



ADENDDUM #4 TO THE INSTITUTIONAL CATALOG 2023-2024

Effective in August 2024



Addendum to the Institutional Catalogue 2023-2024

The following amendments are made to the 2023-2024 Columbia Central University (CCU) Institutional Catalog to align with revisions to the university's administrative policies and processes. The revision to the CCU Notice of Nondiscrimination, effective August 1, 2024, and the revision to the new Institutional Scholarship Policy presented in Addendum #2 to the Institutional Catalog, are included. This last amendment is effective as of August 13, 2024. Furthermore, these updates reflect new academic programs for the School of Technology and the School of Health Sciences are outlined as follows:

School of Technology

- Associate Degree in Web Application Development
- Vocational Technical Certificate in Technical Support

School of Health Sciences

- Bachelor's Degree in Diagnostic Medical Sonography with a concentration in Cardiovascular Technology

Also, the following curricular revisions for our academic programs are presented:

- Bachelor's Degree in Diagnostic Imaging with a concentration in CT and MRI
- Associate Degree in Radiologic Technology
- Associate Degree in Medical Sonography
- Associate Degree in Optical Sciences
- Vocational Technical Certificate in Laboratory Assistant with Electronic Processing

The implementation of these curricular revisions and new programs will take effect in **August 2024**.

Notice of Nondiscrimination

General

Columbia Central University (“CCU”) seeks to comply with all federal, state, and local laws, regulations, and ordinances prohibiting discrimination in private post-secondary education institutions.

CCU does not discriminate against any employee, applicant for employment, student, or applicant for admission on the basis of actual or perceived age (40 years and over in the employment context), color, disability (physical or mental), ethnicity, gender identity, genetic information (including family medical history), marital status, national origin (including ancestry), pregnancy or related conditions, race, religion, sex, or sexual orientation.

Title IX

CCU does not discriminate on the basis of sex and prohibits sex discrimination in any education program or activity that it operates, as required by Title IX and its regulations, including in admission and employment.

Inquiries about Title IX may be referred to CCU’s Title IX Coordinator, the U.S. Department of Education’s Office for Civil Rights, or both. CCU’s Title IX Coordinator is Ms. Norelis Rodríguez, 61 Ponce de León Ave., San Juan, PR 00917, norodriguez@columbiacentral.edu, and 787-704-1020, ext. 140. Contact information for OCR is available here: <https://ocrcas.ed.gov/contact-ocr>.

CCU’s nondiscrimination policy and grievance procedures are available by contacting the Title IX Coordinator. To report information about conduct that may constitute sex discrimination or make a complaint of sex discrimination under Title IX, please contact the Title IX Coordinator.

The Institutional Scholarship Policy for CCU is reviewed:

INSTITUTIONAL GRANTS

This policy applies to all students who enroll at any Columbia Central University (CCU) location and meet the eligibility criteria of the grant for which they are applying. Students may participate in these grants, regardless of whether they receive other (non-institutional) financial aid, as long as they comply with the requirements established in this policy.

Students applying for any financial aid administered by CCU are required to report any additional external financial aid they expect to receive to fund their studies (Veterans, Vocational Rehabilitation, Americorps, etc.).

The application is available and must be submitted to the Financial Aid Office. Applications will be evaluated on a first-come, first-served basis, so CCU encourages you to apply early, as funds available for these grants are limited. CCU will disburse the amount of the grant awarded at the end of the academic semester for which the funds were allocated.

These grants are not available to students enrolled in continuing education courses. Students may only participate in one institutional grant.

Institutional Grant: High School Senior 2024

To be eligible, students must meet the requirements described below:

1. Complete the Institutional Scholarship Application on or before October 31, 2024,
2. Enroll and attend a program offered at any CCU location on or before October 31, 2024,
3. Have not previously enrolled in any of our locations,
4. Maintain satisfactory academic progress,
5. Complete all courses enrolled in each semester of their first academic year,

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6. Be a High School graduated and have completed High School or the equivalent in the year 2024.

The grant will be awarded in the first academic year and the amount to be awarded will be determined based on the program as detailed below:

1. \$800.00 to students enrolled in a Diploma program,
2. \$1,000.00 to students enrolled in an Associate degree program,
3. \$1,500.00 to students enrolled in a Bachelor degree program.

The amount awarded will be disbursed per term. The amount to be disbursed per term will be determined by dividing the amount of the grant by the terms of the academic year.

For example, a student enrolled in a program divided in semesters, will receive two disbursements in their first academic year.

Institutional Grant: "Creciendo Contigo 2024"

To be eligible, students must meet the requirements described below:

1. Complete and submit the Institutional Scholarship Application on or before October 31, 2024,
2. Enroll and attend a program offered at any CCU location on or before October 31, 2024,
3. Maintain satisfactory academic progress,
4. Complete all courses enrolled in each semester of their first academic year,
5. Be a transfer student from another institution or,
6. If previously enrolled in any CCU location in Puerto Rico;
 - a. Have a last day of attendance on or before November 1, 2023 and,

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- b. Enroll and attend in a new program or,
 - c. Re-enroll, in a program previously initiated that was not completed

The grant will be awarded in the first academic year and the amount to be awarded will be determined based on the program as detailed below:

1. \$800.00 to students enrolled in a Diploma program,
2. \$1,000.00 to students enrolled in an Associate degree program,
3. \$1,500.00 to students enrolled in a Bachelor or Master's degree program.

The amount awarded will be disbursed per term. The amount to be disbursed per term will be determined by dividing the amount of the grant by the terms of the academic year.

For example, a student enrolled in a program divided in semesters, will receive two disbursements in their first academic year. A student enrolled in a program based on quarters (3 terms), will receive three disbursements in their first academic year.

Institutional Grant: High School Senior

The High School Senior grant awards \$200.00 to students enrolled in programs leading to a diploma and \$300.00 to students enrolled in programs leading to an associate or bachelor's degree. The grant applies to the first semester of study. An additional \$200.00 will be awarded to students who demonstrate evidence of having completed high school with a cumulative GPA of 3.2 or higher.

To be eligible, students must meet the requirements described below:

1. Completed high school in the year admitted to CCU,
2. Complete the Institutional Grant Application before the end of their first semester,
3. Be a resident of Puerto Rico and/or enrolled in CCU,

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4. Maintain satisfactory academic progress,
 5. Complete all courses enrolled in the first semester of studies.

Institutional Grant: Healthcare Heroes

The Healthcare Heroes grant awards \$200.00 to students enrolled in programs leading to a diploma and \$300 to students enrolled in programs leading to an associate, bachelor's, or master's degree. The grant applies to the first semester of study. An additional \$200.00 will be awarded to students who are ineligible for the maximum Federal Pell Grant amount due to reaching the maximum lifetime eligibility for this grant.

To be eligible, students must meet the requirements described below:

1. Enroll in one of the health-related programs,
2. Complete the Institutional Grant Application before the end of their first semester,
3. Be a resident of Puerto Rico and enrolled in CCU,
4. Maintain satisfactory academic progress,
5. Complete all courses enrolled in the first semester of studies.

Institutional Grant: "Creciendo Contigo"

The "Creciendo Contigo" grant awards \$200.00 to students enrolled in programs leading to a diploma and \$300.00 to students enrolled in programs leading to an associate, bachelor's, or master's degree. The grant applies to the first semester of study. An additional \$200.00 will be awarded to students who are ineligible for the maximum Federal Pell Grant amount due to reaching the maximum lifetime eligibility for this grant.

To be eligible, students must meet the requirements described below:

1. Enroll in a new program after previously completing a program at one of CCU's locations or
2. Re-enroll in a program previously initiated that was not completed in any of the CCU locations.
3. Complete the Institutional Grant Application before the end of their first semester,
4. Be a resident of Puerto Rico,
5. Maintain satisfactory academic progress,
6. Complete all courses enrolled in the first semester of studies.

Institutional Grant: "Por ti, Contigo"

The "Por ti, Contigo" grant awards \$200.00 to new students enrolled in programs leading to a diploma and \$300 to new students enrolled in programs leading to an associate, bachelor's, or master's degree. The grant applies to the first semester of study. An additional \$200.00 will be awarded to students who are ineligible for the maximum Federal Pell Grant amount due to reaching the maximum lifetime eligibility for this grant.

To be eligible, students must meet the requirements described below:

1. Be a new student,
2. Complete the Institutional Grant Application before to the end of their first semester,
3. Be a resident of Puerto Rico and enrolled in CCU,
4. Maintain satisfactory academic progress,
5. Complete all courses enrolled in the first semester of studies.

The following academic programs are added under the CCU School of Technology:

ASSOCIATE DEGREE IN WEB APPLICATION DEVELOPMENT

CIP Code: 11.1008

SOC Code: 15-1254, 15-1255

Credits: 74 credits

Duration: 96 weeks (2 years)

Location: Caguas

Modality of Study: On ground and Online

The Associate Degree in Web Application Development will prepare students with the knowledge and practical skills necessary for developing web application logic. Students will employ concepts related to user interface (UI) along with skills for creating and designing web pages, and for developing attractive and functional interfaces. Likewise, they will implement processes related to the development, operation, and security of web applications, using front- end programming languages such as HTML (HyperText Markup Language), CSS (Cascading Style Sheets), and JavaScript, which are fundamental elements for creating the structure, design, and interactivity of a web page. Additionally, they will develop competencies in the management of data structures. They will apply knowledge related to the management of personal computer components, as well as the installation and configuration of servers to meet business needs. Similarly, they will acquire skills to provide technical support to users in their daily computer needs. Graduates of this program will be able to work as user support technicians, front-end developers, and user interface designers (UX designers), among other roles.

PROGRAM COMPETENCIES

1. Develop technical skills and knowledge in front-end web application design and development methodologies, utilizing cutting-edge technologies and tools.
2. Use programming languages such as HTML, CSS, and JavaScript in the design of interactive and responsive web applications, as well as attractive and functional user interfaces.
3. Effectively communicate their design ideas and proposals through clear and concise presentations, using the terminology specific to the field of web application development, both orally and in writing in Spanish and English.
4. Analyze incidents related to the design and development of web applications logically, critically, and creatively, in order to enhance their interactivity, usability, and aesthetics.
5. Utilize relevant and reliable sources of information to stay updated on the latest trends and practices in the field of web application development.

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6. Apply ethical and moral principles in the management of confidential information, copyright, and intellectual property rights as part of web application development.
 7. Design inclusive and accessible user interfaces and experiences, accommodating the needs of diverse user groups.

Additional program requirement:

1. Orientation with the Academic Coordinator

CURRICULAR STRUCTURE

GENERAL EDUCATION COURSES

Prescribed: 25 credits

COURSE	CODE	COURSE NAME	CONTACT HOURS	CREDITS
BISC	1010	Biological Sciences	10	3
ENGL	1010	Basic English I	45	3
ENGL	1020	Basic English II	45	3
ITTE	1031L	Computer Literacy and Laboratory	60	3
MATH	1010	Basic Mathematics	45	3
SEMI	1010	Transition to University Life and Professional Training Seminar	15	1
SOSC	1010	Social Sciences I	45	3
SPAN	1010	Basic Spanish I	45	3
SPAN	1020	Basic Spanish II	45	3

Sub-total: **390 horas** **25 credits**

CONCENTRATION COURSES

Prescribed: 49 credits

COURSE	CODE	COURSE NAME	CONTACT HOURS	CREDITS
CISE	1000L	Fundamentals of Cybersecurity and Laboratory	60	3
COMP	1000L	Components of Personal Computers and Laboratory	60	3
COMP	1050L	Installation of Servers and Laboratory	60	3
COMP	2080L	Fundamentals of Cloud Computing and Laboratory	60	3
INTE	1100L	Open-Source Operating Systems and Laboratory	60	3
INTE	1200L	Fundamentals of Operating Systems and Laboratory	60	3
INTE	2440L	Network Fundamentals and Laboratory	60	3
INTE	2470L	User Support Technician and Laboratory	60	3
ITSA	2000L	Introduction to Back-End Development and Laboratory	75	4
MATH	2050	Applied Mathematics	45	3
PROG	1035L	Introduction to Computer Programming Logic and Laboratory	60	3
PROG	2400L	Scripting Languages and Laboratory	60	3
WADE	1000L	Front End Technologies and User Interface (UI) and Laboratory	60	3

COURSE	CODE	COURSE NAME	CONTACT HOURS	CREDITS
WADE	1050L	Web Page Creation and Design and Laboratory	60	3
WADE	2000L	Content Management Systems (CMS) and Laboratory	60	3
WADE	2050L	Data Structures and Laboratory	60	3
Sub-total:			960 horas	49 credits

The curricular structure of the Associate Degree in Web Application Development includes the following components:

COMPONENT	HOURS	CREDITS
General Education Courses	390	25
Concentration Courses	960	49
Total	1,350	74

**ASSOCIATE DEGREE IN WEB APPLICATION DEVELOPMENT
CURRICULUM: AUGUST 2024**

CURRICULUM SEQUENCE**

COURSE	CODE	COURSE NAME	PRE-REQUISITES	CREDITS
FIRST TERM: 12 CREDITS				
COMP	1000L	Components of Personal Computers and Laboratory	----	3
SPAN	1010	Basic Spanish I	----	3
MATH	1010	Basic Mathematics	----	3
ITTE	1031L	Computer Literacy and Laboratory	----	3
SECOND TERM: 13 CREDITS				
SPAN	1020	Basic Spanish II	ENGL 1010	3
INTE	1100L	Open Source Operating Systems and Laboratory	COMP 1000L	3
SEMI	1010	Transition To University Life and Professional Training Seminar	----	1
PROG	1035L	Introduction to Computer Programming Logic and Laboratory	----	3
INTE	1200L	Fundamentals Of Operating Systems and Laboratory	----	3
THIRD TERM: 12 CREDITS				
SOSC	1010	Social Sciences I	----	3
INTE	2440L	Network Fundamentals and Laboratory	INTE 1100L	3
WADE	1000L	Front-End Technologies and User Interface (UI) And Laboratory	PROG 1035L	3
CISE	1000L	Fundamentals Of Cybersecurity and Laboratory	----	3
FOURTH TERM: 12 CREDITS				
ENGL	1010	Basic English I	----	3
COMP	1050L	Installation Of Servers and Laboratory	COMP 1000L INTE 1100L	3
WADE	1050L	Web Page Creation and Design and Laboratory	WADE 1000L	3
MATH	2050	Applied Mathematics	----	3

FIFTH TERM: 12 CREDITS				
ENGL	1020	Basic English II	ENGL 1010	3
PROG	2400L	Scripting Languages and Laboratory	PROG 1035L	3
BISC	1010	Biological Sciences	-----	3
WADE	2000L	Content Management Systems (CMS) and Laboratory	WADE 1050L	3
SIXTH TERM: 13 CREDITS				
COMP	2080L	Fundamentals of Cloud Computing and Laboratory	COMP 1050L INTE 2440L	3
WADE	2050L	Data Structures and Laboratory	PROG 1035L	3
INTE	2470L	User Support Technician and Laboratory	COMP 1000L	3
ITSA	2000L	Introduction To Back-End Development and Laboratory	WADE 2050L	4

Grand Total of the associate degree in Web Application Development: 74 credits and 1,350 hours

**The student does not necessarily have to follow the suggested course order, but the order helps them complete their degree in the stipulated time. The student must be aware of taking the courses that have prerequisites in an order that allows them to continue taking the other courses without problems. Courses without prerequisites have no specific order. The student can register for them in the term that they are offered.

MINIMUM GRADING POLICY

Students enrolled in the associate degree in Web Application Development must obtain at least a grade of C (70% or more) upon passing all Concentration courses.

VOCATIONAL TECHNICAL CERTIFICATE IN TECHNICAL SUPPORT

CIP Code: 11.1006

SOC Code: 11-1232

Credits: 36 credits

Duration: 48 weeks (One year)

Location: Caguas

Modality of Study: On ground and Online

The Certificate in Technical Support will prepare students with the skills necessary for the installation, configuration, and maintenance of computer systems. Students will gain knowledge about the internal components of personal computers, networks, and operating systems. Through hands-on labs, they will acquire skills in computer diagnostic and repair methodologies for incident resolution. By completing the program's courses, students will be comprehensively prepared for the CompTIA A+ certification exam, a recognized industry standard. Graduates of this program will be able to work as IT support technicians, computer diagnostic and repair specialists, network technicians, and more.

PROGRAM COMPETENCIES

1. Apply theoretical and practical knowledge of computer installation, configuration, diagnosis, and repair to solve technical problems in business environments.
2. Provide effective technical support to information systems users in their daily computing needs.
3. Demonstrate effective communication skills, both oral and written, to convey technical information in a clear, concise, and understandable manner to diverse audiences, such as users, colleagues, and superiors.
4. Examine computers and networks logically and critically to identify and generate creative solutions to problems related to hardware, software, and security.
5. Integrate technological tools into collaborative processes for the generation of innovative solutions in the field of information technology.
6. Demonstrate ethical and moral conduct in the handling and protection of users' confidential information.
7. Value cultural, generational, and gender diversity as well as diversity of abilities in technological settings, fostering an inclusive and discrimination-free environment.

Additional program requirement:

1. Orientation with the Academic Coordinator

**CURRICULAR STRUCTURE
CONCENTRATION COURSES**

Prescribed: 36 credits

COURSE	CODE	COURSE NAME	CONTACT HOURS	CREDITS
CISE	1000L	Fundamentals of Cybersecurity and Laboratory	60	3
COMP	1000L	Components of Personal Computers and Laboratory	60	3
COMP	1050L	Installation of Servers and Laboratory	60	3
COMP	2000L	Diagnosis and Repair of Computers and Laboratory I	60	3
COMP	2010L	Diagnosis and Repair of Computers and Laboratory II	60	3
COMP	2070	CompTIA A+ Certification Exam Review	45	3
ITTE	1031L	Computer Literacy and Laboratory	60	3
INTE	1100L	Open Source Operating Systems and Laboratory	60	3
INTE	1200L	Fundamentals of Operating Systems and Laboratory	60	3
INTE	2440L	Network Fundamentals and Laboratory	60	3
INTE	2470L	User Support Technician and Laboratory	60	3
MATH	2050	Applied Mathematics	45	3

Sub-total:

690 hours

36 credits

**CERTIFICATE IN TECHNICAL SUPPORT
CURRICULUM: AUGUST 2024**

CURRICULUM SEQUENCE**

COURSE	CODE	COURSE NAME	PRE REQUISITES	CREDITS
FIRST TERM: 12 CREDITS				
ITTE	1031L	Computer Literacy and Laboratory	----	3
COMP	1000L	Components of Personal Computers and Laboratory	----	3
INTE	1100L	Open Source Operating Systems and Laboratory	COMP 1000L	3
MATH	2050	Applied Mathematics	MATH 1010	3
SECOND TERM: 12 CREDITS				
INTE	1200L	Fundamentals of Operating Systems and Laboratory	----	3
INTE	2440L	Network Fundamentals and Laboratory	INTE 1100L	3
COMP	1050L	Installation of Servers and Laboratory	COMP 1000L INTE 1100L	3
COMP	2000L	Diagnosis and Repair of Computers and Laboratory I	COMP 1000L	3
THIRD TERM: 12 CREDITS				
CISE	1000L	Fundamentals of Cybersecurity and Laboratory	----	3
COMP	2010L	Diagnosis and Repair of Computers and Laboratory II	COMP 2000L	3
INTE	2470L	User Support Technician and Laboratory	COMP 1000L	3
COMP	2070	CompTIA A+ Certification Exam Review	INTE 2470L	3

Grand Total of the Certificate in Technical Support: 36 credits and 690 hours

** The student does not necessarily have to follow the suggested course order, but the order helps them complete their degree in the stipulated time. The student must be aware of taking the courses that have prerequisites in an order that allows them to continue taking the other courses without problems. Courses without prerequisites have no specific order. The student can register for them in the term that they are offered.

