



UNIVERSITY OF L'AQUILA



Department of Health, Life and
Environmental Sciences

1st Cycle Degree in **BIOMEDICAL LABORATORY TECHNIQUES**

Laurea in TECNICHE DI LABORATORIO BIOMEDICO

Course Catalogue

Academic year starts the last week of September and it ends the third week of next September.

1st Semester - Starting date: last week of September, end date: 3rd week of January

2nd Semester - Starting date: First week of March, end date: 1st week of June

Exams Sessions: I) from last week of January to the 4th week of February, II) from 2nd week of June to the end of July, III) from 1st to the end of September.

Comprehensive Scheme of the First Cycle Degree in BIOMEDICAL LABORATORY TECHNIQUES					
YEAR	CODE	COURSE	Credits (ECTS)	Semester	
I	D0410	Biology and Biochemistry	9	1	
	D0413	Histology and Anatomy	6	1	
	D0414	Physics and Informatics	10	1	
	D0422	Physiology	3	2	
	D0423	Medical Laboratory Techniques and Clinical Microbiology	6	2	
			<i>Internship I</i>	20	2
II	D0442	Diagnostics and Laboratory Technology	7	1	
	D0496	General and Clinical Pathology	7	1	
	D4241	Hygiene and Medical Statistics	6	1	
	D0500	Cytogenetics and Medical Genetics	4	2	
	D3835	Pathological Anatomy Techniques	4	2	
			<i>Internship II</i>	20	2
III	D0504	Principles of Pharmacotherapy and Emergency Medicine	6	1	
	D0509	Clinical Interdisciplinary Sciences	9	1	
	D0513	Applied Technical Medical Sciences	12	2	
	D4278	Health Care Management Science	4	2	
	D0517	General Psychology	3	2	
			<i>Internship III</i>	20	2
			<i>Free choice Courses</i>	6	2
			<i>Other activities (Seminars, Other Labs)</i>	12	12
		<i>Thesis</i>	6	2	

**Programme of “BIOLOGIA E BIOCHIMICA”
“BIOLOGY AND BIOCHEMISTRY”**

This course is composed of two Modules: A) Applied Biology, B) Introductory Biochemistry and Biochemistry

D0410, Compulsory		
1st Cycle Degree in BIOMEDICAL LABORATORY TECHNIQUES, 1st year ; 1st semester		
Number of ECTS credits: 9 ECTS (workload: 225 hours, 1 CFU=25 Hours)		
A) APPLIED BIOLOGY (3 ECTS)		
Teachers: Sandra CECCONI		
1	Course objectives	The goal of this module is to illustrate the animal cells and to develop the basic concepts of protein structure and function within the overall context of cell function, with special focus on the nucleus and the DNA functioning. This module is strictly connected to the Module B) and it is the basic prerequisite for it.
2	Course content and Learning outcomes (Dublin descriptors)	<p>Topics of the module A:</p> <ul style="list-style-type: none"> - Eucaryotic cell structure and the differences between procaryotic and viral bodies. - The DNA: its organization, function and replication. Chromatin. Chromosomes and telomeres. Histones and nucleosomes. The main DNA damages and their repair. The transcription process in eukaryotic and prokaryotic cells. The gene expression in prokaryotic and eukaryotic cells, the Operone LAC and the tryptofane. Epigenetics modifications. - The genetic code and the transduction process, the tRNA and ribosomes. The protein synthesis, folding and destiny. - The protein secretion: the RER, Golgi's apparatus and vescicoles. Eso and endocytosis. The plasma membrane and the cytoskeleton. Receptor classification and G-proteins. TRK receptors. Insulin and Glucagone. Cell Cycle and cyclines. The CDK and CKI. The checkpoints. The p53 and Rb. The M phase, MPF and its activation. The cell death process: apoptosis and necrosis. - Cell division: Meiosis and Mitosis. The clonation and stem cells. <p>On successful completion of this module, the students should:</p> <ul style="list-style-type: none"> o Have developed basic knowledge and skills in cell and molecular biology and become aware of the complexity of prokaryotic and eukaryotic cells. o Understand and explain the structure and function of different classes of membrane and transmembrane proteins, in particular the opsins, the nicotinic and the acetylcholine receptors; o Be able to describe some of the signal-proteins that determine their localization in different parts of the cell, and to explain the mechanisms that target proteins to particular organelles to ensure they are secreted from the cell; o Be able to understand and explain the structure and function of different classes; o Be able to describe the main cellular organules and their functions; o Demonstrate capacity to continue learning by understanding texts on related topics.
3	Prerequisites and learning activities	The students must know human cell Biology at secondary school level.
4	Teaching methods and language	Lectures; exercises, tutorials; home work Language: Italian/English Ref. Text books: - Alberts et al. – <i>L'essenziale di biologia molecolare della cellula</i> – Ed. Zanichelli - Stefani, N.Taddei.: <i>Chimica, biochimica e biologia applicata</i> Ed. Zanichelli.
5	Assessment methods and criteria	<u>Formative Assessment:</u> the students are invited to make some home work and to participate to discussions on concrete examples. The active participation is supported and stimulated also by short Q&A sessions. <u>Summative Assessment:</u> Formal written examination (50%) and oral examination (50%). Written exam: 2-hour Multiple choice test on the structure and function of the main classes of membrane and transmembrane proteins Oral exam: the student must provide evidence of the acquired knowledge by answering in half an hour to 4 questions on fundamental topics. The questions aim to ascertain the achievement of the fundamental Learning Outcomes.

