

Presentation of the HES-SO

HES-SO University of Applied Sciences and Arts Western Switzerland

Founded in 1997, HES-SO is the largest of its kind in Switzerland. Its 6 faculties and 28 schools are spread over the whole of Western Switzerland, and are strongly anchored in the regional economy. With over 19'400 students, it shares the most beautiful cities and areas in the French-speaking region of Switzerland. HES-SO schools are all endowed with cutting-edge technology and outstanding equipment. They constitute an exceptional network to promote innovation, to offer practical training and to favour transfer of knowledge.

HES-SO ambitions to play an important role on the international scene. Numerous collaborative partnerships have been established with universities in Europe and around the world. HES-SO guarantees top-level teaching quality within a sophisticated applied research environ-

ment that nurtures close links with Swiss professional associations. HES-SO awards university degrees that are practice-oriented and euro-compatible: 46 Bachelor degree programmes, 21 Master degree programmes and more than 250 recognised continuing education courses.

Its professors are accomplished scholars, dynamic and high-qualified experts in their field who are passionate about teaching and applied research. HES-SO is an applied research-based institution, thus offering practical, hands-on experience. Its aim is to prepare its students for the realities of the professional world. Applied research and development projects are carried out within institutes in conjunction with professional and industrial partners and we have a noteworthy participation in European projects.





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Health faculty

The Health faculty at the HES-SO University of Applied Sciences and Arts Western Switzerland

The Faculty of health is one of the six faculties offered by the HES-SO University of Applied Sciences Western Switzerland. Its programmes are deployed in a range of sites providing education in the field of health professions and are present in all regions of Western Switzerland. The health faculty includes 8 Bachelor-level educational programmes; it also offers a Masters of Science in nursing science programme, which is run jointly by the HES-SO and the University of Lausanne (UNIL).

With its 9 educational programmes and its 3200 students, the health field of HES-SO is larger than all other health programmes found in Universities of Applied Sciences and Arts in Switzerland; HES-SO is also the only institution to offer the entire range of programmes covering all health professions recognized at Bachelor-level in Switzerland.

Initial curricula

Bachelor programmes

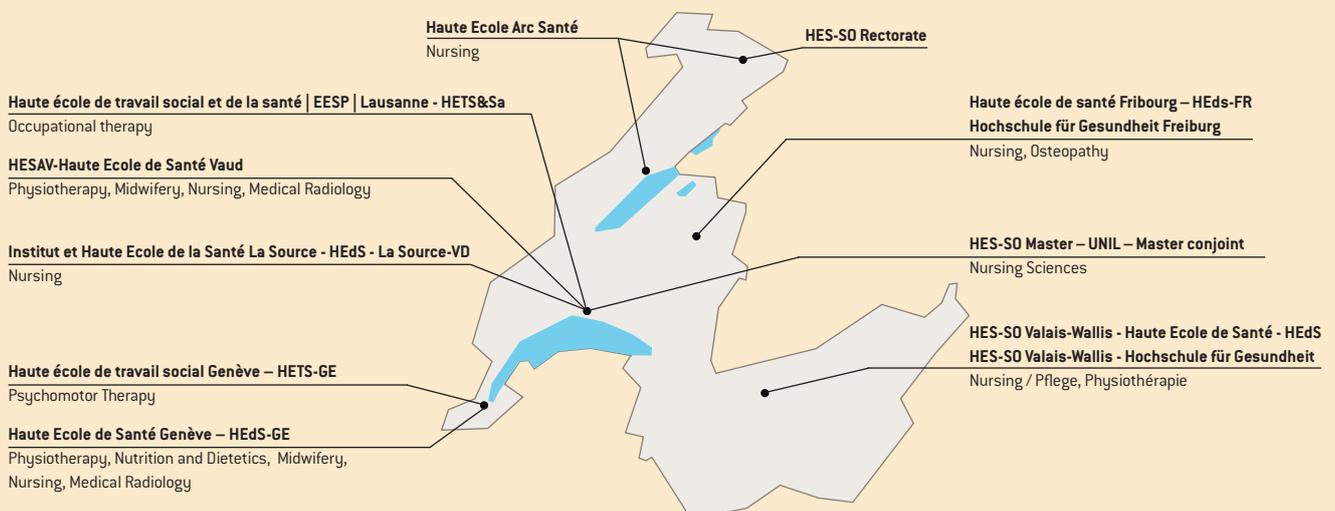
- Occupational Therapy
- Nutrition and dietetics
- Osteopathy ¹
- Physiotherapy
- Psychomotor Therapy
- Midwifery
- Nursing
- Medical Radiology