MINIMUM GRADING POLICY

Students enrolled in the certificate in Technical Support must obtain at least a grade of C (70%) upon passing all Concentration courses.

The following academic program is added under the CCU School of Health Sciences:

**BACHELOR'S DEGREE IN DIAGNOSTIC MEDICAL SONOGRAPHY WITH A
CONCENTRATION IN CARDIOVASCULAR TECHNOLOGY**

CIP Code: 51.0910

SOC Code: 29-2032

Credits: 134 credits

Duration: 160 weeks (3 years and 4 months)

Location: Caguas

Modality of Study: On ground

The bachelor's degree program in Medical Diagnostic Sonography with a concentration in Cardiovascular Technology will prepare students in various disciplines in the field of ultrasound imaging studies. Likewise, students will develop skills for conducting abdominal, gynecological, obstetric, vascular, and cardiac ultrasound imaging studies, among others. They will apply appropriate techniques for conducting stress tests, physiological studies, Holter studies, and electrocardiograms. Graduates of this program will be able to work in Puerto Rico as general sonographers, cardiac sonographers, vascular sonographers, or cardiovascular technologists in medical offices, hospitals, imaging and diagnostic centers, cardiovascular laboratories, and medical equipment companies, among others, after passing the ultrasound physics exam and one or more of their specialties offered by the Examining Board of Radiological Technologists in Diagnostic Imaging and Radiotherapy Technologists of Puerto Rico.

PROGRAM COMPETENCIES

1. Apply theoretical and practical knowledge of medical terminology, physical assessment, patient history, patient management and care, medical imaging studies, and protocols in their professional role as medical sonographers.
2. Develop skills for conducting studies such as stress tests, Holter monitoring, electrocardiography, echocardiography, carotid Doppler, extremity Doppler, and abdominal Doppler, as part of their professional role as cardiac or vascular sonographers.
3. Analyze information and procedures related to the interpretation of medical orders, image creation, preliminary diagnostic impression, anatomy and physiology, laboratory results, image creation, stress tests, Holter studies, and electrocardiography, among others, in a logical and critical manner.

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4. Communicate the preliminary results of studies to the medical team, both orally and in writing, as well as provide patients with assertive and efficient support and guidance about the procedures to be performed.
 5. Utilize available technological and computer resources, incorporating methodological advancements in procedures related to ultrasound, stress tests, Holter studies, electrocardiograms, and imaging.
 6. Demonstrate collaborative work skills for the diagnosis, treatment, and comprehensive care of patients, maintaining a high sense of responsibility and compliance with HIPAA and all laws related to their profession, as well as good moral and ethical judgment.

PRACTICE REQUIREMENTS

To take the practice component of the program, the following current and original documents are required:

1. Negative Criminal Record Certificate
2. Health Certificate
3. Hepatitis B Vaccines
4. Chickenpox Vaccine
5. HIPAA Certificate
6. Cardiopulmonary Resuscitation (CPR) Certification
7. Negative certification of Law 300 - Law on Verification of Credentials and Criminal History of Providers to Children, People with Disabilities and Health Professionals
8. Doping Test *
9. Respiratory Test *
10. Influenza Vaccine *
11. Covid-19 Vaccine (Three Doses)
12. Particle Fit Test*
13. Clinical Practice Cover Letter
14. Practice Authorization Form

***Important Note:** Some practice centers may require additional documents. The student needs to revalidate to practice the profession.

LICENSURE REQUIREMENTS

The following documents (original and copy) are required to take the board exam and practice the profession:

1. Be over eighteen (18) years of age and have resided intermittently in Puerto Rico for a period of 6 months immediately before making the request, including sporadic departures.
2. Negative Criminal Record Certificate (less than 6 months since its issuance)
3. Health Certificate
4. Birth Certificate
5. Negative Certification from the Child Support Administration (ASUME) (no later than 30 days after issuance)
6. High School Diploma or Transcript of Credit
7. Bachelor's Degree Certification and/or Diploma in bachelor's degree program in Medical Diagnostic Sonography with a concentration in Cardiovascular Technology obtained at CCU.
8. Official Credit Transcript with the bachelor's degree program in Medical Diagnostic Sonography with a concentration in Cardiovascular Technology. The credit transcript must be sent directly from the university to the Examination Board of Radiology Technologists at the following address:

Oficina de Reglamentación y Certificación de los Profesionales de la Salud Junta Examinadora de Tecnólogos Radiológicos de Puerto Rico
P.O. BOX 10200, Santurce, Puerto Rico, 00908-0200

9. Approved result of Physical Examination (to request a general sonographer exam)
10. Application completed in all its parts, including the Affidavit with a 2x2 photo and two letter-size envelopes with a pre-addressed postage stamp with the applicant's postal address.
11. Payment to the Secretary of the Treasury for admission to revalidation for \$40.00 (for each specialty); by postal order or by ATH system. Payment is non-refundable.
12. Request for Reasonable Accommodation, if applicable. This document is available to print at <https://www.salud.pr.gov/CMS/DOWNLOAD/8991>

CURRICULAR STRUCTURE
GENERAL EDUCATION COURSES

Prescribed: 37 credits

COURSE	CODE	COURSE NAME	CONTACT HOURS	CREDITS
ENGL	1010	Basic English I	45	3
ENGL	1020	Basic English II	45	3
ENGL	2050	Conversational English	45	3
HUMA	1010	Humanities I	45	3
HUMA	1020	Humanities II	45	3
ITTE	1031L	Computer Literacy and Laboratory	60	3
MATH	1010	Basic Mathematics	45	3
SEMI	1010	Transition to University Life and Professional Training Seminar	15	1
SOSC	1010	Social Sciences I	45	3
SOSC	1020	Social Sciences II	45	3
SPAN	1010	Basic Spanish I	45	3
SPAN	1020	Basic Spanish II	45	3
SPAN	2040	Writing and Composition	45	3

Sub-total **570 hours** **37 credits**

CORE COURSES

Prescribed: 20 credits

COURSE	CODE	COURSE NAME	CONTACT HOURS	CREDITS
MESE	1010	Medical Terminology	45	3
BIOL	2010	Human Anatomy and Physiology I	45	3
BIOL	2020	Human Anatomy and Physiology II	45	3
BIOL	2030	Sectional Anatomy	30	2
BIOL	2030L	Sectional Anatomy Laboratory	30	1
ANAT	2040	Anatomy and Physiology of the Heart	30	2
PHSC	2030	Ultrasound Physics and Instrumentation I	45	3
PHSC	2040	Ultrasound Physics and Instrumentation II	45	3

Sub-total **315 hours** **20 credits**

CONCENTRATION COURSES

Prescribed: 77 credits

COURSE	CODE	COURSE NAME	CONTACT HOURS	CREDITS
SONO	1020	Introduction to Medical Sonography	45	3
SONO	1030	Patient Management and Care in Sonographic Imaging	45	3
SONO	1040L	Abdominal Sonography and Laboratory	75	4
SONO	2020L	Gynecological Sonography and Laboratory	75	4
SONO	2030L	Laboratory of Integration of Clinical Skills in Medical Sonography	60	2

COURSE	CODE	COURSE NAME	CONTACT HOURS	CREDITS
SONO	2050L	Obstetric Sonography and Laboratory	75	4
SONO	2040P	Clinical Practice I: Medical Sonography	90	2
SONO	2070L	Sonography of Superficial Structures and Laboratory	75	4
SONO	2071	Pathology Applied to Medical Sonography I	45	3
SONO	2060P	Clinical Practice II: Medical Sonography	90	2
SONO	2072	Pathology Applied to Medical Sonography II	45	3
SONO	2080	Pre-Certification Exam Seminar in Medical Sonography	30	2
SONO	2090	Special Procedures In Medical Sonography	30	2
SONO	3000P	Clinical Practice III: Medical Sonography	225	5
SONO	3010L	Fundamentals of Electrocardiography, Stress Tests, and Holter	60	3
SONO	3020L	Basic Echocardiography and Laboratory	90	4
SONO	3030L	Sonographic Evaluation of Cardiac Pathologies and Laboratory	60	3
SONO	3040L	Cardiovascular Technology Laboratory	60	2
SONO	3050L	Vascular Sonography of Upper Extremities, Clinical Application and Laboratory	60	3
SONO	3060L	Cerebrovascular Sonography, Clinical Application, and Laboratory	60	3
SONO	3070P	Sonography and Cardiovascular Technology Practice I	180	4
SONO	3080L	Vascular Sonography of Lower Extremities, Clinical Application and Laboratory	60	3
SONO	4010L	Abdominal Doppler and Laboratory	60	3
SONO	4020P	Sonography and Cardiovascular Technology Practice II	180	4
SONO	4030	Pre-Certification Seminar in Cardiovascular Sonography	30	2

Sub-total

1,905 hours 77 credits

COMPONENT	HOURS	CREDITS
General Education Courses	570	37
Core Courses	315	20
Concentration Courses	1,905	77
TOTAL	2,790	134

**BACHELOR'S DEGREE IN DIAGNOSTIC MEDICAL SONOGRAPHY WITH A
CONCENTRATION IN CARDIOVASCULAR TECHNOLOGY
CURRICULUM: AUGUST 2024**

CURRICULUM SEQUENCE**

COURSE	CODE	COURSE NAME	PRE-REQUISITES	CREDITS
FIRST TERM: 15 CREDITS				
ENGL	1010	Basic English I	----	3
ITTE	1031L	Computer Literacy and Laboratory	----	3
BIOL	2010	Human Anatomy and Physiology I	----	3
SONO	1020	Introduction to Medical Sonography	----	3
SONO	1030	Patient Management and Care in Sonographic Imaging	----	3
SECOND TERM: 15 CREDITS				
MATH	1010	Basic Mathematics	----	3
MESE	1010	Medical Terminology	----	3
SPAN	1010	Basic Spanish I	----	3
BIOL	2020	Human Anatomy and Physiology II	BIOL 2010	3
ENGL	1020	Basic English II	ENGL 1010	3
THIRD TERM: 14 CREDITS				
SEMI	1010	Transition to University Life and Professional Training Seminar	----	1
SONO	1040L	Abdominal Sonography and Laboratory	SONO 1020 SONO 1030 MESE 1010	4
PHSC	2030	Ultrasound Physics and Instrumentation I	MATH 1010	3
SONO	2020L	Gynecological Sonography and Laboratory	----	4
SONO	2030L	Laboratory of Integration of Clinical Skills in Medical Sonography	SONO 1020 SONO 1030 SONO 1040L MESE 1010	2
FOURTH TERM: 15 CREDITS				
SONO	2040P	Clinical Practice I: Medical Sonography	SONO 2020L SONO 2030L	2
BIOL	2030	Sectional Anatomy	BIOL 2010 BIOL 2020	2
BIOL	2030L	Sectional Anatomy Laboratory	BIOL 2010 BIOL 2020	1
PHSC	2040	Ultrasound Physics and Instrumentation II	PHSC 2030	3
SONO	2050L	Obstetric Sonography and Laboratory	SONO 1020 SONO 1030 SONO 2020L MESE 1010 PHSC 2030	3
SPAN	1020	Basic Spanish II	SPAN 1010	3

FIFTH TERM: 12 CREDITS				
SONO	2060P	Clinical Practice II: Medical Sonography	SONO 2040P	2
SONO	2070L	Sonography of Superficial Structures and Laboratory	SONO 2030L PHSC 2040	4
SOSC	1010	Social Sciences I	----	3
SONO	2071	Pathology Applied to Medical Sonography I	SONO 1040L SONO 2020L SONO 2050L SONO 2070L	3
SIXTH TERM: 12 CREDITS				
SONO	3000P	Clinical Practice III: Medical Sonography	SONO 2060P	5
SONO	2080	Pre-Certification Exam Seminar in Medical Sonography	SONO 2020L SONO 2040L SONO 2050L SONO 2070L SONO 2071 PHSC 2040	2
SONO	2090	Special Procedures in Medical Sonography	SONO 1040L SONO 2020L SONO 2050L SONO 2070L SONO 2071	2
SONO	2072	Patología Aplicada a la Sonografía Médica II	SONO 2071	3
SEVENTH TERM: 12 CREDITS				
ANAT	2040	Anatomy And Physiology of The Heart	BIOL 2020	3
SONO	3010L	Fundamentals of Electrocardiography, Stress Tests, and Holter	SONO 3000P	3
SONO	3020L	Basic Echocardiography and Laboratory	SONO 3000P	3
HUMA	1010	Humanities I	----	3
EIGHTH TERM: 14 CREDITS				
SOSC	1020	Social Sciences II	SOSC 1010	3
SONO	3030L	Sonographic Evaluation of Cardiac Pathologies and Laboratory	ANAT 2040 SONO 3020L	3
HUMA	1020	Humanities II	HUMA 1010	3
ENGL	2050	Conversational English	ENGL 1020	3
SONO	3040L	Cardiovascular Technology Laboratory	ANAT 2040 SONO 3010L SONO 3020L	2

NINTH TERM: 13 CREDITS				
SONO	3070P	Sonography and Cardiovascular Technology Practice I	SONO 3040L	4
SPAN	2040	Writing and Composition	SPAN 1020	3
SONO	3050L	Vascular Sonography of Upper Extremities, Clinical Application, and Laboratory	SONO 3040L	3
SONO	3060L	Cerebrovascular Sonography, Clinical Application, and Laboratory	SONO 3040L	3
TENTH TERM: 12 CREDITS				
SONO	4020P	Sonography and Cardiovascular Technology Practice II	SONO 3050L SONO 3060L SONO 3070P	4
SONO	3080L	Vascular Sonography of Lower Extremities, Clinical Application, and Laboratory	SONO 3050L SONO 3060L	3
SONO	4010L	Abdominal Doppler and Laboratory	SONO 3050L SONO 3060L	3
SONO	4030	Pre-Certification Seminar in Cardiovascular Sonography	PHSC 2030 PHSC 2040 SONO 3020L SONO 3030L SONO 3050L SONO 3060L SONO 3070P	2

Grand Total of the bachelor's degree in Diagnostic Medical Sonography with A Concentration in Cardiovascular Technology: 2,790 hours y 134 credits

**The student does not necessarily have to follow the suggested course order, but the order helps them complete their degree in the stipulated time. The student must be aware of taking the courses that have prerequisites in an order that allows them to continue taking the other courses without problems. Courses without prerequisites have no specific order. The student can register for them in the term that they are offered.

MINIMUM GRADING POLICY

Students enrolled in the bachelor's degree in Diagnostic Medical Sonography with A Concentration in Cardiovascular Technology, must obtain at least a grade of C (70% or more) upon passing all Core and Concentration courses, except the clinical practice or internship courses which must be passed with B (80%) or more.

The following courses must be passed with a grade of C or higher:

MESE 1010 BIOL 2010 BIOL 2020 BIOL 2030 BIOL 2030L PHSC 2030
PHSC 2040 SONO 1020 SONO 1030 SONO 1040L SONO 2020L SONO 2030L
SONO 2050L SONO 2070L SONO 2071 SONO 2072 SONO 2080 SONO 2090
SONO 3010L SONO 3020L SONO 3030L SONO 3040L SONO 3050L SONO 3060L
SONO 3080L SONO 4010L SONO 4030

The following courses must be passed with a grade of B or higher:

SONO 2040P SONO 2060P SONO 3000P SONO 3070P SONO 4020P

BACHELOR'S DEGREE IN DIAGNOSTIC IMAGING WITH CONCENTRATION IN CT AND MRI

CIP Code: 51.0920

SOC Code: 29-2035

Credits: 131 credits

Duration: 160 weeks (3 years and 4 months)

Location: Bayamón, Caguas, and Carolina

Modality of Study: On ground

The bachelor's degree in Diagnostic Imaging with concentration in CT and MRI will prepare students with the knowledge, skills, attitudes, and competencies necessary for producing images used in the diagnosis of patients from diverse populations, with a focus on computerized tomography (CT) and magnetic resonance imaging (MRI). Students will demonstrate knowledge of scientific and technological advances in this field, as well as skills for providing diagnostic imaging services in an environment that promotes a culture of safety and quality in healthcare services. Graduates of this program will be able to work as imaging technologists in various healthcare settings, following the regulations set forth by the General Regulations of the Licensing Board of Radiological Technologists in Diagnostic Imaging and Radiotherapy Technologists in Puerto Rico.

PROGRAM COMPETENCIES

1. Demonstrate a strong sense of professionalism focused on empathetic and top-quality medical care, as well as the skills for continuous education and professional growth.
2. Employ professional knowledge and skills in the judicious use of ionizing radiation, magnetic fields, and radiofrequency waves to provide superior quality patient care.
3. Effectively express their ideas, both orally and in writing, during simulations and clinical practices, patient interventions, and project and research presentations.
4. Utilize logical reasoning, critical thinking, and clinical judgment in applying systematic problem-solving methods for decision-making, both in routine and non-routine tasks.

-
5. Effectively manage radiology equipment and information technology media in research and the application of best practices in their professional performance.
 6. Apply ethical, legal, and moral principles in the provision of patient-centered healthcare services, based on a culture of safety and the integration of values such as respect for dignity and professional integrity.

PRACTICE REQUIREMENTS

To take the practice component of the program, the following current and original documents are required:

1. Negative Criminal Record Certificate
2. Health Certificate
3. Hepatitis B Vaccines
4. Chickenpox Vaccine
5. HIPAA Certificate
6. Cardiopulmonary Resuscitation (CPR) Certification
7. Negative certification of Law 300 - Law on Verification of Credentials and Criminal History of Providers to Children, People with Disabilities and Health Professionals
8. Doping Test *
9. Respiratory Test *
10. Influenza Vaccine *
11. Clinical Practice Cover Letter
12. Practice Authorization Form

***Important Note:** Some practice centers may require additional documents. The student needs to revalidate to practice the profession.