B) INTRODUCTORY BIOCHEMISTRY AND BIOCHEMISTRY (6 ECTS)

Teachers: Valentina QUARESIMA

1	Course objectives	The goal of this Module is to provide the students with: 1) the classical concepts of chemistry (general, inorganic and organic) targeted towards the learning of chemical and biochemical mechanisms governing life processes; 2) the molecular basis of biological systems and the structure-function relationships of macromolecules (with special reference to the composition and the main functions of the human tissues and fluids); 3) the primary metabolic pathways and their regulation at the molecular, cellular and tissue level.
2	Course content and Learning outcomes (Dublin descriptors)	<p>Topics of the module B:</p> <ul style="list-style-type: none"> - Structure of the atom and the periodic system - Chemical bonds and the water. Solutions. Concentration and solubility. Molarity. - Chemical reactions, Thermodynamics, Chemical kinetics - Chemical equilibrium. Equilibria in aqueous solution. The buffer systems. - Functional groups and reactivity of organic compounds and Stereochemistry - The Biochemistry and the study of human health - Carbohydrates, Lipids, Proteins and Enzymes - Metabolism of carbohydrates (aerobic and anaerobic glycolysis; Krebs' cycle; glycogen metabolism; gluconeogenesis) - Bioenergetics. Electron transport and oxidative phosphorylation. - Lipid metabolism (biosynthesis and catabolism of fatty acids; ketone bodies) - Metabolism of Amino Acids and Proteins (protein turnover and urea cycle) <p>On successful completion of this module, the students should</p> <ul style="list-style-type: none"> o Have acquired profound knowledge of chemistry and biochemistry by integrating chemical, physiological and pathological evidence of human biochemistry; o Understand and explain the meaning of statements related to biochemistry using appropriate language; o be able to describe the rudiments involved in the measurement of analytes in the clinical biochemistry laboratory and to outline how biochemical analysis can be employed to differentiate between normal and diseased conditions; o have acquired skills for performing practical biochemical analysis of clinical samples and data handling exercises associated with biochemical analysis; o have capacity to discuss the function, structure, laboratory investigation and diseases of the different body systems and describe how chemical and biochemical analysis are applied to the study of disease; o be able to outline a step-by-step approach to the use of the laboratory in diagnosis and to correlate laboratory findings in clinical samples to pathological processes; o Demonstrate capacity to continue learning by understanding texts on related topics.
3	Prerequisites and learning activities	The students must know human cell Biology at secondary school level.
4	Teaching methods and language	<p>Lectures; exercises, tutorials; home work Language: Italian/English</p> <p>Ref. Text books:</p> <ul style="list-style-type: none"> -Binaglia L., Giardina B.: <i>Chimica e propedeutica biochimica</i> Ed. McGraw-Hill. -Bettelheim F.A., et al - <i>Chimica e Propedeutica Biochimica</i> Ed. EdiSES -M. Stefani, N.Taddei.: <i>Chimica, biochimica e biologia applicata</i> Ed. Zanichelli.
5	Assessment methods and criteria	<p><u>Formative Assessment:</u> the students are invited to make some home work and to participate to discussions on concrete examples. The active participation is supported and stimulated also by short Q&A sessions.</p> <p><u>Summative Assessment:</u> Formal written examination (50%) and oral examination (50%). Written exam: 2-hour Multiple choice test on chemistry and biochemistry by integrating chemical, physiological and pathological evidence of human biochemistry. Oral exam: the student must provide evidence of the acquired knowledge by answering in half an hour to 4 questions on fundamental topics. The questions aim to ascertain the achievement of the fundamental Learning Outcomes.</p>