Masters programme

- Masters degree in Nursing Science, offered in partnership with University of Lausanne (UNIL)

1. Osteopathy curriculum is not structured as a professionalising Bachelor of Science (B.Sc.) degree as described in the present document.

HES-SO schools of health





Continuing education

The continuing education programmes in the health faculty at the HES-SO University of Applied Sciences and Arts Western Switzerland lead to MAS, DAS or CAS-level qualifications. They are tailored to meet the needs of the different health professions and to promote the dissemination of state-of-the-art professional knowledge stemming from research activities.

Applied Research and Development (aR&D)

Research and Development activities in the various sites are promoted and supported by funding from the HES-SO. 7 research departments or research units are deployed in the HES-SO sites.

The goals of aR&D are:

- Developing a specific scientific knowledge base for the faculty of health professions whilst enhancing the transfer of research results into educational curricula;
- Developing innovative projects to be deployed in professional practice.

HES-SO aR&D priorities:

- Demographic change;
- Institutional arrangements in the social/health fields;
- Development of clinical and technical competencies and design of new assessment tools;
- Prevention, and health promotion;
- Rehabilitation, social integration.

Field interventions

Field interventions aim at providing public or private institutions active in the realm of health with high-level competencies available in the educational institutions of HES-SO. These interventions mainly include:

- Research projects and studies;
- Expert reports and audits;
- Supervision;
- Support for project development;
- Teaching and advising;
- Collaborations in the field of scientific and professional literature and publishing.

Mobility, international exchanges

At the national level, each programme actively collaborates with its counterparts in the German-speaking and Italian-speaking regions of Switzerland on issues of curriculum, programme content and educational development.

At the international level, many courses highlight differences between countries in terms of health, health care systems and conditions of practice for the range of health professions for which education is offered by the HES-SO. International collaboration takes the form of bilateral exchanges with other educational institutions that enable:

- Students to follow part of their education in a foreign country;
- Foreign students from partner educational institutions to come and follow part of the USASW health programmes;
- Educators from the field contribute to programmes in partner educational institutions abroad;
- Students and educators in the HES-SO to benefit from contributions given by teaching staff from partner schools.

Fundamental principles underpinning the educational programmes in the Health faculty at the HES-SO

The education dispensed in the health faculty programmes of the HES-SO is designed to meet the current and future health needs of the population and to fit into the structure of the Swiss health care system. The health faculty's curricula promote, in the students who follow them, the development of professional abilities characterized by reflexive practice and expertise in their chosen field.

Human services professions

The education offered takes into account the singular and unpredictable character of situations typical of all human services professions; health professions require a high degree of ability to adapt to a broad range of situations, as well as an orientation towards the furthering of human potential and a capacity to master one's personal engagement in a professional context.

Adult education

Health faculty programmes grant students an active role in their own training and enhance their autonomy and sense of responsibility.

Alternating school and field placement curriculum

Educational programmes are structured by alternating periods of coursework at school and field placement, enabling students to be quickly put in touch with the complexity of professional situations. The curriculum is designed to ensure that tensions stemming from the confrontation between theoretical knowledge and practical skills can be handled and articulated satisfactorily.