LICENSURE REQUIREMENTS

The following documents (original and copy) are required to take the board exam and practice the profession:

1. Be over eighteen (18) years of age and have resided intermittently in Puerto Rico for a period of 6 months immediately before making the request, including sporadic departures.
2. Negative Criminal Record Certificate (less than 6 months since its issuance)
3. Health Certificate
4. Birth Certificate
5. Negative Certification from the Child Support Administration (ASUME) (no later than 30 days after issuance)
6. Radiological Technologist License.
7. Current Registration Certification of Radiological Technologist
8. Bachelor's Degree Certification and/or Diploma in Diagnostic Imaging with a concentration in CT and MRI obtained at CCU (formerly EDIC College).
9. Official Credit Transcript with the Bachelor's Degree in Diagnostic Imaging with a concentration in CT and MRI. The credit transcript must be sent directly from the university to the Examination Board of Radiology Technologists at the following address:

**Oficina de Reglamentación y Certificación de los Profesionales de la Salud
Junta Examinadora de Tecnólogos Radiológicos de Puerto Rico
P.O. BOX 10200, Santurce, Puerto Rico, 00908-0200**

10. Application completed in all its parts, including the Affidavit with a 2x2 photo and two letter-size envelopes with a pre-addressed postage stamp with the applicant's postal address.
11. Payment to the Secretary of the Treasury for admission to revalidation for \$30.00 (for each specialty); by postal order or by ATH system. Payment is non-refundable.
12. Request for Reasonable Accommodation, if applicable. This document is available to print at <https://www.salud.pr.gov/CMS/DOWNLOAD/8991>

CURRICULAR STRUCTURE
GENERAL EDUCATION COURSES

Prescribed: 19 credits

COURSE	CODE	COURSE NAME	CONTACT HOURS	CREDITS
ENGL	1010	Basic English I	45	3
ENGL	1020	Basic English II	45	3
SEMI	1010	Transition to University Life and Professional Training Seminar	15	1
SPAN	1010	Basic Spanish I	45	3
SPAN	1020	Basic Spanish II	45	3
MATH	1010	Basic Mathematics	45	3
ITTE	1031L	Computer Literacy and Laboratory	60	3

Sub-total **300 hours** **19 credits**

CORE COURSES

Prescribed: 18 credits

COURSE	CODE	COURSE NAME	CONTACT HOURS	CREDITS
MESE	1010	Medical Terminology	45	3
BIOL	2010	Anatomy and Physiology I	45	3
BIOL	2020	Anatomy and Physiology II	45	3
BIOL	2030	Sectional Anatomy	30	2
BIOL	2030L	Sectional Anatomy Laboratory	30	1
PHYS	1020	Introduction to Physics	45	3
PSYC	2510	Psychology	45	3

Sub-total **285 hours** **18 credits**

CONCENTRATION COURSES

Prescribed: 94 credits

COURSE	CODE	COURSE NAME	CONTACT HOURS	CREDITS
RADI	1010	Introduction to Radiology	30	2
RADI	2009	Radiological Physics	45	3
RADI	2010	Patient Care and Management	45	3
RADI	2020	Radiological Positioning and Related Anatomy I	30	2
RADI	2020L	Radiographic Positioning and Related Anatomy I: Laboratory	30	1
RADI	2030	Knowing Imaging Modalities and Equipment	30	2
RADI	2040L	Integrative Seminar: Laboratory	60	2
RADI	2050	Principles of Radiographic Exposure	45	3
RADI	2060	Principles of Radiobiology and Radiographical Protection	30	2
RADI	2070	Radiological Positioning and Related Anatomy II	30	2
RADI	2070L	Radiographic Positioning and Related Anatomy II: Laboratory	30	1

COURSE	CODE	COURSE NAME	CONTACT HOURS	CREDITS
RADI	2080P	Clinical Internship I	135	3
RADI	2100	Radiological Positioning and Related Anatomy III	30	2
RADI	2100L	Radiographic Positioning and Related Anatomy III: Laboratory	30	1
RADI	2110P	Clinical Internship II	135	3
RADI	2130	Radiological Pathology	30	2
RADI	2140	Radiological Positioning and Related Anatomy IV	30	2
RADI	2140L	Radiographic Positioning and Related Anatomy IV: Laboratory	30	1
RADI	2150P	Clinical Internship III	135	3
RADI	2170	Radiographic Quality Assurance and Control	30	2
RADI	2200	Pharmacology and Contrast Media in Diagnostic Imaging	45	3
RADI	2500	Advanced Sectional Anatomy	60	4
RADI	3000	Physics: Instrumentation and Images in Computed Tomography	45	3
RADI	3010	Procedures for Image Formation in Computed Tomography	45	3
RADI	3020	Pathological Correlation by Computed Tomography	45	3
RADI	3030	Procedures for Obtaining Images by Magnetic Resonance	45	3
RADI	3040	Pathological Correlation by Magnetic Resonance	45	3
RADI	3050	Physics: Principles, Parameters, and Concepts of Magnetic Resonance	45	3
RADI	3060	Ethics and Law in Imaging Science	45	3
RADI	3070	Computers in Medical Imaging and Informatics	45	3
RADI	4010P	Clinical Internship in Computed Tomography	270	6
RADI	4020P	Clinical Internship in Magnetic Resonance	270	6
RADI	4030	Pre-Certification Seminar in Radiologic Technology, CT, and MRI	45	3
RADI	4040	Research Methods and Computer Literacy	45	3
RADI	4050	Educational Principles for Technologists	45	3

Sub-total **2,130 hours** **94 credits**

COMPONENT	HOURS	CREDITS
General Education Courses	300	19
Core Courses	285	18
Concentration Courses	2,130	94
TOTAL	2,715	131

**BACHELOR'S DEGREE IN DIAGNOSTIC IMAGING WITH CONCENTRATION IN
CT AND MRI
CURRICULUM: AUGUST 2024**

CURRICULUM SEQUENCE**

COURSE	CODE	COURSE NAME	PRE-REQUISITES	CREDITS
FIRST TERM: 14 CREDITS				
SPAN	1010	Basic Spanish I	----	3
ENGL	1010	Basic English I	----	3
MATH	1010	Basic Mathematics	----	3
BIOL	2010	Anatomy And Physiology I	----	3
RADI	1010	Introduction To Radiology	----	2
SECOND TERM: 15 CREDITS				
MESE	1010	Medical Terminology	BIOL 2010	3
PHYS	1020	Introduction To Physics	MATH 1010	3
BIOL	2020	Anatomy And Physiology II	BIOL 2010	3
ITTE	1031L	Computer Literacy and Laboratory	----	3
RADI	2010	Patient Care and Management	RADI 1010	3
THIRD TERM: 14 CREDITS				
SEMI	1010	Transition To University Life and Professional Training Seminar	----	1
SPAN	1020	Basic Spanish II	SPAN 1010	3
RADI	2020	Radiographic Positioning and Related Anatomy I	BIOL 2010 BIOL 2020 MESE 1010 PHYS 1020 RADI 2010	2
RADI	2020L	Radiographic Positioning and Related Anatomy I: Laboratory	BIOL 2010 BIOL 2020 MESE 1010 PHYS 1020 RADI 2010	1
RADI	2009	Radiological Physics	MATH 1010 PHYS 1020 RADI 1010	3
RADI	2030	Knowing Imaging Modalities and Equipment	RADI 1010	2
RADI	2040L	Integrative Seminar: Laboratory	BIOL 2010 BIOL 2020 MESE 1010 PHYS 1020 RADI 1010 RADI 2010 RADI 2020 RADI 2020L	2

FOURTH TERM: 14 CREDITS				
RADI	2080P	Clinical Internship I	BIOL 2010 BIOL 2020 MESE 1010 PHYS 1020 RADI 1010 RADI 2009 RADI 2010 RADI 2020 RADI 2020L RADI 2040L	3
PSYC	2510	Psychology	----	3
RADI	2050	Principles of Radiographic Exposure	PHYS 1020 RADI 1010 RADI 2009	3
RADI	2060	Principles of Radiobiology and Radiological Protection	PHYS 1020 RADI 1010 RADI 2009	2
RADI	2070	Radiographic Positioning and Related Anatomy II	BIOL 2010 BIOL 2020 MESE 1010 PHYS 1020 RADI 1010 RADI 2009 RADI 2010 RADI 2020 RADI 2020L	2
RADI	2070L	Radiographic Positioning and Related Anatomy II: Laboratory	BIOL 2010 BIOL 2020 MESE 1010 PHYS 1020 RADI 1010 RADI 2009 RADI 2010 RADI 2020 RADI 2020L	1

FIFTH TERM: 13 CREDITS

RADI	2110P	Clinical Internship II	BIOL 2010 BIOL 2020 PHYS 1020 MESE 1010 RADI 1010 RADI 2009 RADI 2010 RADI 2020 RADI 2020L RADI 2030 RADI 2040L RADI 2050 RADI 2060 RADI 2070 RADI 2070L RADI 2080P	3
RADI	2200	Pharmacology and Contrast Media in Diagnostic Imaging	RADI 1010 RADI 2010 BIOL 2010 BIOL 2020 MESE 1010	3
RADI	2170	Radiographic Quality Assurance and Control	RADI 2050	2
RADI	2100	Radiographic Positioning and Related Anatomy III	BIOL 2010 BIOL 2020 MESE 1010 PHYS 1020 RADI 1010 RADI 2009 RADI 2010 RADI 2020 RADI 2020L RADI 2070 RADI 2070L	2
RADI	2100L	Radiographic Positioning and Related Anatomy III: Laboratory	BIOL 2010 BIOL 2020 MESE 1010 PHYS 1020 RADI 1010 RADI 2009 RADI 2010 RADI 2020 RADI 2020L RADI 2070 RADI 2070L	1
RADI	2130	Radiological Pathology	BIOL 2010 BIOL 2020 RADI 2170	2

SIXTH TERM: 12 CREDITS

RADI	2150P	Clinical Internship III	BIOL 2010 BIOL 2020 MESE 1010 PHYS 1020 RADI 1010 RADI 2009 RADI 2010 RADI 2020 RADI 2020L RADI 2030 RADI 2040L RADI 2050 RADI 2060 RADI 2070 RADI 2070L RADI 2080P RADI 2100 RADI 2100L RADI 2110P RADI 2120 or RADI 2200 RADI 2170	3
BIOL	2030	Sectional Anatomy	BIOL 2020	2
BIOL	2030L	Sectional Anatomy Laboratory	BIOL 2020	1
ENGL	1020	Basic English II	ENGL 1010	3
RADI	2140	Radiographic Positioning and Related Anatomy IV	BIOL 2010 BIOL 2020 MESE 1010 PHYS 1020 RADI 1010 RADI 2009 RADI 2010 RADI 2020 RADI 2020L RADI 2070 RADI 2070L RADI 2100 RADI 2100L RADI 2120 or RADI 2200	2

RADI	2140L	Radiographic Positioning and Related Anatomy IV: Laboratory	BIOL 2010 BIOL 2020 MESE 1010 PHYS 1020 RADI 1010 RADI 2009 RADI 2010 RADI 2020 RADI 2020L RADI 2070 RADI 2070L RADI 2100 RADI 2100L RADI 2120 or RADI 2200	1
SEVENTH TERM: 13 CREDITS				
RADI	3060	Ethics and Law in Imaging Science	RADI 1010	3
RADI	3070	Computers in Medical Imaging and Informatics	ITTE 1031L	3
RADI	2500	Advanced Sectional Anatomy	BIOL 2030 BIOL 2030L RADI 2140 RADI 2140L RADI 2150P	4
RADI	4040	Research Methods and Computer Literacy	ITTE 1031L	3
EIGHTH TERM: 12 CREDITS				
RADI	3000	Physics: Instrumentation and Images in Computed Tomography	RADI 2500	3
RADI	3010	Procedures for Image Information in Computed Tomography	RADI 2500	3
RADI	3020	Pathological Correlation by Computed Tomography	RADI 2500	3
RADI	3030	Procedures for Obtaining Images by Magnetic Resonance	RADI 2500	3
NINTH TERM: 12 CREDITS				
RADI	4010P	Clinical Internship in Computed Tomography	RADI 3000 RADI 3010 RADI 3020	6
RADI	3050	Physics: Principles, Parameters, and Concepts of Magnetic Resonance	RADI 2500	3
RADI	3040	Pathological Correlation by Magnetic Resonance	RADI 2500	3

TENTH TERM: 12 CREDITS				
RADI	4020P	Clinical Internship in Magnetic Resonance	RADI 3030 RADI 3040 RADI 3050	6
RADI	4050	Educational Principles for Technologists	ITTE 1031L RADI 2500	3
RADI	4030	Pre-Certification Seminar in Technology Radiology, CT, and MRI	ENGL 1010, MATH 1010, BIOL 2010, SEMI 1010, RADI 1010, ENGL 1020, ITTE 1031L, PHYS 1020, BIOL 2020, RADI 2010, MESE 1010, SPAN 1010, RADI 2009, RADI 2020, RADI 2020L, RADI 2030, RADI 2040L, SPAN 1020, RADI 2050, RADI 2060, RADI 2070, RADI 2070L, RADI 2080P, PSYC 2510, RADI 2170, RADI 2100, RADI 2100L, RADI 2110P, RADI 2120 o RADI 2200, BIOL 2030, BIOL 2030L, RADI 2130, RADI 2140, RADI 2140L, RADI 2150P, RADI 3060, RADI 3070, RADI 4040, RADI 2500, RADI 4050, RADI 3000, RADI 3010, RADI 3020	3

**Grand Total of the bachelor's degree in Diagnostic Imaging with concentration in CT and MRI:
2,715 hours and 131 credits**

**The student does not necessarily have to follow the suggested course order, but the order helps them complete their degree in the stipulated time. The student must be aware of taking the courses that have prerequisites in an order that allows them to continue taking the other courses without problems. Courses without prerequisites have no specific order. The student can register for them in the term that they are offered.

MINIMUM GRADING POLICY

Students enrolled in the bachelor's degree in Diagnostic Imaging with concentration in CT and MRI, must obtain at least a grade of C (70% or more) upon passing all Core and Concentration courses, except the clinical practice or internship courses which must be passed with B (80%) or more.

The following courses must be passed with a grade of C or higher:

MESE 1010	BIOL 2010	BIOL 2020	BIOL 2030	BIOL 2030L	PHYS 1020
PSYC 2510	RADI 1010	RADI 2009	RADI 2010	RADI 2020	RADI 2020L
RADI 2030	RADI 2040L	RADI 2050	RADI 2060	RADI 2070	RADI 2070L
RADI 2100	RADI 2100L	RADI 2130	RADI 2140	RADI 2140L	RADI 2170
RADI 2200	RADI 2500	RADI 3000	RADI 3010	RADI 3020	RADI 3030
RADI 3040	RADI 3050	RADI 3060	RADI 3070	RADI 4030	RADI 4040
RADI 4050					

The following courses must be passed with a grade of B or higher:

RADI 2080P RADI 2110P RADI 2150P RADI 4010P RADI 4020P

ASSOCIATE DEGREE IN RADIOLOGICAL TECHNOLOGY

CIP Code: 51.0911

SOC Code: 29-2034

Credits: 82 credits

Duration: 96 weeks (2 years)

Location: Bayamón, Caguas, and Carolina

Modality of Study: On ground

The associate degree in Radiological Technology will equip students with knowledge of the latest trends in radiological technology and essential skills for their professional development in this field. Students will apply concepts and procedures related to radiographic imaging. Likewise, they will develop the competencies required for successful performance in the certification exam offered by the Licensing Board of Radiological Technologists in Diagnostic Imaging and Radiotherapy Technologists of Puerto Rico once the relevant legal requirements are met. Graduates of this program will be able to practice as radiological technologists upon obtaining their license. Additionally, you can take the exam offered by the American Registry of Radiologic Technologists (ARRT) to practice your profession in the United States.

PROGRAM COMPETENCIES

1. Demonstrate a strong sense of professionalism focused on empathetic and top-quality medical care, grounded in ethical, legal, and moral principles, as well as the skills for continuous education and professional growth.
2. Employ professional knowledge and skills in the judicious use of radiation to provide superior quality patient care.
3. Effectively express their ideas, both orally and in writing, during simulations and clinical practices, patient interventions, and project and research presentations.
4. Utilize logical reasoning, critical thinking, and clinical judgment in applying systematic problem-solving methods for decision-making, both in routine and non-routine tasks.
5. Effectively manage radiology equipment and information technology tools in research and the application of best practices in their professional performance.

-
6. Apply ethical, legal, and moral principles in the provision of patient-centered healthcare services, based on a culture of safety, through the integration of values such as respect for dignity and professional integrity.

PRACTICE REQUIREMENTS

To take the practice component of the program, the following current and original documents are required:

1. Negative Criminal Record Certificate
2. Health Certificate
3. Hepatitis B Vaccines
4. Chickenpox Vaccine
5. HIPAA Certificate
6. Cardiopulmonary Resuscitation (CPR) Certification
7. Negative certification of Law 300 - Law on Verification of Credentials and Criminal History of Providers to Children, People with Disabilities and Health Professionals
8. Doping Test *
9. Respiratory Test *
10. Influenza Vaccine *
11. Clinical Practice Cover Letter
12. Practice Authorization Form

***Important Note:** Some practice centers may require additional documents. The student needs to revalidate to practice the profession.

LICENSURE REQUIREMENTS

The following documents (original and copy) are required to take the board exam and practice the profession:

1. Be over eighteen (18) years of age and have resided intermittently in Puerto Rico for a period of 6 months immediately before making the request, including sporadic departures.
2. Negative Criminal Record Certificate (less than 6 months since its issuance)
3. Health Certificate
4. Birth Certificate
5. Negative Certification from the Child Support Administration (ASUME) (no later than 30 days after issuance)
6. High School Diploma or Transcript of Credit
7. Associate's Degree Certification and/or Diploma in Radiological Technology obtained at CCU (formerly EDIC College).
8. Official Credit Transcript with the Associate Degree in Radiological Technology. The credit transcript must be sent directly from the university to the Examination Board of Radiology Technologists at the following address:

Oficina de Reglamentación y Certificación de los Profesionales de la Salud Junta Examinadora de Tecnólogos Radiológicos de Puerto Rico
P.O. BOX 10200, Santurce, Puerto Rico, 00908-0200

9. Application completed in all its parts, including the Affidavit with a 2x2 photo and two letter-size envelopes with a pre-addressed postage stamp with the applicant's postal address.
10. Payment to the Secretary of the Treasury for admission to revalidation for \$40.00; by postal order or by ATH system. Payment is non-refundable.
11. Request for Reasonable Accommodation, if applicable. This document is available to print at <https://www.salud.pr.gov/CMS/DOWNLOAD/8991>

CURRICULAR STRUCTURE

GENERAL EDUCATION COURSES

Prescribed: 19 credits

COURSE	CODE	COURSE NAME	CONTACT HOURS	CREDITS
ENGL	1010	Basic English I	45	3
ENGL	1020	Basic English II	45	3
SEMI	1010	Transition to University Life and Professional Training Seminar	15	1
SPAN	1010	Basic Spanish I	45	3
SPAN	1020	Basic Spanish II	45	3
MATH	1010	Basic Mathematics	45	3
ITTE	1031L	Computer Literacy and Laboratory	60	3

Sub-total **300 hours** **19 credits**

CORE COURSES

Prescribed: 18 credits

COURSE	CODE	COURSE NAME	CONTACT HOURS	CREDITS
MESE	1010	Medical Terminology	45	3
BIOL	2010	Anatomy and Physiology I	45	3
BIOL	2020	Anatomy and Physiology II	45	3
BIOL	2030	Sectional Anatomy	30	2
BIOL	2030L	Sectional Anatomy Laboratory	30	1
PHYS	1020	Introduction to Physics	45	3
PSYC	2510	Psychology	45	3

Sub-total **285 hours** **18 credits**

CONCENTRATION COURSES

Prescribed: 45 credits

COURSE	CODE	COURSE NAME	CONTACT HOURS	CREDITS
RADI	1010	Introduction to Radiology	30	2
RADI	2009	Radiological Physics	45	3
RADI	2010	Patient Care and Management	45	3
RADI	2020	Radiological Positioning and Related Anatomy I	30	2
RADI	2020L	Radiographic Positioning and Related Anatomy I: Laboratory	30	1
RADI	2030	Knowing Imaging Modalities and Equipment	30	2
RADI	2040L	Integrative Seminar: Laboratory	60	2
RADI	2050	Principles of Radiographic Exposure	45	3
RADI	2060	Principles of Radiobiology and Radiographical Protection	30	2
RADI	2070	Radiological Positioning and Related Anatomy II	30	2
RADI	2070L	Radiographic Positioning and Related Anatomy II: Laboratory	30	1