Programme of "ISTOLOGIA E ANATOMIA"

"HISTOLOGY AND ANATOMY"

The course presents the human body planning, shape and morphology of human tissues, organs and apparatuses and is composed of two Modules: A) Histology, B) Human Anatomy

D0413, Compulsory

1st Cycle Degree in BIOMEDICAL LABORATORY TECHNIQUES, 1st year, 1st semester

Number of total ECTS credits: 6 (total workload: 150 hours; 1 ECTS credit = 25 hours)

A) HISTOLOGY (3 ECTS)

Teacher: Bianca Maria ZANI

1	Course objectives	The goal is to underline the biological correlations between the cell shape and its specific function inside the human body. The students should acquire knowledge of the intercellular connections and their 3D organization aimed to construct different tissues. They should recognize the different kinds of the human body tissues.
2	Course content and Learning outcomes (Dublin descriptors)	<p>Topics of the modules include:</p> <ul style="list-style-type: none"> - human cell general organization; - basic cell biology and histochemistry; - morphology and embryonic development of human cells and tissues; - applied histology through observation of cells and tissues using optical microscopy; - correlations between embryonic development, shape and function of cells and tissues. <p>In the course a more widespread structural approach will be used.</p> <p>On completion of this Module the students should:</p> <ul style="list-style-type: none"> o demonstrate a general knowledge of body planning and of shape and topography of the human body tissues; o have acquired knowledge and understanding of cell structure and tissue organization; o demonstrate ability to integrate the information acquired from lectures with practical microscopic observations; o be able to identify the different types of tissues within the human body, and to describe the function of each; o apply their competence to describe and recognize cells and tissues with the use of microscopy. <p>All of the above will provide the morphological basis needed to face specific biomedical issues.</p>
3	Prerequisites and learning activities	The students must know the basic notions of Cell Biology, Chemistry and Biochemistry acquired in high school. Learning activities : Attending lectures, preparation of oral/written reports, participation in discussion, optical microscope individual observations and oral descriptions.
4	Teaching methods and language	Lectures, seminars, microscope training and testing Language: Italian and English Ref. Text books: S.Adamo et al.: <i>Istologia</i> – Piccin 2009
5	Assessment methods and criteria	Formative Assessment: the students are invited to make some home work and to participate to discussions on concrete examples. The active participation is supported and stimulated also by short Q&A sessions. Summative Assessment: Formal written Examination (100%) Written exam: 2-hour Multiple choice test on Histochemistry, Cell Biology and Histology.

A) HUMAN ANATOMY (3 ECTS)

Teacher: Maria Adelaide CONTINENZA

1	Course objectives	Aim of this module is to provide the fundamentals in human anatomy to aid the student in understanding the relationships between morphology and function of each organ. The human body planning and also systematic and topographic anatomy of the human body organs were explained. The course describes the macro and microscopic structure of the locomotor, circulatory, respiratory, digestive, genitourinary, reproductive, endocrine and nervous system organs.
2	Course content and Learning outcomes (Dublin descriptors)	Correlating the shape with function, the main topics of this module are: <ul style="list-style-type: none"> - Gross Anatomy of the organs of the musculoskeletal, digestive, cardiovascular, respiratory, urinary, nervous, endocrine and reproductive systems.

