
| | 8 | English I | Complementary | 5,2 | 78 |
| 3 | 9 | Chemistry II | Basic Sciences | 6 | 90 |
| | 10 | Physics II | Basic Sciences | 6,8 | 102 |
| | 11 | Calculus II | Basic Sciences | 6,8 | 102 |
| | 12 | English II | Complementary | 5,2 | 78 |
| 4 | 13 | Biology | Basic Sciences | 5,2 | 78 |
| | 14 | Physics III | Basic Sciences | 5,2 | 78 |



| SEM | N° AC | CURRICULAR AREA | STUDY PLAN AREA | WEEKLY CREDITS | TOTAL SEM. CREDIT |
|------------|--------------|-------------------------------|------------------------|-----------------------|--------------------------|
| | 15 | Informatics II | Basic Technologies | 5,2 | 78 |
| | 16 | Electrical Engineering | Basic Technologies | 6,8 | 102 |
| 5 | 17 | Anatomy | Basic Sciences | 6 | 90 |
| | 18 | Analog Electronics I | Basic Technologies | 5,2 | 78 |
| | 19 | Applied Maths | Basic Sciences | 5,2 | 78 |
| | 20 | Biomechanics | Basic Technologies | 5,2 | 78 |
| | 21 | Control I | Basic Technologies | 5,2 | 78 |
| 6 | 22 | Physiology | Basic Sciences | 6,8 | 102 |
| | 23 | Analog Electronics II | Basic Technologies | 5,2 | 78 |
| | 24 | Digital Systems I | Basic Technologies | 6,8 | 102 |
| | 25 | Control II | Basic Technologies | 4,2 | 63 |
| 7 | 26 | Economy and Business | Complementary | 6 | 90 |
| | 27 | Pathophysiology | Basic Sciences | 5,2 | 78 |
| | 28 | Digital Systems II | Basic Technologies | 6,8 | 102 |
| | 29 | Sensors and Transducers | Applied Tech. | 6 | 90 |
| 8 | 30 | Biomaterials | Basic Technologies | 5,2 | 78 |
| | 31 | Rehabilitation Engineering | Applied Tech. | 5,2 | 78 |
| | 32 | Statistical Math | Basic Sciences | 5,2 | 78 |
| | 33 | Biomedical Signal Processing | Basic Technologies | 5,2 | 78 |
| | 34 | Biomedical Instrumentation I | Applied Tech. | 5,2 | 78 |
| 9 | 35 | Images in Medicine | Applied Tech. | 6 | 90 |
| | 36 | Nuclear Medicine | Applied Tech. | 5,2 | 78 |
| | 37 | Biomedical Instrumentation II | Applied Tech. | 5,2 | 78 |



| SEM | N° AC | CURRICULAR AREA | STUDY PLAN AREA | WEEKLY CREDITS | TOTAL SEM. CREDIT |
|--------------------------------------|-------|--|--------------------|----------------|-------------------|
| | 38 | Technological Optative I | Applied Tech. | 5,2 | 78 |
| 10 | 39 | Production Management and Organization | Complementary | 6 | 90 |
| | 40 | Hospital Installations | Applied Tech. | 6 | 90 |
| | 41 | Basic or Humanistic Elective | Basic Sci. / Comp. | 5,2 | 78 |
| | 42 | Technological Optative I | Applied Tech. | 5,2 | 78 |
| 11 | 43 | Supervised Professional Practice | | | 200 |
| | 44 | Final Work | | | 360 |
| TOTAL HOURS OF THE CURRICULUM | | | | | 4139 |

OPTATIVES

| BASIC OPTATIVES | |
|--------------------------------|--|
| SEM. | SUBJECT |
| 10 | Biostatistics |
| 10 | Heat and Principles of Thermodynamics |
| 10 | Informatic Complements |
| HUMANISTIC OPTATIVES | |
| 10 | Economic, Social and Political Reality |
| 10 | Human Relations and Group Dynamics |
| TECHNOLOGICAL OPTATIVES | |
| 9 | Hospital Management |
| 9 | Analog Electronic Complements |
| 9 | Digital Electronic Complements |
| 9 | Advanced Digital Systems Design |
| 9 | Clinical Analysis Laboratory Equipment |



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|----|--|
| 10 | Medical Informatics |
| 9 | Artificial Intelligence |
| 9 | Introduction to Robotics |
| 10 | Organization of Health Systems |
| 9 | Advanced Biomedical Signal Processing and Analysis |
| 9 | Vision Systems |
| 9 | Ultrasound for Medical Use |