COURSE	CODE	COURSE NAME	CONTACT HOURS	CREDITS
RADI	2080P	Clinical Internship I	135	3
RADI	2100	Radiological Positioning and Related Anatomy III	30	2
RADI	2100L	Radiographic Positioning and Related Anatomy III: Laboratory	30	1
RADI	2110P	Clinical Internship II	135	3
RADI	2120	Contrast Media	30	2
RADI	2130	Radiological Pathology	30	2
RADI	2140	Radiological Positioning and Related Anatomy IV	30	2
RADI	2140L	Radiographic Positioning and Related Anatomy IV: Laboratory	30	1
RADI	2150P	Clinical Internship III	135	3
RADI	2160	Pre-Board Seminar	15	1
RADI	2170	Radiographic Quality Assurance and Control	30	2

Sub-total

1,035 hours

45 credits

COMPONENT	HOURS	CREDITS
General Education Courses	300	19
Core Courses	285	18
Concentration Courses	1,035	45
TOTAL	1,620	82

**ASSOCIATE DEGREE IN RADIOLOGICAL TECHNOLOGY
CURRICULUM: AUGUST 2024**

CURRICULUM SEQUENCE **

COURSE	CODE	COURSE NAME	PRE-REQUISITES	CREDITS
FIRST TERM: 14 CREDITS				
SPAN	1010	Basic Spanish I	----	3
ENGL	1010	Basic English I	----	3
MATH	1010	Basic Mathematics	----	3
BIOL	2010	Anatomy And Physiology I	----	3
RADI	1010	Introduction To Radiology	----	2
SECOND TERM: 15 CREDITS				
MESE	1010	Medical Terminology	BIOL 2010	3
PHYS	1020	Introduction To Physics	MATH 1010	3
BIOL	2020	Anatomy And Physiology II	BIOL 2010	3
ITTE	1031L	Computer Literacy and Laboratory	----	3
RADI	2010	Patient Care and Management	RADI 1010	3
THIRD TERM: 14 CREDITS				
SEMI	1010	Transition To University Life and Professional Training Seminar	----	1
SPAN	1020	Basic Spanish II	SPAN 1010	3
RADI	2020	Radiographic Positioning and Related Anatomy I	BIOL 2010 BIOL 2020 MESE 1010 PHYS 1020 RADI 2010	2
RADI	2020L	Radiographic Positioning and Related Anatomy I: Laboratory	BIOL 2010 BIOL 2020 MESE 1010 PHYS 1020 RADI 2010	1
RADI	2009	Radiological Physics	MATH 1010 PHYS 1020 RADI 1010	3
RADI	2030	Knowing Imaging Modalities and Equipment	RADI 1010	2
RADI	2040L	Integrative Seminar: Laboratory	BIOL 2010 BIOL 2020 MESE 1010 PHYS 1020 RADI 1010 RADI 2010 RADI 2020 RADI 2020L	2

FOURTH TERM: 14 CREDITS				
RADI	2080P	Clinical Internship I	BIOL 2010 BIOL 2020 MESE 1010 PHYS 1020 RADI 1010 RADI 2009 RADI 2010 RADI 2020 RADI 2020L RADI 2040L	3
PSYC	2510	Psychology	----	3
RADI	2050	Principles of Radiographic Exposure	PHYS 1020 RADI 1010 RADI 2009	3
RADI	2060	Principles of Radiobiology and Radiological Protection	PHYS 1020 RADI 1010 RADI 2009	2
RADI	2070	Radiographic Positioning and Related Anatomy II	BIOL 2010 BIOL 2020 MESE 1010 PHYS 1020 RADI 1010 RADI 2009 RADI 2010 RADI 2020 RADI 2020L	2
RADI	2070L	Radiographic Positioning and Related Anatomy II: Laboratory	BIOL 2010 BIOL 2020 MESE 1010 PHYS 1020 RADI 1010 RADI 2009 RADI 2010 RADI 2020 RADI 2020L	1

FIFTH TERM: 12 CREDITS

RADI	2110P	Clinical Internship II	BIOL 2010 BIOL 2020 PHYS 1020 MESE 1010 RADI 1010 RADI 2009 RADI 2010 RADI 2020 RADI 2020L RADI 2030 RADI 2040L RADI 2050 RADI 2060 RADI 2070 RADI 2070L RADI 2080P	3
RADI	2120	Contrast Media	RADI 1010 RADI 2010 BIOL 2010 BIOL 2020 MESE 1010	2
RADI	2170	Radiographic Quality Assurance and Control	RADI 2050	2
RADI	2100	Radiographic Positioning and Related Anatomy III	BIOL 2010 BIOL 2020 MESE 1010 PHYS 1020 RADI 1010 RADI 2009 RADI 2010 RADI 2020 RADI 2020L RADI 2070 RADI 2070L	2
RADI	2100L	Radiographic Positioning and Related Anatomy III: Laboratory	BIOL 2010 BIOL 2020 MESE 1010 PHYS 1020 RADI 1010 RADI 2009 RADI 2010 RADI 2020 RADI 2020L RADI 2070 RADI 2070L	1
RADI	2130	Radiological Pathology	BIOL 2010 BIOL 2020 RADI 2170	2

SIXTH TERM: 13 CREDITS

RADI	2150P	Clinical Internship III	BIOL 2010 BIOL 2020 MESE 1010 PHYS 1020 RADI 1010 RADI 2009 RADI 2010 RADI 2020 RADI 2020L RADI 2030 RADI 2040L RADI 2050 RADI 2060 RADI 2070 RADI 2070L RADI 2080P RADI 2100 RADI 2100L RADI 2110P RADI 2120 or RADI 2200 RADI 2170	3
BIOL	2030	Sectional Anatomy	BIOL 2020	2
BIOL	2030L	Sectional Anatomy Laboratory	BIOL 2020	1
ENGL	1020	Basic English II	ENGL 1010	3
RADI	2140	Radiographic Positioning and Related Anatomy IV	BIOL 2010 BIOL 2020 MESE 1010 PHYS 1020 RADI 1010 RADI 2009 RADI 2010 RADI 2020 RADI 2020L RADI 2070 RADI 2070L RADI 2100 RADI 2100L RADI 2120 or RADI 2200	2

RADI	2140L	Radiographic Positioning and Related Anatomy IV: Laboratory	BIOL 2010 BIOL 2020 MESE 1010 PHYS 1020 RADI 1010 RADI 2009 RADI 2010 RADI 2020 RADI 2020L RADI 2070 RADI 2070L RADI 2100 RADI 2100L RADI 2120 or RADI 2200	1
RADI	2160	Pre-Board Seminar	BIOL 2010 BIOL 2020 MESE 1010 PHYS 1020 RADI 1010 RADI 2009 RADI 2010 RADI 2020 RADI 2020L RADI 2030 RADI 2040L RADI 2050 RADI 2060 RADI 2070 RADI 2070L RADI 2080P RADI 2100 RADI 2100L RADI 2110P RADI 2120 or RADI 2200 RADI 2170	1

Grand Total of the Associate Degree in Radiological Technology: 1,620 hours y 82 credits

**The student does not necessarily have to follow the suggested course order, but the order helps them complete their degree in the stipulated time. The student must be aware of taking the courses that have prerequisites in an order that allows them to continue taking the other courses without problems. Courses without prerequisites have no specific order. The student can register for them in the term that they are offered.

MINIMUM GRADING POLICY

Students enrolled in the Associate Degree in Radiological Technology, must obtain at least a grade of C (70% or more) upon passing all Core and Concentration courses, except the clinical practice or internship courses which must be passed with B (80%) or more.

The following courses must be passed with a grade of C or higher:

MESE 1010	BIOL 2010	BIOL 2020	BIOL 2030	BIOL 2030L	PHYS 1020
PSYC 2510	RADI 1010	RADI 2009	RADI 2010	RADI 2020	RADI 2020L
RADI 2030	RADI 2040L	RADI 2050	RADI 2060	RADI 2070	RADI 2070L
RADI 2100	RADI 2100L	RADI 2120	RADI 2130	RADI 2140	RADI 2140L
RADI 2160	RADI 2170				

The following courses must be passed with a grade of B or higher:

RADI 2080P RADI 2110P RADI 2150P

ASSOCIATE DEGREE IN MEDICAL SONOGRAPHY

CIP Code: 51.0910

SOC Code: 29-2032

Credits: 80 credits

Duration: 96 weeks (2 years)

Location: Bayamón, Caguas, and Carolina

Modality of Study: On ground

The associate degree program in Medical Sonography will train students in the physics of ultrasound and the instrumentation of sonographic equipment, as well as patient management and care. Additionally, students will develop skills for performing abdominal, gynecological, obstetrical, and superficial structure sonographic studies using new technologies and diagnostic imaging modalities within the field of diagnostic medical sonography, incorporating the latest advancements in this field. Graduates of this program will be able to practice as licensed general diagnostic medical sonographers in Puerto Rico, whether in medical offices, hospitals, or diagnostic imaging centers, among others, after passing both revalidation exams offered by the Board of Radiological Technologists in Diagnostic Imaging and Radiotherapy Technologists of Puerto Rico. They can choose to take the Sonography Principles & Instrumentation (SPI) exam offered by the American Registry of Diagnostic Medical Sonography (ARDMS). They can also take the exam offered by the American Registry of Radiologic Technologists (ARRT) to practice their profession in the United States.

PROGRAM COMPETENCIES

1. Apply theoretical and practical knowledge of medical terminology, physical assessment, patient history, patient management and care, medical imaging studies, and protocols in their professional role as medical sonographers.
2. Analyze information and procedures related to the interpretation of medical orders, anatomy and physiology, laboratory results, creation of medical images, and preliminary diagnostic impressions, among others, in a logical and critical manner.
3. Communicate the preliminary results of studies to the medical team, as well as provide support and guidance to patients about the procedures to be performed in an assertive and efficient manner, both orally and in writing.

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4. Utilize available technological and computer-based tools, incorporating methodological advances in procedures related to diagnostic medical ultrasound and imaging.
 5. Demonstrate collaborative work skills for the diagnosis, treatment, and comprehensive care of patients with a strong sense of responsibility, in compliance with the HIPAA law and all other laws related to their profession, while maintaining good moral and ethical judgment.

PRACTICE REQUIREMENTS

To take the practice component of the program, the following current and original documents are required:

1. Negative Criminal Record Certificate
2. Health Certificate
3. Hepatitis B Vaccines
4. Chickenpox Vaccine
5. HIPAA Certificate
6. Cardiopulmonary Resuscitation (CPR) Certification
7. Negative certification of Law 300 - Law on Verification of Credentials and Criminal History of Providers to Children, People with Disabilities and Health Professionals
8. Doping Test *
9. Respiratory Test *
10. Influenza Vaccine *
11. Covid-19 Vaccine (Three Doses)
12. Particle Fit Test*
13. Clinical Practice Cover Letter
14. Practice Authorization Form

***Important Note:** Some practice centers may require additional documents. The student needs to revalidate to practice the profession.

LICENSURE REQUIREMENTS

The following documents (original and copy) are required to revalidate and practice the profession:

1. Be over eighteen (18) years of age and have resided intermittently in Puerto Rico for a period of 6 months immediately before making the request, including sporadic departures.
2. Negative Criminal Record Certificate (less than 6 months since its issuance)
3. Health Certificate
4. Birth Certificate
5. Negative Certification from the Child Support Administration (ASUME) (no later than 30 days after issuance)
6. High School Diploma or Transcript of Credit
7. Certification and/or Diploma in associate degree program in Medical Sonography obtained at CCU.
8. Official Credit Transcript with the associate degree program in Medical Sonography. The credit transcript must be sent directly from the university to the Examination Board of Radiology Technologists at the following address:

**Oficina de Reglamentación y Certificación de los Profesionales de la Salud
Junta Examinadora de Tecnólogos Radiológicos de Puerto Rico
P.O. BOX 10200, Santurce, Puerto Rico, 00908-0200**

9. Approved result of Physical Examination (to request a general sonographer exam)
10. Application completed in all its parts, including the Affidavit with a 2x2 photo and two letter-size envelopes with a pre-addressed postage stamp with the applicant's postal address.
11. Payment to the Secretary of the Treasury for admission to revalidation for \$40.00 (for each specialty); by postal order or by ATH system. Payment is non-refundable.
12. Request for Reasonable Accommodation, if applicable. This document is available to print at <https://www.salud.pr.gov/CMS/DOWNLOAD/8991>

CURRICULAR STRUCTURE

GENERAL EDUCATION COURSES

Prescribed: 19 credits

COURSE	CODE	COURSE NAME	CONTACT HOURS	CREDITS
ENGL	1010	Basic English I	45	3
ENGL	1020	Basic English II	45	3
ITTE	1031L	Computer Literacy and Laboratory	60	3
MATH	1010	Basic Mathematics	45	3
SEMI	1010	Transition to University Life and Professional Training Seminar	15	1
SPAN	1010	Basic Spanish I	45	3
SPAN	1020	Basic Spanish II	45	3

Sub-total

300 hours

19 credits

CORE COURSES

Prescribed: 18 credits

COURSE	CODE	COURSE NAME	CONTACT HOURS	CREDITS
MESE	1010	Medical Terminology	45	3
BIOL	2010	Human Anatomy and Physiology I	45	3
BIOL	2020	Human Anatomy and Physiology II	45	3
BIOL	2030	Sectional Anatomy	30	2
BIOL	2030L	Sectional Anatomy Laboratory	30	1
PHSC	2030	Ultrasound Physics and Instrumentation I	45	3
PHSC	2040	Ultrasound Physics and Instrumentation II	45	3

Sub-total

285 hours

18 credits

CONCENTRATION COURSES

Prescribed: 43 credits

COURSE	CODE	COURSE NAME	CONTACT HOURS	CREDITS
SONO	1020	Introduction to Medical Sonography	45	3
SONO	1030	Patient Management and Care in Sonographic Imaging	45	3
SONO	1040L	Abdominal Sonography and Laboratory	75	4
SONO	2020L	Gynecological Sonography and Laboratory	75	4
SONO	2030L	Laboratory of Integration of Clinical Skills in Medical Sonography	60	2
SONO	2050L	Obstetric Sonography and Laboratory	75	4
SONO	2040P	Clinical Practice I: Medical Sonography	90	2
SONO	2070L	Sonography of Superficial Structures and Laboratory	75	4
SONO	2071	Pathology Applied to Medical Sonography I	45	3
SONO	2060P	Clinical Practice II: Medical Sonography	90	2
SONO	2072	Pathology Applied To Medical Sonography II	45	3

COURSE	CODE	COURSE NAME	CONTACT HOURS	CREDITS
SONO	2080	Pre-Certification Exam Seminar in Medical Sonography	30	2
SONO	2090	Special Procedures In Medical Sonography	30	2
SONO	3000P	Clinical Practice III: Medical Sonography	225	5
Sub-total			1,005 hours	43 credits

COMPONENT	HOURS	CREDITS
General Education Courses	300	19
Core Courses	285	18
Concentration Courses	1,005	43
TOTAL	1,590	80

**ASSOCIATE DEGREE IN MEDICAL SONOGRAPHY
CURRICULUM: AUGUST 2024**

CURRICULUM SEQUENCE**

COURSE	CODE	COURSE NAME	PRE-REQUISITES	CREDITS
FIRST TERM: 15 CREDITS				
ENGL	1010	Basic English I	----	3
ITTE	1031L	Computer Literacy and Laboratory	----	3
BIOL	2010	Human Anatomy and Physiology I	----	3
SONO	1020	Introduction to Medical Sonography	----	3
SONO	1030	Patient Management and Care in Sonographic Imaging	----	3
SECOND TERM: 15 CREDITS				
MATH	1010	Basic Mathematics	----	3
MESE	1010	Medical Terminology	----	3
SPAN	1010	Basic Spanish I	----	3
BIOL	2020	Human Anatomy and Physiology II	BIOL 2010	3
ENGL	1020	Basic English II	ENGL 1010	3
THIRD TERM: 14 CREDITS				
SEMI	1010	Transition to University Life and Professional Training Seminar	----	1
SONO	1040L	Abdominal Sonography and Laboratory	SONO 1020 SONO 1030 MESE 1010	4
PHSC	2030	Ultrasound Physics and Instrumentation I	MATH 1010	3
SONO	2020L	Gynecological Sonography and Laboratory	SONO 1030 SONO 1040L	4
SONO	2030L	Laboratory of Integration of Clinical Skills in Medical Sonography	SONO 1020 SONO 1030 SONO 1040L MESE 1010	2
FOURTH TERM: 12 CREDITS				
SONO	2040P	Clinical Practice I: Medical Sonography	SONO 2020L SONO 2030L	2
BIOL	2030	Sectional Anatomy	BIOL 2020	2
BIOL	2030L	Sectional Anatomy Laboratory	BIOL 2020	1
PHSC	2040	Ultrasound Physics and Instrumentation II	MATH 1010 PHSC 2030 SONO 1020	3
SONO	2050L	Obstetric Sonography and Laboratory	SONO 1020 SONO 1030 SONO 2020L MESE 1010 PHSC 2030	3

FIFTH TERM: 12 CREDITS				
SONO	2060P	Clinical Practice II: Medical Sonography	SONO 2040P	2
SONO	2070L	Sonography of Superficial Structures and Laboratory	SONO 2030L PHSC 2040	4
SPAN	1020	Basic Spanish II	SPAN 1010	3
SONO	2071	Pathology Applied to Medical Sonography I	SONO 1040L SONO 2020L SONO 2050L SONO 2070L	3
SIXTH TERM: 12 CREDITS				
SONO	3000P	Clinical Practice III: Medical Sonography	SONO 2060P	5
SONO	2080	Pre-Certification Exam Seminar in Medical Sonography	SONO 1040L SONO 2020L SONO 2050L SONO 2070L SONO 2071 PHSC 2040	2
SONO	2090	Special Procedures in Medical Sonography	SONO 1040L SONO 2020L SONO 2050L SONO 2070L SONO 2071	2
SONO	2072	Patología Aplicada a la Sonografía Médica II	SONO 2071	3

Grand Total of the associate degree in Medical Sonography: 1,590 hours y 80 credits

**The student does not necessarily have to follow the suggested course order, but the order helps them complete their degree in the stipulated time. The student must be aware of taking the courses that have prerequisites in an order that allows them to continue taking the other courses without problems. Courses without prerequisites have no specific order. The student can register for them in the term that they are offered.

MINIMUM GRADING POLICY

Students enrolled in the associate degree in Medical Sonography, must obtain at least a grade of C (70% or more) upon passing all Core and Concentration courses, except the clinical practice or internship courses which must be passed with B (80%) or more.

The following courses must be passed with a grade of C or higher:

MESE 1010	BIOL 2010	BIOL 2020	BIOL 2030	BIOL 2030L	PHSC 2030
PHSC 2040	SONO 1020	SONO 1030	SONO 1040L	SONO 2020L	SONO 2030L
SONO 2050L	SONO 2070L	SONO 2071	SONO 2072	SONO 2080	SONO 2090

The following courses must be passed with a grade of B or higher:

SONO 2040P SONO 2060P SONO 3000

ASSOCIATE DEGREE IN OPTICAL SCIENCE

CIP Code: 51.1801

SOC Code: 29-2081

Credits: 80 credits

Duration: 96 weeks (2 years)

Location: Bayamón and Caguas

Modality of Study: On ground and Online

The associate degree program in Optical Sciences will prepare students with the theoretical and practical knowledge for the roles required in optical offices and/or optical laboratories. Students will employ their knowledge and technical skills in providing optical aids for the maintenance and/or improvement of a patient's visual health. They will apply scientific knowledge, clinical procedures, as well as skills and abilities to work in an optical office for fitting eyeglasses, contact lenses, and ophthalmic accessories. Graduates of this program will be prepared to work in an optical office or laboratory. Additionally, they will be able to take the certification examination offered by the Puerto Rico Board of Opticians to obtain their license once they meet the legal requirements.