		<ul style="list-style-type: none"> - Detailed morphological description of organs, implemented through observation of plastic models and of 3D reconstructed images. - Optical microscopy observations to show the structure and spatial architecture of the main organs (liver, kidney, spleen, lung, heart and vessels, bone, muscles, salivary glands, endocrine glands, gonads). <p>On completion of this module, students are expected to be able to:</p> <ul style="list-style-type: none"> o demonstrate a general knowledge of body planning, shape and topography of the main organs in each apparatus, including a comprehensive knowledge of human body tissues; o have acquired knowledge and understanding of organ structure and tissue organization; o demonstrate ability to integrate the information acquired from lectures with practical microscopic observation; o be able to identify the different types of organ of the body, and to describe the structure of each; o apply their competence to describe and recognize organs and tissues with the use of optical microscopy.
3	Prerequisites and learning activities	<p>Prerequisites The students must know the basic notions of Cell Biology, Chemistry and Biochemistry acquired in high school.</p> <p>Learning activities: Attending lectures, preparation of oral/written reports, participation in discussion, optical microscope individual observations and oral descriptions.</p>
4	Teaching methods and language	<p>Teaching methods Lectures, seminars, microscope training and testing</p> <p>Language: Italian and English</p> <p>Ref. Text books: -G. Anastasi et al: Anatomia dell'uomo – Edi-Ermes 2011 -Netter: Human Anatomy Atlas – Elsevier 2012 Other books and atlases of human body anatomy are accepted.</p>
5	Assessment methods and criteria	<p>Formative Assessment: the students are invited to make some home work and to participate to discussions on concrete examples. The active participation is supported and stimulated also by short Q&A sessions.</p> <p>Summative Assessment: Formal written Examination (30%) and Oral Examination (70%) Written exam: 2-hour Multiple choice test on the main organs and their functions. The students will be assessed on their demonstrated ability to discuss the main course contents, using the appropriate scientific terminology.</p> <p>Oral exam: the student must provide evidence of the acquired knowledge of the human body organs, proving the achievement of the main Learning Outcomes.</p>

<p>Programme of “FISICA E INFORMATICA” “PHYSICS AND INFORMATICS”</p> <p>The course provides Basic Physics, Information processing, Informatics and radioprotection. It is composed of four Modules : A) Applied Physics, B) Radiation Protection, C) Information Processing, D) Basic Informatics</p>		
<p>D0414, Compulsory 1st Cycle Degree in BIOMEDICAL LABORATORY TECHNIQUES , 1st year - 1st semester</p>		
<p>Number of ECTS credits: 11 (workload 300 hours; 1 credit = 25 hours)</p>		
<p>A) APPLIED PHYSICS (3 ECTS)</p>		
<p>Teacher: Silvia COLACICCHI</p>		
1	Course objectives	<p>The purpose of this module is to provide participants with a broad introduction to fundamentals of physics. In this module students will develop knowledge and skills related to Newtonian mechanics, fluid dynamics and waves. The course aims to give students a full and thorough knowledge of these topics with emphasis on the relationship between the Physics laws and the normal human body functions.</p>
2	Course content and Learning outcomes (Dublin descriptors)	<p>Topics of the Module include</p> <ul style="list-style-type: none"> - Standards: SI System, Measurements and significant figures. Vectors. Force and acceleration. Newton's Laws. Energy and momentum. Equilibrium, the lever and mechanical advantage. Temperature and heat . Heat/energy balance in human body. - Wave characteristics, intensity, X-ray and radioprotection. Magnetic resonance. Sources