Field placement arrangements

Contractual terms and financial partnership agreements between institutions of the social/health fields that offer field placements and the HES-SO guarantee that fieldwork educators are experts in their area of professional practice; they are designated and recognized by their institution and have followed a specific postgraduate training course.

Competency approach

Health faculty educational programmes are based upon a competency approach; this educational orientation has been chosen in order to enhance the students' ability to understand approach and analyse evolving situations, to perceive their specificities and to adapt their professional interventions to unique and unpredictable occurrences and singular contexts.



Curricula are based upon **competency and professional role reference guides, common to all health professions** and defined at the national level. Students, who have completed their studies, have acquired a set of generic competencies deemed necessary for all health professions requiring University of Applied Sciences and Arts - level education:

- Appropriate knowledge base for a context of evolving health policy challenges.
- Professional expertise and methodological competencies
- Professionally appropriate and responsible conduct
- Ability to communicate, interact and document.

Students also must have acquired a specific set of competencies for their chosen profession; these are articulated around seven professional roles defined as common to all health professions:

- Expert
- Communicator
- Collaborator
- Manager
- Health promoter
- Learner and educator
- Professional

Bachelor Thesis

All programs entail the production of a Bachelor thesis; this requirement is an opportunity for students to concretely become initiated to a methodological research and development approach through:

- Defining professionally relevant research questions;
- identifying relevant documentary sources;
- Designing an appropriate method of data collection and analysis;
- Carrying out a small-scale implementation of a rigorous methodological approach;
- Drawing conclusions from this endeavour for one's chosen health profession;
- Producing a publicly accessible document.

Inter-professional collaboration

HES-SO health programmes enhance students' ability, on the basis of the communication and collaboration competencies mentioned above, to carry out interprofessional interventions in response to changes taking place in the social/health fields.

Bachelor of Science HES-SO in Radiologic Medical Imaging Technology

- 240 students
- HESAV-Haute Ecole de Santé Vaud (Lausanne)
- Haute école de santé Genève - HEdS-GE (Geneva) both member of HES-SO University of Applied Sciences and Arts Western Switzerland
- Full time educational programme
- 180 ECTS, including 90 ECTS for field practice
- Bachelor thesis: 15 ECTS
- Modular curriculum
- Professional reference frameworks :
 - Professional profile of ASTRM (Swiss Association of Medical Radiology Technologists /MRT)
 - Overview of the Tuning Template for Radiography in Europe 2008.
 - Health Professions Council. (2009). *Radiographers: Standards of proficiency*. London : HPC.
 - Health Professions Council. (2009). *Standards of education and training guidance*. London : HPC.
 - Recommended Estro Core Curriculum For Radiation Oncologists/Radiotherapists 3rd Edition, April 2012.
 - Competencies for the European Nuclear Medicine Technologist (EANM) by BNMS Technology Group April 1998.
 - ProfessionsSantéOntario. (2009). *Core curriculum guide for inter-professional competencies*.
<http://www.professionssanteontario.ca>.
 - Professional profile (CanMed) : generic competencies as defined by the Health Field, and specific competencies in conformity with the B.Sc. MRT qualification.
- International partnerships



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Concept

Description of the professional field of practice

Medical radiology technologists may work in public or private institutes in the three main fields of medical radiology : general radio-diagnosis and interventional radiology, nuclear medicine and radio-oncology.

General radio-diagnosis and interventional radiology

In this first main field of practice, medical radiology technologists use a broad range of techniques, methods and chains of equipment derived from medical radiology technology : X-ray (radiography and scanners), ultrasound and imaging through nuclear magnetic resonance (MRI). The variety of radio-diagnostic tests and the development of interventional radiology have contributed to a broadening of their field and an increase in their responsibilities over the past few years.