PROGRAM COMPETENCIES

1. Apply scientific knowledge and basic clinical skills in optical sciences for the operation and proper management of optical offices and laboratories.
2. Communicate their ideas and interpretation of optometrists' or ophthalmologists' prescriptions, both orally and in writing, to patients, colleagues, and other members of the allied health team.
3. Analyze information and procedures related to their professional field logically and critically to select the best treatment alternatives and accessories for the patient's visual health.
4. Effectively utilize technological equipment in procedures offered in optical offices and laboratories, as well as available computer resources in information analysis and interpretation.

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5. Demonstrate sensitivity, accuracy, and professionalism in patient service through proper attention to their needs, respect for human dignity, and appropriate handling of ethical and legal matters.

PRACTICE REQUIREMENTS

To take the practice component of the program, the following current and original documents are required:

1. Negative Criminal Record Certificate
2. Health Certificate
3. Cardiopulmonary Resuscitation (CPR) Certification
4. HIPAA Certificate
5. Negative certification of Law 300 - Law on Verification of Credentials and Criminal History of Providers to Children, People with Disabilities and Health Professionals

***Important Note:** Some practice centers may require additional documents. The student needs to revalidate to practice the profession.

LICENSURE REQUIREMENTS

The following documents (original and copy) are required to revalidate and practice the profession:

1. Be over eighteen (18) years of age and have resided intermittently in Puerto Rico for a period of 6 months immediately before making the request, including sporadic departures.
2. Negative Criminal Record Certificate (less than 3 months since its issuance)
3. Health Certificate (less than 1 year since its issuance)
4. Birth Certificate
5. Negative Certification from the Child Support Administration (ASUME) (no later than 30 days after issuance)
6. High School Diploma or Transcript of Credit
7. Certification and/or Diploma in associate degree program in Optical Science obtained at CCU.
8. Official Credit Transcript with the associate degree program in Optical Science. The credit transcript must be sent directly from the university to the Examination Board of Optics at the following address:

**Junta Examinadora de Ópticos de Puerto Rico
P.O. BOX 10200, Santurce, Puerto Rico, 00908-0200**

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9. Application completed in all its parts, including the Affidavit with a 2x2 photo and two letter-size envelopes with a pre-addressed postage stamp with the applicant's postal address.
 10. Payment to the Secretary of the Treasury for admission to revalidation for \$25.00; by postal order, ATH, or credit card.
 - a. Pay for the test at a cost of:
 - i. Stage I. \$25.00 (Theoretical Test)
 - ii. Stage II. \$25.00 (Practical Test) - if you do not pass Stage I, it cannot be offered until Stage I is approved.
 - iii. Any person who fails any of the parts of the exam on three occasions will not be able to take a new exam until he/she presents to the Examination Board reliable proof that he/she has taken and passed the remedial course, or courses recognized or accredited by it.
 - iv. If you have any doubts, please contact the Examination Board of Optics.

CURRICULAR STRUCTURE
GENERAL EDUCATION COURSES

Prescribed: 25 credits

COURSE	CODE	COURSE NAME	CONTACT HOURS	CREDITS
BIOL	1010	Introduction to Biology	45	3
ENGL	1010	Basic English I	45	3
ENGL	1020	Basic English II	45	3
ITTE	1031L	Computer Literacy and Laboratory	60	3
MATH	1010	Basic Mathematics	45	3
HUMA	1010	Humanities I	45	3
SEMI	1010	Transition to University Life and Professional Training Seminar	15	1
SPAN	1010	Basic Spanish I	45	3
SPAN	1020	Basic Spanish II	45	3
Sub-total			390 hours	25 credits

CORE COURSES

Prescribed: 9 credits

COURSE	CODE	COURSE NAME	CONTACT HOURS	CREDITS
PHYS	1020	Introduction To Physics	45	3
BUAD	2250	Human Relations	45	3
BUMA	1050	Introduction To Entrepreneurship	45	3
Sub-total			135 hours	9 credits

CONCENTRATION COURSES

Prescribed: 46 credits

COURSE	CODE	COURSE NAME	CONTACT HOURS	CREDITS
OPTI	2000	Anatomy and Physiology of the Eye	45	3
OPTI	2020	Ophthalmic Materials I	45	3
OPTI	2020L	Ophthalmic Materials I: Laboratory	30	1
OPTI	2030	Contact Lenses	45	3
OPTI	2030L	Contact Lenses: Laboratory	60	2
OPTI	2010	Principles of Physical Optics	45	3
OPTI	2040	Ophthalmic Materials II	30	2
OPTI	2040L	Ophthalmic Materials II: Laboratory	60	2
OPTI	2050L	Medical Billing for Optical Sciences and Laboratory	60	3
OPTI	2060	Vision Abnormalities	45	3
OPTI	2150L	Pre-Internship Laboratory in Frame Sizing	60	2
OPTI	2110	Prescription Dispensing I	45	3
OPTI	2110L	Prescription Dispensing I: Laboratory	60	2
OPTI	2100	Laws Regulating the Optic Practice	30	2
OPTI	2160	Prescription Dispensing II	45	3
OPTI	2120P	Clinical Practice and Seminar	405	9
Sub-total			1,110 hours	46 credits

COMPONENT	HOURS	CREDITS
General Education Courses	390	25
Core Courses	135	9
Concentration Courses	1,110	46
TOTAL	1,635	80

**ASSOCIATE DEGREE IN OPTICAL SCIENCE
CURRICULUM: AUGUST 2024**

CURRICULUM SEQUENCE**

COURSE	CODE	COURSE NAME	PRE-REQUISITES	CREDITS
FIRST TERM: 15 CREDITS				
SPAN	1010	Basic Spanish I	----	3
ENGL	1010	Basic English I	----	3
MATH	1010	Basic Mathematics	----	3
BIOL	1010	Introduction To Biology	----	3
ITTE	1031L	Computer Literacy and Laboratory	----	3
SECOND TERM: 13 CREDITS				
SEMI	1010	Transition to University Life and Professional Training Seminar	----	1
SPAN	1020	Basic Spanish II	SPAN 1010	3
ENGL	1020	Basic English II	INGL 1010	3
OPTI	2000	Anatomy and Physiology of The Eye	BIOL 1010	3
PHYS	1020	Introduction To Physics	MATH 1010	3
THIRD TERM: 15 CREDITS				
OPTI	2010	Principles Of Physical Optics	MATH 1010 OPTI 2000 PHYS 1020	3
OPTI	2020	Ophthalmic Materials I	OPTI 2000 PHYS 1020	3
OPTI	2020L	Ophthalmic Materials I: Laboratory	OPTI 2000 PHYS 1020	1
BUAD	2250	Human Relations	----	3
OPTI	2030	Contact Lenses	OPTI 2000 OPTI 2010 OPTI 2020 OPTI 2020L PHYS 1020	3
OPTI	2030L	Contact Lenses: Laboratory	OPTI 2000 OPTI 2010 OPTI 2020 OPTI 2020L PHYS 1020	2

FOURTH TERM: 13 CREDITS				
OPTI	2060	Vision Abnormalities	BIOL 1010 OPTI 2000	3
OPTI	2040	Ophthalmic Materials II	OPTI 2000 OPTI 2010 OPTI 2020 OPTI 2020L PHYS 1020	2
OPTI	2040L	Ophthalmic Materials II: Laboratory	OPTI 2000 OPTI 2010 OPTI 2020 OPTI 2020L PHYS 1020	2
HUMA	1010	Humanidades I	---	3
OPTI	2050L	Facturación Médica para Ciencias Ópticas y Laboratorio	ITTE 1031L OPTI 2000 OPTI 2060	3
FIFTH TERM: 12 CREDITS				
OPTI	2150L	Pre-Internship Laboratory in Frame Sizing	BIOL 1010 OPTI 2000 OPTI 2010 OPTI 2020 OPTI 2020L OPTI 2040 OPTI 2040L PHYS 1020	2
BUMA	1050	Introduction to Entrepreneurship	---	3
OPTI	2100	Laws Regulating the Optic Practice	---	2
OPTI	2110	Prescription Dispensing I	BIOL 1010 OPTI 2000 OPTI 2010 OPTI 2020 OPTI 2020L OPTI 2030 OPTI 2030L OPTI 2040 OPTI 2040L OPTI 2150L	3
OPTI	2110L	Prescription Dispensing I: Laboratory	BIOL 1010 OPTI 2000 OPTI 2010 OPTI 2020 OPTI 2020L OPTI 2030 OPTI 2030L OPTI 2040 OPTI 2040L OPTI 2150L	2

SIXTH TERM: 12 CREDITS				
OPTI	2120P	Clinical Practice and Seminar	OPTI 2000 OPTI 2010 OPTI 2020 OPTI 2020L OPTI 2030 OPTI 2030L OPTI 2040 OPTI 2040L OPTI 2050L OPTI 2060 OPTI 2100 OPTI 2110 OPTI 2150L	9
OPTI	2160	Prescription Dispensing II	OPTI 2110 OPTI 2110L	3

Grand Total of the associate degree in Optical Science: 1,635 hours y 80 credits

**The student does not necessarily have to follow the suggested course order, but the order helps them complete their degree in the stipulated time. The student must be aware of taking the courses that have prerequisites in an order that allows them to continue taking the other courses without problems. Courses without prerequisites have no specific order. The student can register for them in the term that they are offered.

MINIMUM GRADING POLICY

Students enrolled in the associate degree in Optical Science, must obtain at least a grade of C (70% or more) upon passing all Core and Concentration courses, except the clinical practice or internship courses which must be passed with B (80%) or more.

The following courses must be passed with a grade of C or higher:

PHYS 1020	BUAD 2250	BUMA 1050	OPTI 2000	OPTI 2020	OPTI 2020L
OPTI 2030	OPTI 2030L	OPTI 2010	OPTI 2040	OPTI 2040L	OPTI 2050L
OPTI 2060	OPTI 2150L	OPTI 2110	OPTI 2110L	OPTI 2100	OPTI 2160

The following courses must be passed with a grade of B or higher: OPTI 212

VOCATIONAL TECHNICAL CERTIFICATE IN LABORATORY ASSISTANT WITH ELECTRONIC PROCESSING

CIP Code: 51.0802

SOC Code: 29-2012

Credits: 37 credits

Duration: 48 weeks (1 year)

Location: Bayamón, Caguas, Carolina, and Yauco

Modality of Study: On ground

The Laboratory Assistant Program with Electronic Processing prepares students with concepts in basic sciences, customer service, and laboratory procedures. Additionally, students will develop skills to assist in areas such as equipment cleaning and disinfection, preparation of culture media, labeling of samples, and customer service. Graduates of this program will be able to work responsibly and ethically as laboratory assistants under the direction and supervision of a medical technologist or director and in compliance with legal requirements.

PROGRAM COMPETENCIES

1. Demonstrate theoretical knowledge and professional skills in equipment maintenance, sample and blood component handling, culture media preparation, staining, and other legally authorized procedures within their role as laboratory assistants.
2. Employ effective oral and written communication skills when interacting with clients and both internal and external personnel, including doctors, nurses, and others, while managing information relevant to processes within clinical laboratories, pathological laboratories, and blood banks.
3. Apply the processes of the scientific method and logical reasoning in their professional practice, including problem-solving, analyzing medical terminology used in medical orders (tests and diagnoses), and the proper handling of laboratory samples and equipment.
4. Effectively utilize technological equipment and computer resources in processes related to customer service, data entry, and patient information management in clinical laboratories.
5. Demonstrate ethical and moral responsibility, professional attitude, and other interpersonal skills that contribute to compliance with current laws and regulations regarding patient data confidentiality in healthcare services.

PRACTICE REQUIREMENTS

To take the practice component of the program, the following current and original documents are required:

1. Negative Criminal Record Certificate
2. Health Certificate
3. Hepatitis B Vaccines (3 doses) *
4. Vaccines against Chickenpox (2 doses)
5. Doping Test*
6. Nose and Throat Culture*
7. HIPAA Law Certificate
8. Negative certification of Law 300-Law on Verification of Credentials and Criminal History of Providers to Children, People with Disabilities and Health Professionals*

****Important Note:** Some practice centers may require additional documents. The student does not need to revalidate to practice the profession.

General information: The Institution reserves the right to modify this study program at any time in agreement with the corresponding department.

CURRICULAR STRUCTURE

Prescribed: 37 credits

COURSE	CODE	COURSE NAME	CONTACT HOURS	CREDITS
ESPA	1007	Basic Spanish	60	2
LITE	1001	Computer Literacy and Laboratory	60	2
LABS	1000L	Introduction to the Laboratory Assistant Profession and Laboratory	90	3
INGL	1109	Basic English I	60	2
BIOL	1000	Fundamentals of Human Anatomy and Physiology	60	2
LABS	1010L	General Science Compendium and Laboratory	60	2
SEMI	1005	Academic Adaptation and Professional Life Seminar	30	1
MICR	1000L	Handling of Samples, Basic Microbiology and Parasitology Concepts and Laboratory	90	3
MEDT	1000	Medical Terminology in the Laboratory	60	2
LABS	1030L	Handling of Samples in Hematology, Chemistry, Urinalysis, Coagulation, Serology, Immunology, and Molecular Biology, and Laboratory	120	4
LABS	1040L	Handling of Samples and Blood Components in Blood Banks, and Laboratory	60	2
LABS	1020L	General Data Entry and Billing Processes for Laboratory Services	90	3
LABS	1050L	Handling of Pathological Samples and Laboratory	90	3
LABS	1060	Integrative Seminar: Laboratory Assistant	60	2
LABS	1070P	Laboratory Assistant Clinical Practice	180	4

Total:

1,170 hours

37 credits

**VOCATIONAL TECHNICAL CERTIFICATE IN LABORATORY ASSISTANT WITH
ELECTRONIC PROCESSING
CURRICULUM: AUGUST 2024**

CURRICULUM SEQUENCE**

COURSE	CODE	COURSE NAME	PRE-REQUISITES	CREDITS
FIRST TERM: 13 CREDITS				
ESPA	1007	Basic Spanish	----	2
LITE	1001	Computer Literacy and Laboratory	----	2
LABS	1000L	Introduction to the Laboratory Assistant Profession and Laboratory	----	3
INGL	1109	Basic English I	----	2
BIOL	1000	Fundamentals of Human Anatomy and Physiology	----	2
LABS	1010L	General Science Compendium and Laboratory	----	2
SECOND TERM: 12 CREDITS				
SEMI	1005	Academic Adaptation and Professional Life Seminar		1
MICR	1000L	Handling of Samples, Basic Microbiology and Parasitology Concepts and Laboratory	LABS 1000L	3
MEDT	1000	Medical Terminology in the Laboratory	BIOL 1000	2
LABS	1030L	Handling of Samples in Hematology, Chemistry, Urinalysis, Coagulation, Serology, Immunology, and Molecular Biology, and Laboratory	LABS 1000L	4
LABS	1040L	Handling of Samples and Blood Components in Blood Banks, and Laboratory	LABS 1000L	2
THIRD TERM: 12 CREDITS				
LABS	1020L	General Data Entry and Billing Processes for Laboratory Services	MEDT 1000	3
LABS	1050L	Handling of Pathological Samples and Laboratory	BIOL 1000	3
LABS	1060	Integrative Seminar: Laboratory Assistant	LABS 1000 LABS 1010L LABS 1020L LABS 1030L LABS 1040L LABS 1050L	2
LABS	1070P	Laboratory Assistant Clinical Practice	LABS 1000 LABS 1010L LABS 1020L LABS 1030L LABS 1040L LABS 1050L	4

Grand total of Certificate in Laboratory Assistant with Electronic Processing: 1,170 hours y 37 credits

** The student does not necessarily have to follow the suggested course order, but the order helps them complete their degree in the stipulated time. The student must be aware of taking the courses that have prerequisites in an order that allows them to continue taking the other courses without problems. Courses without prerequisites have no specific order. The student can register for them in the term that they are offered.

MINIMUM GRADING POLICY

Students enrolled in Laboratory Assistant with Electronic Processing must obtain at least a grade of C (70%) or higher to pass all courses in the program, except the practice courses that must be pass with B (80%) or higher.

The following courses must be passed with a grade of C or higher:

MICR 1000L MEDT 1000 LABS 1000L LABS 1010L LABS 1020L LABS 1030L
LABS 1040L LABS 1050L LABS 1060

The following courses must be passed with a grade of B or higher:

LABS 1070P

ACADEMIC PROGRAMS COURSES DESCRIPTIONS

GENERAL EDUCATION

ENGL 1010 - Basic English I

In this course, the students will demonstrate proper use of the English language with a primary focus on syntax, grammar, punctuation, and spelling. Students will distinguish verb tenses in sentences and paragraphs. They will also produce clear, well-developed and well-organized sentences, messages, paragraphs, and short compositions using correct capitalization, punctuation and syntax. Students will also argue about various contexts, including reading and media materials on the Internet, short stories, and library resources.

3 credits

Prerequisite: None

Corequisite: None

ENGL 1020 - Basic English II

In this course students will enhance their listening, reading, writing, and speaking skills in English as a second language. Students will demonstrate an understanding of grammar elements, literature, and the development of writing, reading, listening, and speaking skills. Also, they will apply critical thinking skills in reading and writing.

3 credits

Prerequisite: ENGL 1010 Corequisite:

None

ESPA 1007 Basic Spanish

In this course, students will produce oral presentations and written assignments using the grammatical rules of the Spanish language. They will also analyze texts of varying levels of complexity. Likewise, students will write assignments with varied vocabulary, correct syntax, and adequate spelling.

2 credits

Prerequisite: None

Corequisite: None

HUMA 1010 - Humanities I

In this course, students will analyze the fundamental aspects of human evolution and the historical development of social, economic, political, religious, and cultural movements in the civilizations that influenced the Western world. Students will also evaluate the importance of the humanistic legacy and the vital values that led to the evolution and development of Western civilization. Furthermore, students will value the historical processes that shaped the legacy of the ancient and medieval Western civilization which are reflected in today's humanity.

3 credits

Prerequisite: None

Corequisite: None

70

INGL 1109 - Basic English I

In this course, students will demonstrate command of the basic rules of English grammar and their usage both orally (listening and speaking) and in writing (reading and writing). They will compose sentences by using the standard conventions of the English language. In addition, students will reinforce their vocabulary knowledge for a better understanding of English in everyday situations.

2 credits

Prerequisite: None

Corequisite: None

ITTE 1031L - Computer Literacy and Laboratory

In this course, students will analyze the usefulness of email, institutional databases, and computerized systems in their learning process, considering aspects of academic integrity. In addition, they will examine fundamental concepts related to internet services, security, privacy, and ethics, as well as core aspects of assistive technology. Furthermore, they will demonstrate technological competencies in various application programs, cloud storage, and web pages.

3 credits

Prerequisite: None

Corequisite: None

LITE 1001 Computer Literacy

In this course, students will analyze the utility of productivity tools, databases, and computerized systems in their learning process. They will distinguish basic concepts of technology, the information processing cycle, its devices, and the function of computer programs. In addition, they will examine basic aspects related to the services, security, privacy, and ethics of the internet, as well as to assistive technology. Furthermore, they will demonstrate technological competencies by using digital tools for creating documents in word, presentation, and electronic spreadsheet processors.

2 credits

Prerequisite: None

Corequisite: None

MATH 1010 - Basic Mathematics

In this course, students will apply the characteristics of the set of real numbers and their uses in everyday life, as well as the concepts of ratio, proportion, and percentage. They will also solve everyday situations by applying the concepts of linear equations and inequalities in one variable and polynomials. In addition, students will use measurement concepts and conversion factors in professional and everyday problem solving.

