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Radiology diagnosing imaging and radiotherapy techniques

INTEGRATED COURSE: GENERAL HYGIENE, RADIOLOGICAL INSTRUMENTS AND RADIOLOGICAL PROTECTION

SSD: ING-INF/01, MED/36, MED/44

CFU: 7

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MODULE: Electronics and information technology

SSD: ING-INF/01

CFU: 2

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MODULE: Radiological protection

SSD: MED/36

CFU: 2

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MODULE: Workplace safety

SSD: MED/44

CFU: 3

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PREREQUISITES

Although there are no prerequisites, basic knowledge of physics and chemistry is required.

LEARNING OBJECTIVES

The course has objectives in terms of knowledge concerning both clinical problems related to the work activity and the rules that regulate the correct behavior in the workplace, designed to protect the health and safety of the worker as well as any third parties. Other learning objectives are in terms of ability and concern the correct actions to be taken in the event of accidents or occupational diseases. The two previous objectives act as a corollary to the third learning objective, consisting of learning in terms of expected behaviors related to responsibility, as potential employers, towards collaborators and employees. The course aims to provide the student with the skills necessary to understand the key role that computer networks and communication devices play for today's society, also introducing the related challenges in terms of security and privacy.

LEARNING OUTCOMES

Knowledge and understanding

Have the basis to identify possible occupational health problems related to work and in particular with the activity of radiology technician. computer networks. the basic characteristics of a network: topology and architecture. the characteristics of the data and how it travels across a network. Internet and the Web how to search for information



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on the Internet. security and privacy. risks associated with system malfunction and hardware loss

Applying knowledge and understanding

At the end of the course, the student will be able to:

- *Use the acquired knowledge of human anatomy and neuroanatomy to understand human physiology and pathophysiology, a fundamental requirement for carrying out the profession in the health sector. The student will also be able to use the knowledge acquired for the independent study of aspects relating to the specific field to which he will dedicate himself in the professional activity.*
- *apply knowledge of histology to understand other closely related branches of biology such as anatomy, cytology, physiology*
- *possess the knowledge of cell physiology to understand the mechanisms underlying the maintenance of homeostasis*
- *possess the integrated knowledge of Anatomy and Physiology on the integration and control systems that regulate the main phenomena of absorption and excretion of nutrients*
- *use the knowledge acquired for the independent study of the subject under study*
- *use the knowledge acquired to approach subsequent dedicated courses*
- *use the anatomical knowledge acquired to perform projections dedicated to precise anatomical structures.*

Communication skills

Being able to inform colleagues on the principles governing occupational health and safety. how to properly use the terminology used.

Making judgements

The knowledge acquired will allow the student to independently assess and resolve situations of occupational risk not explicitly treated in teaching. adequate knowledge and competence to have to use computers and computer systems connected to the network safely and effectively. how to prevent and deal with the risks associated with system malfunction and hardware loss.

COURSE SYLLABUS

MODULE: Radiological protection

-RIFERIMENTI DI LEGISLAZIONE DI INTERESSE RADIOPROTEZIONISTICO:

D.P.R. n. 185/1964; D.lgs 19/9/1994, n. 626; D.lgs 17/3/1995, 230; D.lgs 26/5/2000, n.187; D.lgs. 9/4/2008, n. 81; Direttiva 2013/59/EURATOM.

-RADIATIONS: *Definition and physical principles. Natural and artificial sources of radiation. Non Ionizing Radiation (NIR) and Ionizing Radiation (IR). Radioactivity and radioactive decay. Use of radiation for medical purposes. Primary exposure factors, secondary exposure factors. Law of the Inverse of the Square of Distance.*

-RADIOBIOLOGY: *Biological effects of ionizing radiation on the human species. Radiolysis of the water. Factors that influence the biological effectiveness of ionizing radiation (dose intensity, LET, oxygen effect, dose fractionation). DNA damage. Repair of radiation*



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damage. Deterministic somatic effects, stochastic somatic and stochastic genetic effects. Tissue radiosensitivity scale. Acute irradiation syndrome.

-**RADIOPROTEZIONE:** Historical and legislative premises. Radiation protection terminology. National and international organizations for radiation protection. The Ethical Principles of Radiation Protection. Dosimetric quantities, dosimetry and dose limits. Features and methods of use of personal dosimeters. Physical surveillance. Medical surveillance. General and specific standards of radioprotection and safety in radiodiagnostics, in interventional radiology, in radiation therapy, in nuclear medicine. Ionizing Radiation Protection Devices (individual, collective, environmental). Irradiation, Contamination and Decontamination. Disposal of Radioactive Waste.

-**RADIOPROTECTION IN FERTILE AGE AND IN PREGNANCY:** Regulations. Effects on the product of conception.

- **REFERENCES OF LEGISLATION OF RADIOPROTECTIONISTIC INTEREST:**

D.P.R. n. 185/1964; D.lgs 19/9/1994, n. 626; D.lgs 17/3/1995, 230; D.lgs 26/5/2000, n.187; D.lgs. 9/4/2008, n. 81; Direttiva 2013/59/EURATOM.

MODULE: Workplace safety

- Occupational medicine in its historical context
- Legislative aspects (decree 81/2008)
- Occupational diseases and accidents
- Health surveillance
- Risk from physical, chemical and biological agents
- Health effects of noise and optical radiation
- Health effects of ionizing radiation
- Work-related stress

MODULE: Electronics and information technology

- Introduction to computer networks
- Topology, architectures and dimensions of computer networks
- Communication protocols and networking standards
- The Internet and the Web
- Internet security and privacy

COURSE STRUCTURE

The **GENERAL HYGIENE, RADIOLOGICAL INSTRUMENTATION AND RADIATION PROTECTION** module it is organized in lectures (90 hours) and theoretical-practical exercises. The lessons are held by projecting illustrative images (Power-Point) and through the use of paper material provided by the teacher

COURSE GRADE DETERMINATION

MODULE: Radiological protection

The acquisition of the expected learning outcomes will be ascertained through a multiple choice written test (30 questions)



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MODULE: Workplace safety

The lessons take place in an interactive way, stimulating the frequent intervention of the students. This will allow to evaluate autonomy of judgment, communication skills and learning ability. This assessment method complements the formal one represented by the final exam, which takes place in written form with question / answer methods, alternating general issues with more specific assessment elements.

MODULE: Electronics and information technology

The acquisition of the expected learning outcomes will be ascertained through a multiple choice written test (30 questions)

OPTIONAL ACTIVITIES

Students will have the opportunity to carry out theoretical / practical exercises and participate in seminars. The teachers will provide constant support during and after the lessons

READING MATERIALS

MODULE: Radiological protection

MODULE: Workplace safety

Health and Safety in Organizations. D.A. Hofman and L.E. Tetrick Editors. Published by Pfeiffer, 2003.

Electronics and information technology

Deborah Morley and Charles S. Parker, *Understanding Computers: Today and Tomorrow (16th edition)* - Cengage Learning