Nuclear medicine

In the field of nuclear medicine, medical radiology technologists use radioactivity. Materials used are radioisotopes administered to patients in infinitesimal quantities. Preparing them requires specific competence in the fields of radioprotection and radiochemistry (for manipulation in the laboratory). Nuclear medicine examinations produce and allow the elaboration of data that reveal in an objective manner the structure and functioning of an organ (physiology). The emergence of hybrid technologies stemming from the fields of radio-diagnostic methods and nuclear medicine contribute adds value to the versatility of the training and qualification of medical radiology technologists.

Radio-oncology

In the field of radio-oncology, medical radiology technologists provide cancer treatments using ionising radiation. This domain of activity is structured within a multidisciplinary and inter-professional approach. In close collaboration with oncologists and radio-physicists, medical radiology technologists participate in the elaboration and implementation of treatment plans. Medical radiology technologists play an important part in this field as they also contribute to compliance and continuity of care measures when providing support and follow-up to cancer patients.

The evolution of the professional field is largely determined by the following factors :

- The development of prevention and health promotion ;
- The accelerated development of medical technology;
- The increasing complexity of patient care measures ;
- The evolution of norms in the field of radioprotection ;
- The increasing autonomy of medical radiology technologists ;
- The development of inter-professional practices.

Requirements of the professional field

The evolution of the professional field leads to new requirements for the training of medical radiology technologists. Educational programmes must enable future MRTs to acquire the following competencies :

- Ensuring that a high quality of care is provided to patients in complex clinical situations.
- Coordinating intra-professional activity within a context of flexible work organisation.
- Ensuring inter-professional collaboration in order to guarantee a high level of continuity of care for patients in an interdisciplinary environment.
- Guaranteeing the collection, measure and analysis of data received or produced during radiology treatments.
- Piloting the technological chain of medical imaging apparatus and the implementation of testing procedures.
- Mastering the increasing range of tests relying on imaging for diagnostic purposes.
- Contributing to diagnostic and therapeutic protocols in a critical manner.
- Working in a versatile manner in view of the emergence of hybrid technologies derived from radio-diagnosis and nuclear medicine.
- Working within the context of clinical departments because of the important development of interventional radiology.
- Optimising work processes and protocols in a context characterised by strong economic and financial pressures.

Pedagogical and didactic principles and recommendations

The breadth of the professional field, the diversity of contexts in which MRTs intervene and the requirements for high level

performance necessitate a broad-based, generalist UAS-level education centred on the acquisition of :

- Scientific competencies based upon research.
- High-level competencies (« advanced practice »).
- Inter- and trans-disciplinary competencies.
- Interpersonal and social competencies.
- Expert competencies in radioprotection.

The pedagogical principles deployed in the educational programme give students a central place in their own education. Students are offered an opportunity to develop their autonomy and their sense of responsibility, to broaden their modes of thought and their work capacities, to deepen their commitment and their positive engagement in a context of adult education, to become reflexive practitioners of their chosen profession and finally to adopt the values that underpin the curriculum.

The values transmitted by the educational programme focus on respect, on recognising the individuality of other persons, on the pursuit of understanding through objective means and on the development of autonomy and of a sense of responsibility.

In order to take into account the principles and values outlined above, the nature of teaching modalities to be offered and the competencies to be acquired necessitate a broad range of didactic options (types of teaching and learning modes and tools, evaluation and testing modalities and academic support).

Modular educational programme

Modules may be structured in two different ways : as a block or as courses dispensed throughout the semester. A module may not straddle two academic years. Modules are generally restricted to one semester, in order to facilitate the national and international mobility of students and teaching staff.

All theoretical compulsory modules are taught in HES-SO schools HESAV - Lausanne and HEdS - Geneva. Optional modules are offered in one or the other of the two sites. Field practice modules include placements in all three main professional fields and students have a broad preferential access to health care structures in all French-speaking Swiss cantons.

Bachelor Thesis

The Bachelor Thesis is defined as the elaboration of a theoretical problematic stemming from an identified professional issue. The Bachelor thesis is an integral part of the personal project of each student as well as of his-her professional development process.