3 credits

Prerequisite: None

Corequisite: None

PSYC 2510 Psychology

In this course, students will analyze the historical development and basic concepts of psychological studies on human behavior. Additionally, they will explain the situations that exert significant influence on psychosocial behavior. Likewise, they will apply concepts and theories of psychology to modern day life situations and in their professional relationships. They will analyze the individual in ways integral to personal relationships, cultural context, and social conflicts.

3 credits

Prerequisite: None

Corequisite: None

SEMI 1005 Academic Adaptation and Professional Life Seminar

In this course, students will develop essential skills for their training and transition from university life to their entry into the workforce. They will participate in learning experiences aimed at enhancing self-knowledge and exploring the possibilities of university studies and career paths. In addition, they will explain the competencies sought by employers with the support of available resources. Likewise, they will establish successful strategies for making progress in their academic program and for planning and entering the job market.

1 credit

Prerequisite: None

Corequisite: None

SEMI 1010 - Transition to University Life and Professional Training Seminar

In this course, students will develop essential skills for their training and transition from university life to their entry into the workforce. They will participate in learning experiences aimed at enhancing self-knowledge and exploring the possibilities of university studies and career paths. In addition, they will explain the competencies sought by employers with the support of available resources. Likewise, they will establish successful strategies for making progress in their academic program and for planning and entering the job market.

1 credit

Prerequisite: None

Corequisite: None

SOSC 1010 - Social Sciences I

In this course, students will examine the fundamental concepts of the social sciences, starting with the evolution and development of society. They will analyze issues related to various disciplines that comprise the social sciences, such as anthropology, sociology, and psychology. They will also evaluate social issues by applying critical judgment to current social issues. This course requires 10 hours of participation in community service-learning activities.

3 credits

Prerequisite: None

Corequisite: None

SPAN 1010 - Basic Spanish I

In this course, students will examine the basic spelling, grammar, and syntax rules when expressing themselves orally or in writing. Students will analyze a variety of literary genres in a critical and reflexive way. They will also apply the linguistic rules that govern oral and written communication.

3 credits

Prerequisite: None

Corequisite: None

SPAN 1020 - Basic Spanish II

In this course, students will critically analyze different literary genres such as poetry, theater, and novels. They will describe and illustrate their evolution, development, and characteristics. Furthermore, they will analyze the elements that differentiate investigative journalism from in-depth journalism. Students will also recognize the importance of public speaking and discourse as resources for effective communication. In addition, they will write and present a speech.

3 credits

Prerequisite: SPAN 1010

Corequisite: None

CORE AND CONCENTRATION COURSES

ANAT 2040 Anatomy and Physiology of the Heart

In this course, students will recognize the cardiac anatomical structures and their functioning in the human heart. They will apply appropriate cardiac terminology. They will identify the proper positioning of cardiac structures and the anatomical relationship of adjacent structures.

2 credits

Prerequisites: BIOL 3030, BIOL 2030L

BISC 1010 - Biological Sciences

In this course, students will analyze the fundamental concepts and characteristics that distinguish living organisms, their evolutionary processes, and their interaction with other organisms and the environment. Furthermore, they will distinguish the essential aspects for the functioning and development of life. Students will explain the reproductive aspects of the cell and its genetic role. They will also examine different ecosystems and the effect caused by human intervention on the environment.

3 credits

Prerequisite: None

Corequisite: None

BIOL 1000 Fundamentals of Human Anatomy and Physiology

In this course, students will identify cells, main structures, and systems of the human body. They will analyze the functions of organelles in eukaryotic cells, as well as the primary structures and systems of the human body. Students will differentiate common pathologies of the body's systems, the benefits of key vitamins, and the health effects of vitamin deficiencies or excesses.

2 credits

Prerequisite: None

Corequisite: None

BIOL 1010 Introduction to Biology

In this course, students will examine the fundamental concepts of biology, the characteristics that distinguish living organisms, and their evolutionary processes. They will analyze the cell as the fundamental unit of living organisms, as well as its metabolic and energetic cellular processes. They will also relate the processes of cell division to human genetics. In addition, they will evaluate different ecosystems and the effect of human intervention on the environment.

3 credits

Prerequisite: None

Corequisite: None

BIOL 2010 Anatomy and Physiology I

In this course, students will discuss the basic concepts of human anatomy and physiology. They will analyze the levels of organization, emphasizing the structure and function of a cell, such as the four basic tissues and the integumentary, skeletal, muscular, and nervous system of the human body. Additionally, they will examine the most common pathologies in these systems.

3 credits

Prerequisite: None

Corequisite: None

BIOL 2020 Anatomy and Physiology II

In this course, students will analyze the structure and function of the endocrine, cardiovascular, lymphatic, respiratory, digestive, urinary, and reproductive systems. At the same time, they will discuss the function of the organs composing these systems. Additionally, they will examine the most common pathologies in these systems.

BIOL 2030 Sectional Anatomy

In this course, students will explain the functioning of the human body systems and the organs that comprise them. They will also differentiate the levels of structural organization in the human body and how they interrelate. Additionally, they will interpret the basic concepts related to image acquisition using computed tomography, magnetic resonance imaging, and ultrasound.

3 credits

Prerequisite: None

Corequisite: BIOL 2030L

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BIOL 2030L Sectional Anatomy Laboratory

In this course, students will identify the function of the human body's systems and organs. Additionally, they will analyze images from computerized tomography, magnetic resonance, and ultrasound. Likewise, they will explain the relationship between the structures localized in the brain, thorax, abdomen, and pelvis.

3 credits

Prerequisite: None

Corequisite: BIOL 2030

BUAD 2250 Human Relations

This course focuses on how individuals work within organizations and how they can be motivated to collaborate more harmoniously. It covers the study of organizational behavioral models, communication, employee stressors, discipline, equal opportunities, social ethics, sexual harassment, and self-affirmation.

3 credits

Prerequisite: None

Corequisite: None

BUMA 1050 Introduction to Entrepreneurship

In this course, students will analyze the general aspects, techniques, and basic skills needed to develop a company. They will justify the planning and development process of a business plan. Additionally, they will explain and develop an ethical and social awareness that will enable them to perform well in the business world.

3 credits

Prerequisite: None

Corequisite: None

CISE 1000L Fundamentals of Cybersecurity and Laboratory

In this course, students will examine concepts of security and privacy in digital environments. They will also identify the principles of information security and risk management. Additionally, they will analyze cyber threats and types of cyberattacks, as well as an organization's needs for the evaluation and efficient management of security policies according to regulatory and normative aspects.

3 credits

Prerequisite: None

Corequisite: None

COMP 1000L Components of Personal Computers and Laboratory

In this course, students will distinguish the components that make up computers and other technological devices, as well as the fundamentals of their operation. Additionally, they will examine different types of processors, their architecture, characteristics, and role in the operation of a computer system. They will also analyze computer components and technological devices to make informed decisions in the processes of selecting, assembling, and maintaining customized computer systems and making improvements to existing devices.

3 credits

Prerequisite: None

Corequisite: None

COMP 1050L Installation of Servers and Laboratory

In this course, students will distinguish concepts and processes related to the installation of servers. They will also examine the roles, features and versions of server operating systems, as well as server management and interfaces. In addition, they will apply theory through practical exercises of server installation, hardware components, and different versions of server operating systems.

3 credits

Prerequisites: COMP 1000L, INTE 1100L

Corequisite: None

COMP 2000L Diagnosis and Repair of Computers and Laboratory I

In this course, students will apply techniques and methodologies to identify common hardware issues in electronic devices. Students will also develop strategies for the solution of these problems. Likewise, they will practice diagnosing and repairing computers through real-life situation simulations.

3 credits

Prerequisite: COMP 1000L

Corequisite: None

COMP 2010L Diagnosis and Repair of Computers and Laboratory II

In this course, students will analyze common software and network issues. Likewise, they will apply techniques and strategies for identifying and resolving incidents. They will also practice diagnosing and repairing computers through real-life situation simulations.

3 credits

Prerequisite: COMP 2000L

Corequisite: None

COMP 2070 CompTIA A+ Certification Exam Review

In this course, students will review specific information about the work of information system professionals in an organization. They will apply processes for installing, configuring, diagnosing, maintaining, and troubleshooting computer systems. In addition, they will employ IT professional skills to develop plans, assess system status, and prepare documentation.

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3 credits

Prerequisite: COMP 2010L

Corequisite: None

COMP 2080L Fundamentals of Cloud Computing and Laboratory

In this course, students will apply concepts and principles of cloud computing. Likewise, they will demonstrate competence in understanding cloud service models, as well as in the implementation and management of infrastructures in the cloud. They will also employ techniques for designing and deploying software in cloud environments.

3 credits

Prerequisites: COMP 1050L, INTE 2440L

Corequisite: None

INTE 1100L Open-Source Operating Systems and Laboratory

In this course, students will distinguish the fundamentals of open-source operating systems' functioning. They will also integrate the theoretical and practical aspects of Linux operating systems. In addition, students will demonstrate their skills in the use, management, and configuration of open-source operating systems.

3 credits

Prerequisite: None

Corequisite: None

INTE 1200L - Fundamentals of Operating Systems and Laboratory

In this course, students will examine the processes for configuring, administering, and installing operating systems, as well as the fundamentals for operating systems certification. They will apply procedures for creating operating system images as well as network hardware and software configurations. Students will also perform system information backups and restoration. In addition, they will employ techniques for installing and configuring operating systems.

3 credits

Prerequisite: None

Corequisite: None

INTE 2440L Network Fundamentals and Laboratory

In this course, students will recognize the basic concepts of telecommunication networks. Likewise, they will identify the essential components of a network including devices such as routers, switches, hubs, and wireless access points. Students will also distinguish the characteristics and functions of each network component, and their use in establishing and maintaining connectivity. Similarly, they will analyze the most utilized reference models in computer networks, their importance today, and the benefits that they offer in terms of communication and collaboration.

3 credits

Prerequisites: INTE 1100L

Corequisite: None

INTE 2470L User Support Technician and Laboratory

In this course, students will learn about the user support process as well as the techniques and skills necessary for providing support and assistance to technology users in various environments. Likewise, they will execute techniques and strategies for identifying and resolving common hardware, software, and network issues. In addition, students will develop communication and interpersonal skills to handle difficult situations and manage user expectations, necessary for their entry into and performance in the technical support services job field.

3 credits

Prerequisite: COMP 1000L

Corequisite: None

ITSA 2000L Introduction to Back-End Development and Laboratory

In this course, students will develop skills in creating dynamic applications and websites from the server-side (back-end). They will apply techniques for database management and the development of Application Programming Interfaces (APIs) using various runtime environments and database management programs. In addition, they will determine appropriate security processes during the development of dynamic applications and websites.

3 credits

Prerequisite: WADE 2050L

Corequisite: None

LABS 1000L Introduction to the Laboratory Assistant Profession and Laboratory

In this course, students will analyze the functions and roles of a laboratory assistant, along with the ethical responsibilities and duties required to practice the profession in a clinical setting. They will evaluate the areas and departments within a laboratory, as well as the characteristics and functions of relevant equipment and materials. Additionally, they will discuss the laws and regulations governing the profession and relevant to the operation of clinical laboratories, as established by regulatory agencies.

3 credits

Prerequisite: None

Corequisite: None

LABS 1010L General Science Compendium and Laboratory

In this course, students will integrate basic knowledge of biology, chemistry, and physics to understand organic processes at the atomic, molecular, cellular, and tissue levels as analyzed in clinical laboratory procedures. They will justify the importance of the interactions between biochemical, physical, and inorganic factors in the study of processes that sustain cellular life. Furthermore, they will evaluate the behavior of particles in the three states of matter, focusing on the properties of liquids, gas laws, thermodynamics, and motion, and their applications in a clinical laboratory setting.

2 credits

Prerequisite: None

Corequisite: None

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LABS 1020L General Data Entry and Billing Processes for Laboratory Services

In this course, students will distinguish between different healthcare plans, their coverage, and fees for laboratory services. They will interpret medical orders to assign correct codes in laboratory service billing. Additionally, they will apply the regulations established by the HIPAA law to the provision of laboratory services. Students will demonstrate basic skills for data entry, information management, and the billing process of clinical laboratory services using the SAIL information system and others.

3 credits

Prerequisite: MEDT 1000

Corequisite: None

LABS 1030L Handling of Samples in Hematology, Chemistry, Urinalysis, Coagulation, Serology, Immunology, and Molecular Biology, and Laboratory

In this course, students will apply processes to assist in the pre-analytical phase of samples, such as receipt, registration, preparation, packaging, transportation, and preservation or storage of specimens. They will evaluate the different types of specimens suitable for each test and the qualities required for their analysis. They will analyze rejection criteria related to the absence of information on the medical order, incorrect specimen labeling, sample quality, and other factors established by the laboratory. Furthermore, they will employ the specific procedures for assistance in the management of each type of sample.

4 credits

Prerequisite: LABS 1000L

Corequisite: None

LABS 1040L Handling of Samples and Blood Components in Blood Banks, and Laboratory

In this course, students will apply processes to assist in the pre-analytical phase of blood bank samples, such as receipt, registration, preparation, packaging, transportation, and preservation or storage of specimens. They will identify the different types of specimens suitable for each test. They will recognize the qualities that make a specimen suitable for analysis. They will apply rejection criteria related to the absence of information on the medical order, incorrect specimen labeling, sample quality, and others established by the laboratory. They will employ specific procedures for assistance in handling each type of sample. They will classify units based on their packaging and temperature. Students will explain the process for receiving, weighing, and centrifuging blood components. They will apply the criteria for separating and storing blood components according to their source and temperature.

2 credits

Prerequisite: LABS 1000L

Corequisite: None

LABS 1050L Handling of Pathological Samples and Laboratory

In this course, students will apply processes to assist in the receipt, registration, preparation, transportation, and storage of pathological samples (surgical specimens) with an emphasis on maintaining the integrity of the specimen. They will develop techniques for proper handling of samples and laboratory equipment.

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3 credits

Prerequisite: BIOL 1000

Corequisite: None

LABS 1060 Integrative Seminar: Laboratory Assistant

In this course, students will apply the necessary skills to perform special procedures according to their role as laboratory assistants. They will reflect on their experiences in practice and the acquisition of knowledge in the different workplace environments in hospitals. They will prepare a professional portfolio, showcasing certifications such as OSHA, HIPAA, and CPR, among others.

2 credits

Prerequisite: LABS1000L, LABS1010L, LABS1020L, LABS1030L, LABS1040L, LABS1050L

Corequisite: None

LABS 1070P Laboratory Assistant Clinical Practice

In this course, students will employ universal precautions, laws, and biosafety protocols to ensure a safe working environment. They will relate the information in medical orders with the necessary samples and tests, along with administrative billing processes. Moreover, they will analyze biological samples using industry-standard procedures and the appropriate techniques, instruments, and technological equipment to obtain reliable results.

4 credits

Prerequisite: LABS1000L, LABS1010L, LABS1020L, LABS1030L, LABS1040L, LABS1050L

Corequisite: None

MATH 2050 - Applied Mathematics

In this course, students will analyze different problems and situations found in information systems using set theory, propositional logic, and Boolean algebra as a basis. Students will solve combinatorial problems and arithmetic sequences. Furthermore, they will examine various abstract structures using graphs and trees for their explanation and implementation.

3 credits

Prerequisite: None

Corequisite: None

MEDT 1000 Medical Terminology in the Laboratory

In this course, students will identify the concepts of roots, prefixes, suffixes, and etymology in medical terminology. They will analyze medical terms used to designate the systems that make up the human body. They will distinguish common tests used for diagnosis and follow-up after treatment, the medications that interfere with these tests, and the special instructions for each one. They will interpret medical orders by applying medical terminology.

2 credits

Prerequisite: BIOL 1000

Corequisite: None

MICR 1000L Handling of Samples and Basic Microbiology and Parasitology Concepts, and Laboratory

In this course, students will examine the basic concepts of microbiology and parasitology, the classifications and characteristics of common etiological agents, and the transmission methods of high-risk infectious diseases. They will apply sample handling procedures in the pre-analytical phase, including receipt, registration, preparation, packaging, transportation, preservation or storage of specimens, culture media, and excreta emulsions. Students will identify different types of specimens suitable for each test and the appropriate qualities for their analysis. They will evaluate rejection criteria related to the absence of information on the medical order, incorrect specimen labeling, sample quality, and other criteria established by the laboratory.

3 credits

Prerequisite: LABS 1000L

Corequisite: None

MESE 1010 Medical Terminology

In this course, students will evaluate the composition, structure and derivation of words that are part of medical terminology. They will analyze the meaning of medical term segments and their relationship with anatomy, health conditions, and procedures or treatments performed on patients. Likewise, they will apply medical terminology used in various branches of healthcare, such as physiology and pathology.

3 credits

Prerequisite: None

OPTI 2000 Anatomy and Physiology of the Eye

In this course, students will examine the structure and functions of the eye and the visual apparatus. They will analyze the shape and spatial arrangement of the cells and tissues of the eyeball and the human visual system through image observation. They will identify the normal structure of the eyeball and the human visual system, as well as related abnormalities.

3 credits

Prerequisite: BIOL 1010

Corequisite: None

OPTI 2010 Principles of Physical Optics

In this course, students will demonstrate knowledge and practical skills for fitting, handling, and maintaining various types of specialized contact lenses. They will also examine the different types of existing contact lenses. They will utilize advanced techniques for fitting and caring for various types of contact lenses. Moreover, they will employ fitting and observation techniques with specialized instruments.

3 credits

Prerequisite: MATH 1010, OPTI 2000, PHYS 1020

Corequisite: None

OPTI 2020 Ophthalmic Materials I

In this course, students will identify the materials and characteristics of various types of ophthalmic lenses. They will explain the medical conditions that affect how light rays are focused within the eye. Furthermore, they will evaluate the power and curvature, as well as the prismatic power, of ophthalmic lenses prescribed for optical use.

3 credits

Prerequisite: OPTI 2000, PHYS 1020

Corequisite: OPTI 2020L

OPTI 2020L Ophthalmic Materials I: Laboratory

In this course, students will apply the fundamental principles of ophthalmic lenses fabrication. They will explain personal protection guidelines and the safety parameters for working in the laboratory. They will employ the skills they have acquired in fabricating ophthalmic lenses.

1 credit

Prerequisite: OPTI 2000, PHYS 1020

Corequisite: OPTI 2020

OPTI 2030 Contact Lenses

In this course, students will analyze the historical and theoretical foundations of the invention and development of contact lenses. They will examine advanced techniques for fitting, designing, and caring for various types of contact lenses. Moreover, they will apply fitting and observation techniques with specialized instruments.

3 credits

Prerequisite: OPTI 2000, OPTI 2010, OPTI 2020, OPTI 2020L, PHYS 1020

Corequisite: OPTI 2030L

OPTI 2030L Contact Lenses: Laboratory

In this course, students will demonstrate knowledge and practical skills for fitting, handling, and maintaining various types of specialized contact lenses. They will also examine the different types of existing contact lenses. They will utilize advanced techniques for fitting and caring for various types of contact lenses. Moreover, they will employ fitting and observation techniques with specialized instruments.