		<p>and propagation of light. Human eye functioning. Main sight defects and their correction. Sources and propagation of sound, intensity. Ear sensitivity and decibels. Human ear functioning. Ultra and infra-sounds.</p> <ul style="list-style-type: none"> - Fluid mechanics: liquids and gases. Density and pressure. Flow laws. Viscosity. Properties of blood flow circulation. <p>On successful completion of this module the student should</p> <ul style="list-style-type: none"> o Understand basic physics concepts of linear mechanics. o Understand basic properties and physics of fluids. o Understand basic properties and physics of periodic motion. o Understand basic properties and physics of waves. o be able to solve applied problems, identifying the key physics concepts involved and performing related calculations. o be able to relate the physics principles to various aspects of modern technologies used in the workplace. o be able to communicate the physics principles and applications with their colleagues. o be able to critically assess primary literature in the area of medical physics.
3	Prerequisites and learning activities	The student must have the basic mathematical knowledge and methods as acquired in the secondary schools
4	Teaching methods and language	Lectures, team work, exercises, home work Language: Italian/English Ref. Text books : Any book used at secondary school supported by the teacher's slides are suitable.
5	Assessment methods and criteria	<u>Formative Assessment:</u> the students are invited to make some home work and to solve some concrete problems. The active participation is supported and stimulated also by short Q&A sessions. <u>Summative Assessment:</u> Formal written Examination (100%) Written exam: 2-hour problem solving tests on the main topics of the course.
B) RADIOPROTECTION TECHNIQUES (2 ECTS)		
Teacher: Ernesto DI CESARE		
1	Course objectives	This Module aims to provide the students with a level of understanding sufficient to enabling them to properly identify the existence, magnitude of potential hazard and potential significance of any radiation hazard and to implement appropriate agreed protocols for dealing with such events by involving external experts/consultants when required.
2	Course content and Learning outcomes (Dublin descriptors)	<p>Topics of the Module:</p> <ul style="list-style-type: none"> - Basic concepts of ionizing radiation - Radiation doses and units - Radiation hazards – Health effects, Doses in perspective - Radiation measurement - Use of EPD / dose rate and contamination monitor, Relevance of measurement results - Radiation use - Practical protection: Protection from internal exposures, Protection from external exposures, Accident case histories; - National and European Regulation and Supporting Schemes: Overview of Italian Regulation; - Dose limitation (Occupational, Emergency, Patients and carers), Key requirements; - Hazard Recognition and Situation Analysis (medical incidents: Foreseeable, mitigation, consequences, Civil nuclear incidents: Nuclear emergency plans, Possible scenarios). <p>On completion of the training candidates should:</p> <ul style="list-style-type: none"> o Understand the nature and properties of ionizing radiations o Be familiar with terminology used in radiation protection o Be aware of and understand the potential hazards associated with ionizing radiations and have an understanding of the concept of ALARP (As Low As Reasonably Practicable), one of the fundamental principles of risk management o Understand the basic principles of practical protection o Have a general awareness of the range of applications of ionizing radiation in medicine o Have an awareness of the categories of possible radiation incidents – industrial, nuclear, malicious (CBRN) etc. and their likely consequences o Understand how radiation measurements can be made in the field and know how to use,

		and interpret results obtained from instrumentation available to the ambulance trusts. o Know and be familiar with agreed national strategy/protocols for dealing with radiation incidents and understand the importance of adhering to specified procedures.
3	Prerequisites and learning activities	The student must have the basic mathematical notions and methods as acquired in the secondary schools
4	Teaching methods and language	Lectures, team work, exercises, home work Language: Italian/English Ref. Text books : E. di Cesare, P Gallicchi, M Midiri " <i>La Radioprotezione Negli Studi Radiologici</i> ", ed Gnocchi, 2010
5	Assessment methods and criteria	<u>Formative Assessment:</u> the students are invited to make some home work and to participate to discussions on concrete examples. The active participation is supported and stimulated also by short Q&A sessions. <u>Summative Assessment:</u> Formal written Examination (100%) Written exam: 2-hour Multiple choice test on the main radioprotection rules and safety protocol application.
C) INFORMATION PROCESSING (2 ECTS)		
Teacher: Arturo SARRANTONI		
1	Course objectives	Aim of this module is to introduce the data and in particular the computerized data, as a valuable resource for any medical activity and to present tools and techniques to provide secure control and management. Students will study database design, data models, database management systems, database theory and database security techniques.
2	Course content and Learning outcomes (Dublin descriptors)	Topics of this Module are: - Introduction to the importance of the database approach to data storage, analysis and manipulation compared with the file-based system approach - Top-down database design methods - The disadvantages of the bottom-up approach and the advantages of the top-down approach in the design of large and complex database - Conceptual modelling of databases - Logical modelling of databases - Queries on relational databases - Coding systems in computer science and medicine - Database security techniques On successful completion of this module, the student should: o Have gained knowledge and understanding of what is involved in the design of a database. o Have gained knowledge and understanding of the models used for structuring data in database systems. o Be able to implement a database and report on the process. o Be able to query a database. o Demonstrate a critical understanding of the database approach to data management. o Demonstrate an extensive understanding of data modeling concepts and methodologies (i.e. top-down and bottom-up methods). o Demonstrate the ability to design and implement relational database systems. o Be able to use a high-level query language (i.e. SQL and QBE) to manipulate data stored in a relational DBMS. o Have capacity to up-date the knowledge in this evolving field.
3	Prerequisites and learning activities	The student must have the basic mathematical knowledge and methods as acquired in the secondary schools
4	Teaching methods and language	Lectures, team work, exercises, home work Language: Italian/English Ref. Text books : Vittorini P.- " <i>L'informatica per la medicina e la sanità pubblica</i> ", 2009. Ed. L'Una.
5	Assessment methods and criteria	<u>Formative Assessment:</u> the students are invited to make some home work and to develop a simple database. The active participation is supported and stimulated also by short Q&A sessions. <u>Summative Assessment:</u> Formal written Examination (100%) Written exam: consisting in the development of a simple database by following the methodology presented during the course.