The Bachelor Thesis requires students, individually or as a group, to demonstrate the following abilities :

- Analysing a professional situation.
- Articulating theoretical concepts with professional practice.
- Constructing formalised knowledge in a communicable and controlled way

The Bachelor Thesis is an opportunity for students to combine the pursuit of validity (scientific methodology), appropriateness (value-based approach) and a concern for efficacy and efficiency (translation into action) characteristic of a professional stance anchored into the expert role attributed to holders of UAS-level qualifications.

Educational arrangements implemented for the production of the Bachelor thesis combine and articulate 3 distinct pedagogical cultures :

- A culture of teaching by the transmission of theoretical and methodological knowledge, in which the student is the « object » of the educational process.
- A culture of education based on the acquisition of abilities (reflection, analysis, synthesis), in which the student is the « subject » of the educational process.
- A culture of professional development in which the student is acquiring competencies and is viewed as a « social actor », i.e. a future MRT.

The Bachelor thesis is valued at 15 ECTS (Written work and oral defence).

Fieldwork practice

Professional education does not only have the goal of training future MRTs to be professionally active and hold a job in their field ; it aims at preparing them for exercising their skills in the context of a constantly evolving profession.

Integration into the curriculum of alternating periods of coursework and field practice give students an opportunity to quickly experience the complexity of professional situations. The structure of the training programme is designed to deal with inevitable tensions arising from the confrontation of theoretical and practical knowledge, as well to provide the best possible articulation between them. The goal is to work on these tensions and contradictions in order to develop a permanent reflexive stance about, as well as in, professional intervention ; such a stance is viewed as the cornerstone of true professionalism.

Confrontation with the professional world, the requirements of which gradually increase as students progress in their educational programme, is set up, regulated, supported and accompanied in partnership with the social/health care institutions through specific field placement dispositions.

Fieldwork practice periods take place in a professional practice setting, on the basis of a tripartite contract. They necessitate the participation of a teaching staff member, a field-practice supervisor and a student.

The field-practice supervisors are professionals holding a MRT diploma who has a high level of expertise recognised by the employers and hold a HES-SO certificate of Advanced Studies in field-practice supervision. Their role is to supervise the student during field practice. They take in the student and participates, along with the member of the teaching staff following the student's field practice, in the elaboration of the tripartite pedagogical contract. They are responsible for evaluating the student and thus also contributes to the integration of alternating coursework/practice periods of training.

The curriculum for the B.Sc in Medical Radiology Technology (MRT) includes 6 field placement periods, adding up to a total of 48 weeks and 90 ECTS.

Curriculum structure

Module characteristics are described in a module fact-sheet : title, number of credits, schedule, general goals of the module, competencies, content, pedagogical modalities and requirements, mode of evaluation, professor in charge of the module and other teaching staff involved, etc. Modules are classified into the following different types :

Type M1 : modules focused on professional intervention

Modules of the M1 type include theoretical modules as well as fieldwork practice periods. M1 modules have a generalist goal and focus on the professional interventions of MRTs in various clinical contexts in public or private health care organisations such as : general radio-diagnosis and interventional radiology (GRD/IR), tomodensitometry (TDM) better known as « scanner », magnetic resonance (MRI), nuclear medicine (MN) and radio-oncology (RO).

Type M2 : modules focused on the scientific underpinnings of health professions

M2 modules are primarily dedicated to the scientific background required for health professions. These modules are



considered as transverse thematic courses providing the scientific bases to M1 modules. M2 courses are articulated and synchronised during each semester with M1 modules. M2 are largely dedicated to sciences : radio-physics and radiobiology, radioprotection, human and social sciences, biomedical sciences, study of negatives, imaging and medical IT. These modules give an opportunity to integrate research results in a transverse manner during the entire educational programme.