2 credits

Prerequisite: OPTI 2000, OPTI 2010, OPTI 2020, OPTI 2020L, PHYS 1020

Corequisite: OPTI 2030

OPTI 2040 Ophthalmic Materials II

In this course, students will analyze the processes for mounting low and high-power lenses, single vision lenses, multifocal lenses, safety lenses, and specialty lenses. They will employ techniques for inspecting, handling, and identifying various materials used in lens fabrication. They will value the importance of lens position, tilt, and rotation in the frame. They will examine the proper handling and maintenance of equipment, machinery, instruments, and related optical devices.

2 credits

Prerequisite: OPTI 2000, OPTI 2010, OPTI 2020, OPTI 2020L, PHYS 1020

Corequisite: OPTI 2040L

OPTI 2040L Ophthalmic Materials II: Laboratory

In this course, students will apply the techniques used in the fabrication of ophthalmic lenses. They will integrate specialized materials, single-vision, bifocal, and multifocal lenses, along with finishing techniques. They will demonstrate lens inspection practices, optical calculations, frame repair, and the use and maintenance of ophthalmic equipment. They will evaluate processes to ensure precision, accuracy in following prescription specifications, safety, and careful handling of materials, equipment, instruments, and machinery in the ophthalmic laboratory.

2 credits

Prerequisite: OPTI 2000, OPTI 2010, OPTI 2020, OPTI 2020L, PHYS 1020

Corequisite: OPTI 2040

OPTI 2050L Medical Billing for Optical Sciences and Laboratory

In this course, students will analyze basic concepts of optometry, documentation terminology, and the revenue cycle in the field of optical sciences. They will apply procedures for medical billing of healthcare services provided to patients. Students will demonstrate knowledge in diagnostic coding and procedures for billing and auditing. They will also assess the importance of methods for tracking claims and appeals according to medical coverage determinations and policies in the billing process. This course includes the use of a simulator.

3 credits

Prerequisites: ITTE 1031L, OPTI 2000, OPTI 2060

Corequisite: None

OPTI 2100 Laws Regulating the Optic Practice

In this course, students will analyze the laws that regulate the profession of licensed opticians. They will determine the differences between practicing in the field of optics and other visual health professionals. They will interpret ethical issues related to optics practice involving patients, colleagues, other related professionals, and the broader community.

2 credits

Prerequisite: None

Corequisite: None

OPTI 2110 Prescription Dispensing I

In this course, students will examine the types and components of eyeglass frames, facial measurements, and alignment. They will analyze the processes of delivering, fitting, adjusting, maintaining, and repairing eyeglass frames, single-vision, bifocal, and multifocal lenses, and the handling and maintenance of contact lenses. They will justify recommendations for ophthalmic treatments and accessories and the importance of developing the optician-patient relationship.

3 credits

Prerequisites: BIOL 1010, OPTI 2000, OPTI 2010, OPTI 2020, OPTI 2020L OPTI 2040, OPTI 2040L, OPTI 2030, OPTI 2030L, OPTI 2040, OPTI 2040L, OPTI 2150L

Corequisite: OPTI 2110L

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OPTI 2110L Prescription Dispensing I: Laboratory

In this course, students will apply concepts related to the principles of professional optics in their laboratory experiences. They will examine the types and components of eyeglass frames, facial measurements, and alignment. They will employ procedures for delivering, fitting, adjusting, maintaining, and repairing eyeglass frames, single-vision, bifocal, and multifocal lenses, and the handling and maintenance of contact lenses. They will demonstrate procedures for recommending ophthalmic treatments and accessories and developing the optician-patient relationship.

2 credits

Prerequisite: BIOL 1010, OPTI 2000, OPTI 2010, OPTI 2020, OPTI 2020L, OPTI 2040, OPTI 2040L, OPTI 2030, OPTI 2030L, OPTI 2040, OPTI 2040L, OPTI 2150L

Corequisite: OPTI 2110

OPTI 2120P Clinical Practice and Seminar

In this course, students will integrate the techniques and knowledge acquired through their coursework into their clinical practice experience. They will apply procedures for managing and performing administrative and office-related tasks, and those related to handling contact lenses and laboratory equipment while using correct terminology. They will demonstrate skills in providing guidance and assistance to patients in an optical office.

9 credits (45 hours of theory and 360 lab hours)

Prerequisites: OPTI 2000, OPTI 2010, OPTI 2020, OPTI 2020L, OPTI 2030, OPTI 2030L, OPTI 2040, OPTI 2040L, OPTI 2050L, OPTI 2060, OPTI 2100, OPTI 2110, OPTI 2150L

Corequisite: None

OPTI 2150L Pre-Internship Laboratory in Frame Sizing

In this course, students will demonstrate proficiency in performing the functions and operations required in an optical laboratory. They will apply knowledge in the use and management of equipment to make lenses. In addition, they will interpret ophthalmic prescriptions for the production of lenses.

2 credits

Prerequisite: BIOL 1010, OPTI 2000, OPTI 2010, OPTI 2020, OPTI 2020L, OPTI 2040, OPTI 2040L, PHYS 1020

Corequisite: None

OPTI 2160 Prescription Dispensing II

In this course, students will examine various types of frames and their components. They will determine factors that affect an ophthalmic prescription, such as vertex distance, lens rotations and tilts, and magnification. They will analyze procedures for designing and applying multifocal segments, as well as finishing operations, basic fitting techniques, and interpreting complex prescriptions. They will assess the importance of dedication to service and professionalism in filling prescriptions.

3 credits

Prerequisite: OPTI 2110, OPTI 2110L

Corequisite: None

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PHSC 1020 Introduction to Physics

In this course, students will analyze the importance of physics concepts, the use of mathematical formulas, and measurement systems in the health field. They will examine different types of motion, Newton's laws, and the relationship between work and energy. Additionally, students will evaluate the behavior of particles in the three states of matter, the properties of liquids, and the main laws of gases. They will also explain physical phenomena such as acoustics, radiation, and electricity in their future professional field.

3 credits (45 hours of theory)

Prerequisite: MATH 1010

Corequisite: None

PHSC 2030 Ultrasound Physics and Instrumentation I

In this course, students will examine the definitions, foundations, concepts, and mathematical operations related to ultrasound physics. They will explain the classifications of sound, the anatomy of the sound source, the propagation of sound, its intensity, as well as the basic components of the ultrasound transducer, its shapes, characteristics, and diagnostic ultrasound modalities. They will identify ultrasound instrumentation, beam formation, image processing, and the monitor.

3 credits

Prerequisite: MATH 1010

PHSC 2040 Ultrasound Physics and Instrumentation II

In this course, students will examine the basic principles of hemodynamics and Doppler physics. They will explain the components of spectral imaging and flow patterns. They will analyze the arteriovenous Doppler spectrum. They will differentiate artifacts and their appropriate use for improving ultrasound images. They will discuss intensities, thermal and biological effects, and the ALARA principle.

3 credits

Prerequisite: PHSC 2030

PHYS 1020 Introduction to Physics

In this course, students will analyze the importance of physics concepts, the use of mathematical formulas, and measurement systems in the health field. They will examine different types of motion, Newton's laws, and the relationship between work and energy. Additionally, students will evaluate the behavior of particles in the three states of matter, the properties of liquids, and the main laws of gases. They will also explain physical phenomena such as acoustics, radiation, and electricity in their future professional field.

3 credits

Prerequisite: None

Corequisite: None

PROG 1035L Introduction to Computer Programming Logic and Laboratory

In this course, students will discuss the fundamental concepts of underlying logical principles in computer systems. Likewise, they will develop skills for identifying logical patterns, problem-solving through logical reasoning, and constructing algorithms. Students will also demonstrate skills in designing and evaluating logic circuits, as well as knowledge of their operation and applications. Additionally, they will apply skills in developing and optimizing computer systems.

3 credits

Prerequisite: None

Corequisite: None

PROG 2400L Scripting Languages and Laboratory

In this course, students will develop skills in script writing and execution, task automation and data manipulation. Additionally, they will develop skills in the use of scripting languages for resolving incidents in various contexts in a business environment.

3 credits

Prerequisite: PROG 1035L

Corequisite: None

RADI 1010 Introduction to Radiology

In this course, students will examine the origin and development of radiological technology. Likewise, they will explain the radiologist professional roles and their interactions with patients, as well as the ethical and legal aspects applicable to the discipline. Additionally, they will discuss aspects related to radiological protection, and patient management and care.

2 credits

Prerequisite: None

Corequisite: None

RADI 2009 Radiological Physics

In this course, students will identify physics concepts related to radiation, including electricity, magnetism, and electromagnetism, as well as the associated laws. Likewise, they will examine the relevant terminology and applications of the laws of physics. Furthermore, they will analyze the mathematical operations necessary to understand radiology.

3 credits

Prerequisite: PHYS 1020

Corequisite: None

RADI 2010 Patient Care and Management

In this course, students will determine the applicability of appropriate techniques and procedures before, during, and after radiological interventions, as well as the importance of fostering trust and safety through effective communication with patients. They will justify the integration of infection control techniques and aseptic principles in patient management and care across various clinical settings. Moreover, they will apply techniques and procedures for taking vital signs and for identifying and managing emergencies during radiological interventions.

3 credits

Prerequisite: None

Corequisite: None

RADI 2020 Radiological Positioning and Related Anatomy I

In this course, students will analyze the principles and general rules of patient positioning for radiographic imaging. They will also examine techniques for performing radiological procedures. Furthermore, they will identify pathologies related to the anatomical areas being radiographed.

2 credits

Prerequisites: BIOL 2020, RADI 1010, RADI 2010

Corequisite: RADI 2020L

RADI 2020L Radiographic Positioning and Related Anatomy I: Laboratory

In this course, students will apply the principles and general rules of patient positioning for radiographic imaging. Similarly, they will employ the appropriate protocols and techniques for performing radiological procedures of the chest, abdomen, pelvis, and hip. Additionally, they will describe pathologies related to the anatomical areas being radiographed.

1 credit

Prerequisites: BIOL 2020, RADI 1010, RADI 2010

Corequisite: RADI 2020

RADI 2030 Knowing Imaging Modalities and Equipment

In this course, students will distinguish the diagnostic modalities and radiology equipment used in medical treatment within a radiology department. They will also examine the new modalities employed in clinical diagnosis, such as computed tomography, bone densitometry, magnetic resonance imaging, radiotherapy, nuclear medicine, fluoroscopy, ultrasound, and mammography. Additionally, they will contrast conventional radiology with digital radiology in terms of utility, cost, and application.

2 credits

Prerequisite: RADI 1010

Corequisite: None

RADI 2040L Integrative Seminar and Laboratory

In this course, students will distinguish the components of radiographic equipment and the radiographic room. They will also apply terminology related to positioning and the principles of radiographic imaging. Additionally, they will assess the role of the radiologic technologist in various areas of a clinical center and the importance of the professional code of ethics.

2 credits

Prerequisites: RADI 1010, MESE 1010

Corequisite: None

RADI 2050 Principles of Radiographic Exposure

In this course, students will examine the operation of the X-ray machine and the factors that affect it. They will also explain the interaction of X-rays with matter, differential absorption, contrast examination, and exponential attenuation. Additionally, they will analyze radiographic techniques, X-ray emission, factors affecting the quantity and quality of emission, production and control of scattered radiation, image quality factors, and radiographic viewing.

3 credits

Prerequisites: RADI 1010, RADI 2009 Corequisite:

None

RADI 2060 Principles of Radiobiology and Radiographical Protection

In this course, students will examine the fundamental principles involved in the interaction of ionizing radiation with biological tissues. They will also analyze the short-term and long-term effects of radiation on humans and the protective mechanisms for the safe use of radiation in diagnostic and treatment studies on patients. Additionally, they will distinguish various methods of radiological protection for occupational staff, patients, and the general public, as well as special precautions for pregnant women.

2 credits

Prerequisite: RADI 2009

Corequisite: None

RADI 2070 Radiographic Positioning and Related Anatomy II

In this course, students will analyze the principles and general rules of patient positioning for radiographic scanning, as well as the techniques used for radiographic procedures. They will also identify the components of the lower extremity and upper extremity of the body, along with their respective joints. Additionally, they will examine pathologies related to the anatomical areas being radiographed. They will also apply knowledge related to patient assessment, medical orders, radiological protection, exposure factors, and radiographic quality.

2 credits

Prerequisites: RADI 2020, RADI 2020L

Corequisite: RADI 2070L

RADI 2070L Radiographic Positioning and Related Anatomy II: Laboratory

In this course, students will distinguish the principles, concepts, and general rules of patient positioning for radiographic imaging. They will also analyze a medical order and the clinical history of a patient prior to taking radiographic images. Furthermore, they will apply procedures and techniques for radiographic imaging of the human body's extremities.

1 credit

Prerequisites: RADI 2020, RADI 2020L

Corequisite: RADI 2070

RADI 2080P Clinical Internship I

In this course, students will demonstrate the skills and competencies required for the role of a radiologic technologist. They will employ their skills to perform radiologic studies in real-world settings. They will also apply the knowledge acquired in previous courses to take radiographic images of the chest, abdomen, pelvis, and hip. Additionally, they will identify regulations and ethical and legal aspects related to the field of radiology.

3 credits

Prerequisites: BIOL 2020, RADI 2010, RADI 2020L, RADI 2040L

Corequisite: None

RADI 2100 Radiographic Positioning and Related Anatomy III

In this course, students will analyze the principles and general rules of patient positioning for radiographic imaging. They will also examine the techniques used for radiographic procedures of the skull, facial bones, and the entire spine. They will also identify the signs of pathologies related to the anatomical areas being radiographed. Furthermore, they will apply knowledge related to patient assessment, reading medical orders, radiological protection, exposure factor identification, and radiographic quality. (This course includes the use of a simulator.)

2 credits

Prerequisites: RADI 2070, RADI 2070L

Corequisite: RADI 2100L

RADI 2100L Radiographic Positioning and Related Anatomy III: Laboratory

In this course, students will apply the principles and general rules of patient positioning for radiographic imaging. They will employ the techniques used for radiographic procedures of the skull, facial bones, and the entire spine. Additionally, they will describe pathologies related to the anatomical areas being radiographed. Furthermore, they will explain processes related to patient assessment, reading medical orders, radiological protection, exposure factor identification, and radiographic quality. (This course includes the use of a simulator.)

1 credit

Prerequisites: RADI 2070, RADI 2070L Corequisite:
RADI 2100

RADI 2110P Clinical Internship II

In this course, students will apply their knowledge of capturing radiographic images of the lower extremity and upper extremity of the body in various clinical scenarios. They will also select the necessary equipment for radiographic studies based on the interpretation of medical orders.

Furthermore, they will employ anatomical markers correctly according to radiographic positioning protocols, considering the applicable regulations and ethical and legal aspects in the field of radiology.

3 credits

Prerequisites: RADI 2050, RADI 2060, RADI 2070, RADI 2070L, RADI 2080P

Corequisite: None

RADI 2120 Contrast Media

In this course, students will analyze the various contrast media used for the visualization of radiographic structures. They will also examine the composition of contrast media and the requirements for their administration, as well as contraindications and potential adverse reactions. Additionally, they will describe their role in the preparation and handling of contrast media in accordance with the ethical and legal aspects associated with the profession.

2 credits

Prerequisite: RADI 1010, RADI 2010, BIOL 2020, MESE 1010

Corequisite: None

RADI 2130 Radiological Pathology

In this course, students will examine diseases and injuries that commonly affect the body and their relationship to visible changes in the radiographic image. They will also analyze the epidemiology and natural history of the diseases studied. Additionally, they will identify pathologies diagnosable through X-ray applications and the techniques used for their detection.

2 credits

Prerequisites: BIOL 2020, RADI 2170 Corequisite:

None

RADI 2140 Radiographic Positioning and Related Anatomy IV

In this course, students will examine the principles and general rules of patient positioning for special radiographic imaging studies. They will also differentiate the techniques used for various radiological procedures of the upper gastrointestinal, lower gastrointestinal, urinary, neurological, and skeletal systems aimed at identifying pathologies. Additionally, they will apply knowledge related to patient assessment, reading medical orders, radiological protection, exposure factors, and radiographic quality.

2 credits

Prerequisites: RADI 2100, RADI 2100L, RADI 2200

Corequisite: RADI 2140L

RADI 2140L Radiographic Positioning and Related Anatomy IV: Laboratory

In this course, students will apply the principles and general rules of patient positioning for radiographic imaging. They will employ protocols and techniques for conducting radiological procedures of the upper gastrointestinal, lower gastrointestinal, urinary, neurological, and skeletal systems. Additionally, they will explain the pathologies related to the anatomic parts identified in radiographic images.

1 credit

Prerequisites: RADI 2100, RADI 2100L, RADI 2200

Corequisite: RADI 2140

RADI 2150P Clinical Internship III

In this course, students will apply techniques and procedures for capturing radiographic images of the skull and spine. They will also determine actions and processes to be executed in various clinical situations in real workplace settings. Additionally, they will demonstrate their knowledge of the regulations and ethical and legal aspects applicable to the field of radiology.

3 credits

Prerequisites: RADI 2100, RADI 2100L, RADI 2110P, RADI 2200, RADI 2170

Corequisite: None

RADI 2160 Pre-Board Seminar

In this course, students will review concepts related to radiologic technology (RT) evaluated by the American Registry of Radiologic Technologists (ARRT) and the Licensing Board of Radiological Technologists in Diagnostic Imaging and Radiotherapy Technologists of Puerto Rico. Additionally, they will apply concepts related to the areas covered by the certification exam, such as patient care, safety, radiographic procedures, and image acquisition.

1 credit

Prerequisites: All courses previous to the sixth term

Corequisite: None

RADI 2170 Radiographic Quality Assurance and Control

In this course, students will examine aspects related to the production, acquisition, and evaluation of a diagnostic radiographic image. Additionally, they will analyze the factors affecting radiographic quality. They will also recognize digital radiographic equipment and its optimal operation.

2 credits

Prerequisite: RADI 2050

Corequisite: None

RADI 2200 Pharmacology and Contrast Media in Diagnostic Imaging

In this course, students will analyze the fundamentals of pharmacology, venipuncture, and the administration of diagnostic contrast agents and medications intravenously. They will differentiate the contrast media used for distinguishing radiographic structures. Moreover, they will recognize the composition, contraindications, and adverse reactions associated with these agents. Additionally, they will examine the proper preparation, handling, and administration to patients, in accordance with the ethical and legal parameters of the profession.

3 credits

Prerequisite: RADI 1010

Corequisite: None

RADI 2500 Advanced Sectional Anatomy

In this course, students will identify the structures and location of the major anatomical planes. They will also value the importance of volumetric data sets and 3D reconstruction of body structures for critical diagnosis and disease treatment. Additionally, they will explain cross-sectional anatomy and the processes involved in patient care and assisting physicians with prognosis.

4 credits

Prerequisites: BIOL 2030, BIOL 2030L

Corequisite: None

RADI 3000 Physics: Instrumentation and Images in Computed Tomography

In this course, students will analyze the historical development, evolution, physical principles, and instrumentation employed in computed tomography (CT). They will also examine X-ray radiation in CT image formation, beam attenuation in CT, linear attenuation coefficients, tissue characteristics, and the application of Hounsfield units. They will differentiate data acquisition and manipulation techniques, as well as image reconstruction algorithms. Additionally, they will evaluate CT systems and operations, factors affecting image quality, artifact production and reduction, and image communication.

3 credits

Prerequisite: RADI 2500

Corequisite: None

RADI 3010 Procedures for Image Formation in Computed Tomography

In this course, students will examine the procedures involved in computed tomography (CT) imaging for both adult and pediatric patients. They will differentiate specific organ structures within the body, patient symptoms, and potential pathologies through indications and parameters for CT protocols. Additionally, they will explain the modalities and trends in CT.