D) BASIC INFORMATICS (3 ECTS)

Teacher: Pierpaolo VITTORINI		
1	Course objectives	The purpose of this introductory module is to explain the origins, key components and current state of Health Informatics. It also provides knowledge and skills relating to the delivery of healthcare in a technologically advanced and information led society. The course is designed to enable students to solve information and health management problems arising from the adoption of information and communication technologies and changes in healthcare provision.
2	Course content and Learning outcomes (Dublin descriptors)	<p>Topics include:</p> <ul style="list-style-type: none"> - Health care structure and processes in the Public Health in Italy; - Use of technology to support the delivery and planning of health care systems currently in use in the world; - The role of structured and unstructured clinical data, coding and data standards; security and risk implications in health care; key issues in health informatics and how particular design strategies are suited to addressing them; the scope for automated clinical decision support; - Introduction to methods of evaluation; evaluation of a system within a primary care organisation. - Introduction to algorithms and examples in computational epidemiology - Computer architectures and operating systems - Introduction to imaging <p>On successful completion of the Module the student should be able to:</p> <ul style="list-style-type: none"> o Identify and critically appraise appropriate sources of research information o Critically evaluate the relevance of an evidence based approach for Health Informatics o Demonstrate understanding of the research process o Critically analyse the application of a research approach to Health Informatics. o Demonstrate systematic understanding of principles and techniques in relevant aspects of scientific and healthcare disciplines which interact with the application of information science and technology. o Demonstrate detailed understanding of the scientific basis of clinical and technical problems encountered in the health-related and healthcare fields. o Use computers and models to develop knowledge-based systems o Develop a practical knowledge of clinical coding, terminology and disease classification, and a comprehensive understanding on how their concepts may be realised in computerised health systems. o Use information technology to prepare, process, store and present data, information and knowledge, and critically evaluate solutions and responses using appropriate techniques. o Test concepts and hypotheses for innovative solutions. o Demonstrate adoption of the necessary systemic and professional values appropriate to conduct in health informatics research, business and policy-making. o Promote the value of equality and diversity when working in the group settings
3	Prerequisites and learning activities	The student must have the basic mathematical notions and methods as acquired in the secondary schools
4	Teaching methods and language	Lectures, team work, exercises, home work Language: Italian/English Ref. Text books : Vittorini P.- L'informatica per la medicina e la sanità pubblica . 2009. Ed. L'Una.
5	Assessment methods and criteria	<u>Formative Assessment:</u> the students are invited to make some home work and to participate to discussions on concrete examples. The active participation is supported and stimulated also by short Q&A sessions. <u>Summative Assessment:</u> Formal written Examination (60%), Practical Assessment (40%) Written exam: consisting in the development of a simple database by following the methodology presented during the course. Practical assessment: Office software knowledge.