Type M3 : modules focused on professional development

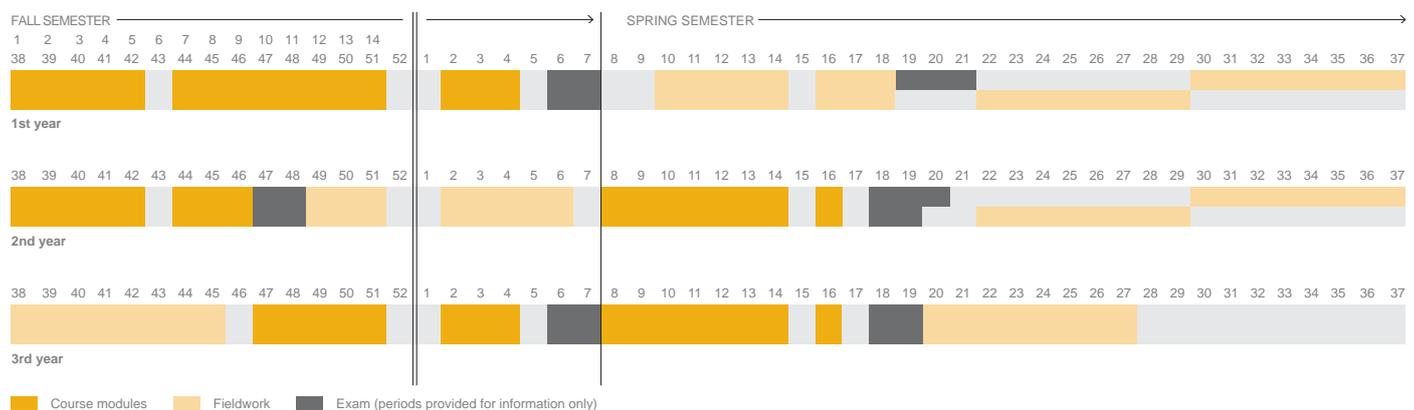
M3 modules are characterised by courses relating to learning processes and to the construction of professional identity in students (professionalisation process). These modules allow for and promote, in students/future professionals, a reflexive stance towards their own education and towards the changes that it is bringing about. M3 modules are also comprised of

courses in theories and methodologies for research, including documentary research, literature reviews and Evidence Based Practice approaches. M3 modules also allow for the transfer and integration of research results through the formalised elaboration of the Bachelor Thesis.

Compulsory optional modules

Compulsory optional modules may be of the M1, M2 or M3 type. They afford an opportunity to strengthen competencies in one of the three main fields of activity of MRTs, or in transverse themes already presented in courses (e.g. ultrasound or interventional radiology) ; they may also focus on emergent activities (e.g. forensic imaging, or image processing). Compulsory optional modules offered may vary from one yearly promotion to the next. The range of modules offered also constitutes a development matrix for continuing education in medical radiology techniques founded upon the results of a permanent professional watch.

Academic calendar



Mobility and international partnerships

International mobility for the MRT programme takes place on the basis of the following arrangements and partnerships :

- « IN » and « OUT » international mobility of teaching staff and students through partnerships with the higher education institutions : Lisbon, Porto, Copenhagen, Groningen, Helsinki, Stockholm, Manchester, Oslo.
- Two international « OUT » modules : International Module Exchange in Abdominal Ultrasound (Groningen-NL) and Digital Radiography and Technology – advanced level (Copenhagen-DK).

- Co-organisation of an Erasmus Intensive Module, Research Summer School, in «Optimization of image quality and X-radiation dose in medical imaging» with Salford University/Greater Manchester, Groningen, Lisbon and Oslo.
- International Module Exchange « IN » in Clinical Forensic Radiography, in partnership with the Institut Universitaire Romand de Médecine Légale (University Institute for Forensic Medicine of French-speaking Switzerland). Partners : Copenhagen, Groningen, Helsinki, Lisbon, Oslo.