3 credits

Prerequisite: RADI 2500

Corequisite: None

RADI 3020 Pathological Correlation by Computed Tomography

In this course, students will analyze common diseases diagnosable through computed tomography (CT). They will examine diseases or traumatic processes, along with their description, etiology, and symptoms. Additionally, they will correlate medical terms with identified pathologies based on CT appearances and possible diagnoses.

3 credits

Prerequisite: RADI 2500

Corequisite: None

RADI 3030 Procedures for Obtaining Images by Magnetic Resonance

In this course, students will analyze imaging techniques related to the central nervous system (CNS), neck, chest, musculoskeletal system, and abdominopelvic regions. They will also examine the clinical applications of these techniques, available coils and their specific use, considerations in scan sequences, alternatives in protocols, and positioning criteria. Additionally, they will differentiate anatomical structures and planes, as well as the signal characteristics of normal and abnormal structures.

3 credits

Prerequisite: RADI 2150P

Corequisite: None

RADI 3040 Pathological Correlation by Magnetic Resonance

In this course, students will analyze common diseases diagnosable through the use of magnetic resonance imaging in terms of their description, etiology, and associated symptoms. They will also examine the appearance of magnetic resonance images for the detection of diseases or traumatic processes. Additionally, they will explain the most common diseases observable through magnetic resonance imaging.

3 credits

Prerequisite: RADI 2500

Corequisite: None

RADI 3050 Physics: Principles, Parameters, and Concepts of Magnetic Resonance

In this course, students will explain the physical principles of magnetic resonance imaging (MRI) and its historical evolution. They will examine the processes for generating and detecting a magnetic resonance signal, as well as image formation. Additionally, they will apply the appropriate parameters for capturing high-quality images.

3 credits

Prerequisite: RADI 2500

Corequisite: None

RADI 3060 Ethics and Law in Imaging Sciences

In this course, students will examine the historical and philosophical foundation of ethics, as well as its components. They will also analyze a range of ethical issues and dilemmas encountered in clinical practice. Additionally, they will assess aspects related to negligence, legal and professional standards, and the importance of proper documentation and informed consent.

3 credits

Prerequisite: RADI 1010

Corequisite: None

RADI 3070 Computers in Medical Imaging and Informatics

In this course, students will examine the applications of computers in radiological science, particularly in the capture, visualization, storage, and distribution of images. They will also analyze the basic concepts of patient information management and medical record handling, as well as issues related to privacy and relevant regulations. Additionally, they will differentiate various computer applications used in healthcare for the acquisition, visualization, and utilization of digital images.

3 credits

Prerequisite: ITTE 1031L

Corequisite: None

RADI 4010P Clinical Internship in Computed Tomography

In this course, students will critically analyze concepts and theories related to radiological procedures. They will assess the criteria for patient care, the importance of competent performance in radiographic imaging, and total quality management. Additionally, they will apply techniques and procedures for patient management and the acquisition of diagnostic images through computed tomography, in compliance with the ethical and professional standards required in the field.

6 credits

Prerequisites: RADI 3000, RADI 3010, RADI3020

Corequisite: None

RADI 4020P Clinical Internship in Magnetic Resonance

In this course, students will identify the necessary educational materials, facilities, and personnel for conducting magnetic resonance imaging for diagnostic purposes. They will also demonstrate magnetic resonance imaging procedures under indirect instructor supervision. Additionally, they will value the importance of complying with the ethical and professional standards required in the field.

6 credits

Prerequisite: RADI 2500

Corequisite: None

RADI 4030 Pre-Certification Seminar in Technology Radiology, CT, and MRI

In this course, students will review concepts related to radiologic technology (RT), magnetic resonance (MR) modalities, and computed tomography (CT) evaluated by the American Registry of Radiologic Technologists (ARRT) and the Licensing Board of Radiological Technologists in Diagnostic Imaging and Radiotherapy Technologists of Puerto Rico. They will also apply knowledge and cognitive skills underlying the work of radiologic technologists for intelligent performance in tasks involving computed tomography and magnetic resonance.

3 credits

Prerequisites: ENGL 1010, MATH 1010, BIOL 2010, SEMI 1010, RADI 1010, ENGL 1020, ITTE 1031L, PHYS 1020, BIOL 2020, RADI 2010, MESE 1010, SPAN 1010, RADI 2009, RADI 2020, RADI 2020L, RADI 2030, RADI 2040L, SPAN 1020, RADI 2050, RADI 2060, RADI 2070, RADI 2070L, RADI 2080P, PSYC 2510, RADI 2170, RADI 2100, RADI 2100L, RADI 2110P, RADI 2200, BIOL 2030, BIOL 2030L, RADI 2130, RADI 2140, RADI 2140L, RADI 2150P, RADI 3060, RADI 3070, RADI 4040, RADI 2500, RADI 4050, RADI 3000, RADI 3010, RADI 3020

Corequisite: None

RADI 4040 Research Methods and Computer Literacy

In this course, students will analyze research methods and computer skills relevant to radiologic technologists in the context of ongoing changes in healthcare-related professions. They will also assess available resources for their professional growth. Additionally, they will value the importance of developing and disseminating intellectual research, information literacy, and the use of academic research methods in the profession.

3 credits

Prerequisite: ITTE 1031L Corequisite:

None

RADI 4050 Educational Principles for Technologists

In this course, students will examine strategies and techniques for developing the skills of an effective learning facilitator in a clinical setting. They will also identify common learning opportunities within the clinical setting. Additionally, they will apply the key elements required for the development of a learning experience.

3 credits

Prerequisite: ITTE 1031L

Corequisite: None

SONO 1020 Introduction to Medical Sonography

In this course, students will analyze the historical development of sonography, the field of medical sonography, the role of the sonographer, and the terminology associated with ultrasound imaging. They will examine the basic principles of ultrasound, scanning methods, documentation, ergonomic and preventive aspects, equipment use and care, and quality control. Furthermore, they will specify the ethical and legal aspects governing the profession. This course includes a simulator.

3 credits

Prerequisite: None

SONO 1030 Patient Management and Care in Sonographic Imaging

In this course, students will examine infection control techniques and the principles of surgical asepsis for the maintenance of a sterile field during patient management and care. They will differentiate management techniques for taking diagnostic images safely and effectively. They will develop skills for taking vital signs and providing first aid during a medical emergency.

3 credits

Prerequisite: None

SONO 1040L Abdominal Sonography and Laboratory

In this course, students will review topics related to the anatomy and physiology of the abdominal organs, anatomical variants, the sonographic appearance of these structures, and associated pathologies. They will describe the techniques, procedures, and protocols used in the evaluation of the abdomen. They will develop skills to perform quality abdominal sonograms using the appropriate scanning techniques.

4 credits

Prerequisites: SONO 2010, SONO 1030, MESE 1010

SONO 2020L Gynecological Sonography and Laboratory

In this course, students will review topics related to the anatomy and physiology of the female pelvic organs, anatomical variants, the sonographic appearance of these structures, and associated pathologies. They will describe the techniques, procedures, and protocols used in the evaluation of the female pelvis. They will develop skills to perform high-quality pelvic and endovaginally sonograms using appropriate scanning techniques.

4 credits

Prerequisites: SONO 2010, SONO2020L, SONO 1030, MESE 1010, PHSC2023

SONO 2030L Laboratory of Integration of Clinical Skills in Medical Sonography

In this course, students will discuss the components, techniques, and protocols of a sonography laboratory. They will interpret the content of medical orders. They will manage the patient according to universal standards. They will prepare a sonographic report.

2 credits

Prerequisites: SONO 2010, SONO 1030, MESE 1010, SONO 2040L

Corequisite: SONO 2020L

SONO 2040P Clinical Practice I: Medical Sonography

In this course, students will practice, in a real environment and under the direct supervision of a clinical instructor, performing abdominal, gynecological, and obstetric sonographic studies in the first, second, or third trimester. They will analyze the patient's medical history, scanning techniques, protocols, identification of cuts, evaluation of organs, and anatomical structures. They will demonstrate professional attitudes and ethics in their role as medical sonographers.

2 credits

Prerequisites: SONO 2130L, SONO 2020L

Corequisite: SONO 2050L

SONO 2050L Obstetric Sonography and Laboratory

In this course, students will analyze embryonic and fetal anatomy at each stage of pregnancy. They will recognize the normal sonographic appearance of the embryo and fetus. They will explain the complications related to pregnancy, such as multiple pregnancies, pregnancy failures, premature delivery, fetal death, pathological conditions of the fetus, and anomalies, among others. They will apply the appropriate scanning techniques when performing an obstetric sonogram.

4 credits

Prerequisites: SONO 2010, SONO 1030, MESE 1010, PHSC2023

SONO 2060P Clinical Practice II: Medical Sonography

In this course, students will practice, in a real environment and under the direct supervision of a clinical instructor, performing sonographic studies of superficial structures such as the thyroid, parathyroid, breasts, testicles, penis, popliteal region, musculoskeletal structures, and the neonatal brain. They will analyze the patient's medical history, scanning techniques, protocols, identification of cuts, evaluation of organs, and anatomical structures. They will demonstrate professional attitudes and ethics in their role as medical sonographers.

2 credits

Prerequisite: SONO 2040P

SONO 2070L Sonography of Superficial Structures and Laboratory

In this course, students will examine the anatomy, physiology, and pathologies of superficial structures that can be evaluated with diagnostic ultrasound. They will identify clinical signs, symptoms, laboratory values, and protocol techniques used in conducting each sonographic study. They will develop skills to conduct quality studies, applying the appropriate scanning techniques in the evaluation of superficial structures, such as the thyroid, parathyroid, breasts, testicles, penis, popliteal region, neonatal brain, and musculoskeletal structures.

4 credits

Prerequisite: SONO 2030L, PHSC 2040

SONO 2071 Pathology Applied to Medical Sonography I

In this course, students will describe the pathological processes associated with the organs and structures of the abdominal cavity and the superficial structures of the human body that can be evaluated through the use of medical sonography. They will discuss the etiology, signs and symptoms, normal sonographic appearance, and abnormal sonographic patterns of these organs and structures, as well as the etiology of congenital anomalies and the correlation of laboratory tests. They will recognize the measurements of organs for the evaluation of pathological findings related to the size and location of the organs and the components of different pathologies.

3 credits

Prerequisites: SONO 1040L, SONO 2020L, SONO 2050L, SONO 2070L

SONO 2072 Pathology Applied to Medical Sonography II

In this course, students will describe the pathological processes associated with gynecology and obstetrics by gestation stage that can be evaluated through the use of medical sonography. They will discuss the etiology, signs and symptoms, normal sonographic appearance and abnormal sonographic patterns of organs and structures, as well as the etiology of congenital anomalies and the correlation of laboratory tests related to obstetrics and gynecology. They will recognize the measurements of anatomical structures for the evaluation of pathological findings related to organ size, location, appearance, and composition of different pathologies.

3 credits

Prerequisite: SONO 2150

SONO 2080 Pre-Certification Exam Seminar in Medical Sonography

In this course, students will review the concepts acquired in their formal academic preparation as medical sonographers. They will discuss the physical principles of ultrasound and instrumentation, including clinical safety issues, ultrasound transducers, pulsed instrumentation, Doppler instrumentation, hemodynamics, quality assurance, artifacts, protocols, and new technologies. In addition, they will explain the anatomy, physiology, laboratory tests, and benign and malignant pathologies of the organs included in abdominal, pelvic, obstetric, and superficial structure sonographic studies.

2 credits

Prerequisites: SONO 2040L, SONO 2020L, SONO 2050L, SONO 2070L, SONO 2071, PHSC 2040

SONO 2090 Special Procedures in Medical Sonography

In this course, students will develop techniques for invasive, interventional, and therapeutic procedures guided by sonography. They will practice the preparation of patients, as well as the equipment, materials, and protocols of different procedures. They will discuss the role of the sonographer in performing procedures such as breast biopsies, thyroid biopsies, soft tissue biopsies, thoracentesis, paracentesis, chorionic villus sampling, amniocentesis, fine needle aspiration, umbilical cord sampling, umbilical cord transfusion, and *in vitro* fertilization, among others.

2 credits

Prerequisites: SONO 1040L, SONO 2020L, SONO 2050L, SONO 2070L, SONO 2071

SONO 3000P Clinical Practice III: Medical Sonography

In this course, students will practice, in a real environment and under the direct supervision of a clinical instructor, the performance of all the abdominal, gynecological, and obstetric sonographic studies learned during their academic preparation and of superficial structures such as the thyroid, parathyroid, breasts, testicles, penis, popliteal region, musculoskeletal structures, and the neonatal brain. They will analyze the concepts learned as part of their preparation, including the patient's medical history, scanning techniques, protocols, the identification of cuts, and the evaluation of organs and anatomical structures. They will demonstrate professional attitudes and ethics in their role as medical sonographers.

5 credits

Prerequisites: BIOL 2010, BIOL 2020, BIOL 2030, BIOL 2030L, SONO 1020SONO 1030, SONO 1040L, MESE 1010, PHSC 2030, PHYS 2040, SONO 2020L, SONO 2030L, SONO 2050L, SONO 2070L, SONO 2040P, SONO 2060P

SONO 3010L Fundamentals of Electrocardiography, Stress Tests and Holter and Laboratory

In this course, students will explain the electrical and mechanical events in the cardiovascular system and their relationship with the nervous system. They will identify various normal and abnormal electrocardiographic records. They will analyze the arrhythmias that affect the cardiovascular system with their associated electrocardiographic tracings. They will discuss the Holter study and stress test, including topics related to preparing for the test, the reasons for performing it, and the interpretation of normal and abnormal results.

3 credits

Prerequisite: SONO 3000P

Corequisite: ANAT 2040

SONO 3020L Basic Echocardiography and Laboratory

In this course, students will apply echocardiography and Doppler techniques for cardiac evaluations through ultrasound. They will identify normal anatomy, cardiac structures, and their normal sonographic appearance. They will classify anatomical characteristics, internal structures of the heart, and the movement of its walls for the evaluation of its hemodynamics.

4 credits

Prerequisite: SONO 3000P

SONO 3030L Sonographic Evaluation of Cardiac Pathologies and Laboratory

In this course, students will evaluate cardiac pathologies through the use of echocardiography. They will conduct simulated practices for the acquisition and development of techniques and skills in the quantitative evaluation of a normal echocardiogram in a laboratory. They will use grayscale, M-mode, and Doppler modalities with proper scanning techniques for the production of quality images.

3 credits

Prerequisite: ANAT 2040, SONO 3020L

SONO 3040L Cardiovascular Technology Laboratory

In this course, students will explain the role of the cardiovascular sonographer and technologist, the components of a cardiovascular sonography laboratory, and techniques and protocols related to the field. They will apply patient management and medical order interpretation techniques. They will perform a cardiovascular sonographic report.

2 credits

Prerequisite: ANAT 2040, SONO 3010L, SONO 3020L

SONO 3050L Vascular Sonography of Upper Extremities, Clinical Application and Laboratory

In this course, students will develop knowledge about anatomy, physiology, and pathologies of both the arterial and venous systems of the upper extremities. They will use equipment, study protocols, and patient management techniques. They will interpret preliminary studies of the venous and arterial systems of the upper extremities.

3 credits

Prerequisite: SONO 3040L

SONO 3060L Cerebrovascular Sonography, Clinical Application and Laboratory

In this course, students will develop knowledge of anatomy, physiology, and pathologies of both the extracranial and intracranial cerebrovascular systems. They will apply infection control techniques, emergency situation management, and patient transportation and transference techniques. They will interpret preliminary studies of the cerebrovascular system.

3 credits

Prerequisite: SONO 3040L

SONO 3070P Sonography and Cardiovascular Technology Practice I

In this course, students will examine procedures in medical consulting, dispensaries, or hospitals as part of their professional practice. They will apply knowledge of electrocardiograms (EKG), treadmill test (TMT), Holter tests, telemetry and echocardiography, and cerebrovascular and vascular sonography of the upper extremities, both arterial and venous. They will use skills related to upper extremity sonography and cardiovascular technology under the supervision of a professional.

4 credits

Prerequisite: SONO 3040L

SONO 3080L Vascular Sonography of Lower Extremities, Clinical Application and Laboratory

In this course, students will develop knowledge of anatomy, physiology, and pathologies of both the arterial and venous systems of the lower extremities. They will use equipment, study protocols, and patient management techniques. They will interpret preliminary studies of the venous and arterial system of the lower extremities.

3 credits

Prerequisites: SONO 3050L, SONO 3060L

SONO 4010L Abdominal Doppler and Laboratory

In this course, students will develop anatomical, physiological, and pathological knowledge of both the abdominal arterial and venous systems. They will perform evaluations of the abdominal aorta, hepatic artery, inferior vena cava, and the hepatic venous and portocaval systems. They will identify the most common pathologies in these structures and their respective treatments.

3 credits

Prerequisites: SONO 3050L, SONO 3060L

SONO 4020P Sonography and Cardiovascular Technology Practice II

In this course, students will collaborate in medical consulting, dispensaries, or hospitals, with the necessary skills for their professional practice. They will review the practice of skills related to taking EKGs, stress tests, Holter tests, echocardiograms, and cerebrovascular and upper extremity sonography. They will apply knowledge of vascular sonography of the lower extremities, both arterial and venous, and abdominal vascularity. They will use skills related to vascular sonography of the lower extremities and abdominal vascularity under the supervision of a professional.

4 credits

Prerequisites: SONO 3050L, SONO 3060L, SONO3070P

SONO 4030 Pre-Certification Seminar in Cardiovascular Sonography

In this course, students will review the concepts acquired throughout their formal academic preparation as sonographers and cardiovascular technologists. They will apply the principles of ALARA in ultrasound studies. They will discuss topics related to vascular sonography of the upper and lower extremities, cerebrovascular sonography, abdominal vascular, and the fundamentals of echocardiography. They will integrate the acquired competencies to pass the certification exam for cardiac sonographers and vascular sonographers.

2 credits

Prerequisites: PHSC 2030, PHSC 2040, SONO 3020L, SONO 3030L, SONO 3050L, SONO 3060L, SONO 3070P

WADE 1000L Front End Technologies and User Interface (UI) and Laboratory

In this course, students will develop skills for creating attractive and high-performance interfaces. They will also use front-end programming languages such as HTML, CSS, and JavaScript to design interactive and adaptive user interfaces. Furthermore, they will create appealing and functional designs through a practical, project-based approach.

3 credits

Prerequisite: PROG 1035L

Corequisite: None

WADE 1050L Web Page Creation and Design and Laboratory

In this course, students will examine basic concepts of web programming. They will develop a website using programming languages such as HTML and CSS, among others. In addition, they will integrate graphic and multimedia elements into web page design.

3 credits

Prerequisite: WADE 1000L

Corequisite: None

WADE 2000L Content Management Systems (CMS) and Laboratory

In this course, students will develop knowledge of content management systems (CMS). They will also examine the features and advantages of predefined structures and functionalities that facilitate the development and organization in web application programming. In addition, they will apply techniques for creating, organizing, and publishing content through CMS administration.

3 credits

Prerequisite: WADE 1050L

Corequisite: None

WADE 2050L Data Structures and Laboratory

In this course, students will analyze the fundamentals of creating organized and efficient structures for information storage and management. They will apply techniques for designing sets of tables with defined relationships and constraints that ensure data integrity. In addition, they will employ knowledge of normalization for optimizing database design. Furthermore, they will develop skills in designing databases that meet project requirements and facilitate secure information manipulation and retrieval.

3 credits

Prerequisite: PROG 1035L

Corequisite: None