Programme of “FISIOLOGIA” “HUMAN PHYSIOLOGY”		
D0422 , Compulsory		
1st Cycle degree in BIOMEDICAL LABORATORY TECHNIQUES, 1st year ; 2nd semester		
Number of ECTS credits: 3 (workload : 75 hours, 1 ECTS credit = 25 hours))		
Teacher: Maria Giuliana TOZZI		
1	Course objectives	<p>The goal of this course is to provide the knowledge about the organs and systems physiology in normal healthy conditions.</p> <p>On successful completion of this module, the student should understand the fundamental concepts of: a) the cell excitability and the interaction between excitable cells; b) the integrated functioning of different organs, apparatuses and their main control mechanisms; c) the basic neurophysiological processes related to the behavior and to the cognitive and emotional interactions with the environment.</p>
2	Course content and Learning outcomes (Dublin descriptors)	<p>Topics of the module include:</p> <ul style="list-style-type: none"> - Cellular Physiology; Physiology of excitable cells (structure and function of the plasma membrane: ion channels, resting membrane potential, genesis and propagation of action potential, synaptic transmission); - Blood and Cardiovascular Physiology (blood general functions; hemostasis and coagulation; electrical activity of the heart [ECG]; cardiac mechanic events; physiology of circulation, control mechanisms); - Physiology of renal function (VFG; main tubular mechanism; urine formation; renal role in the maintenance of fluid-electrolyte balance, control of extracellular volume and osmolarity, regulation of acid-base balance); - Physiology of respiratory system (ventilation, perfusion, alveolar-capillary gas exchange; control mechanisms; diffusion and transport of respiratory gases in the blood); - Physiology of the gastrointestinal system (secretion, motility, absorption and their control mechanisms); - Physiology of endocrine system (hormonal regulation, the hypothalamus-pituitary system and endocrine glands); - Physiology of the nervous system (receptors, perception of pain, basic elements of motor system, and functional organization of the sympathetic and parasympathetic systems). <p>On successful completion of this module, the student should</p> <ul style="list-style-type: none"> o Acquire profound knowledge of the integrated functioning of different organ systems; o Have knowledge and understanding of the compensatory mechanisms induced by the changes of the internal and external environment to maintain the homeostasis; o Demonstrate skills in physiologic mechanisms involved in human health and ability to conceive a proof; o Understand and explain the meaning of statements using physiologic notation and language; o Demonstrate capacity to continue learning by understand other texts on related topics.
3	Prerequisites and learning activities	The student must know Human Anatomy and Biochemistry
4	Teaching methods and language	<p>Frontal lectures; seminars; team work; exercises, tutorials; home work</p> <p>Language: Italian/English</p> <p>Ref. Text books:</p> <ul style="list-style-type: none"> -Stanfield, "<i>Fisiologia</i>", EDISES 2011 -DU Silverthorn "<i>Fisiologia</i>", Casa Ed. Ambrosiana -GATHibodeau &KT Patton "<i>Anatomia e Fisiologia.</i>"
5	Assessment methods and criteria	<p><u>Formative Assessment:</u> the students are invited to make some home work and to participate to discussions on concrete examples. The active participation is supported and stimulated also by short Q&A sessions.</p> <p><u>Summative Assessment:</u> Formal Oral Examination (100%)</p> <p>Oral exam: Half an hour discussion and presentation of the integrated functioning of different organ systems and of the compensatory mechanisms induced by the changes of the internal and external environment to maintain the homeostasis by using correct physiologic notation and language.</p>

**Programme of “TECNICHE DI MEDICINA DI LABORATORIO E MICROBIOLOGIA CLINICA”
“MEDICAL LABORATORY TECHNIQUES AND CLINICAL MICROBIOLOGY”**

This course is composed of two Modules : A) Medical laboratory techniques, B) General and Clinical Microbiology

D0423, Compulsory

1st Cycle Degree in BIOMEDICAL LABORATORY TECHNIQUES, 1st year - 2nd semester

Number of ECTS credits: 6 (workload 150 hours, 1 credit = 25 hours)

A) MEDICAL LABORATORY TECHNIQUES (3 ECTS)

Teacher: Benedetta CINQUE

1	Course objectives	The main purpose of the program is to provide the students with the good knowledge of the basic techniques used in the laboratory
2	Course content and Learning outcomes (Dublin descriptors)	<p>The topics of the Module A include:</p> <ul style="list-style-type: none"> - Flow Cytometry: structure, function and applications - Principles of Geometrical Optics - Optical Microscopy - Structure, function and specimen preparation - Electron Microscopy: Transmission electron microscope (TEM); Scanning electron microscope (SEM) and applications - Centrifugation techniques: preparative centrifugation, analytical centrifugation and applications - Immunochemical techniques (ELISA, RIA, Immunofluorescence technique, agglutination reactions) and applications <p>On successful completion of the modules, the student should:</p> <ul style="list-style-type: none"> o have profound knowledge of flow cytometry techniques and their diagnostic applications; o have knowledge of optical microscopy and understanding of specimen preparation procedures; o understand and explain immunochemical techniques; o demonstrate skills in the preparation of slides for microscopy and competences in flow cytometry analysis.
3	Prerequisites and learning activities	The student must know basic principles of Chemistry and Physics
4	Teaching methods and language	Lectures, team work, scientific paper reading Language: Italian Text books: - Spandrio L. " <i>Principi e tecniche di chimica clinica</i> ", Piccin, 2006. - N. Simonetti, G. Simonetti, F.D. D'Auria, M. Lembo " <i>Elementi di tecniche microbiologiche</i> ", Ed. EMSI, 2001.
5	Assessment methods and criteria	<u>Formative Assessment:</u> the students are invited to make some home work and to participate to discussions on concrete examples. The active participation is supported and stimulated also by short Q&A sessions. <u>Summative Assessment:</u> Formal Oral Examination (100%) Oral exam: Half an hour discussion and presentation of the flow cytometry techniques and their diagnostic applications by proving knowledge of specimen preparation procedures and techniques.

B) GENERAL AND CLINICAL MICROBIOLOGY (3 ECTS)

Teacher: Remo BARNABEI

1	Course objectives	This Module aims to provide students with an introduction to the broad compass of Microbiology - ways in which fundamental principles are put into practice and the elementary skills and techniques needed for safe laboratory work.
2	Course content and Learning outcomes (Dublin descriptors)	<p>The topics of the Modules B include:</p> <ul style="list-style-type: none"> - Brief History of microbiology. General bacteriology: instrumentation in a microbiological laboratory and sterilization techniques. General information on prokaryotic cells. Pathogenic microorganisms. Pathogenicity. Virulence factors, the main bacterial toxins. Microscopic examination of bacteria. Staining techniques and techniques of cultivation of bacteria and fungi. Special Bacteriology: Staphylococcus, Streptococcus, Neisseria,

		<p>Pseudomonas, Helicobacter pilory, Enterobacteriaceae (E. coli VTEC, Salmonella, Shigella), Brucella, Klebsiella, Acinetobacter, Clostridia, Corynebacteria, Haemophilus, Bordetella, Mycobacteria, Chlamydia, Legionella, Mycoplasma, Treponema, Borrelia, Streptococcus mutans and dental plaque . Antibacterial drugs. Resistances. The susceptibility. Fungi: Biology. Candida albicans, Aspergillus. Viruses: Biology, Viral interference, Molecular biology techniques.</p> <p>- Special Virology: HBV, HCV, HIV, natural history and diagnosis. Serology</p> <p>On successful completion of the modules, the student should be able to:</p> <ul style="list-style-type: none"> o know and understand routine microbiology techniques; o illustrate the diversity of pathogens within the microbial world using examples of current local and global interest; o Compare and contrast strategies by which different pathogens invade and cause disease in a host, including subversion of the immune system; o Evaluate strategies for the prevention and treatment of infection; o Relate the specific properties of pathogens to diagnostic methods; o Develop analytical and experimental laboratory skills in medical microbiology; o Evaluate experimental data and develop capacity to read and understand scientific reports.
3	Prerequisites and learning activities	The student must know basic principles of Chemistry and Physics
4	Teaching methods and language	<p>Lectures, team work, scientific paper reading</p> <p>Language: Italian</p> <p>Text books:</p> <p>-Wilson K., Walker J. <i>"Biochimica e biologia molecolare Principi e tecniche"</i>, Raffaello Cortina Editore, 2006.</p> <p>- Spandrio L. <i>"Principi e tecniche di chimica clinica"</i>, Piccin, 2006.</p>
5	Assessment methods and criteria	<p><u>Formative Assessment:</u> the students are invited to make some home work and to participate to discussions on concrete examples. The active participation is supported and stimulated also by short Q&A sessions.</p> <p><u>Summative Assessment:</u> Formal Oral Examination (100%)</p> <p>Oral exam: Half an hour discussion and presentation of the flow cytometry techniques and their diagnostic applications by proving knowledge of specimen preparation procedures and techniques.</p>

<p>Programme of "SCIENZE TECNICODIAGNOSTICHE DI LABORATORIO"</p> <p>"DIAGNOSTIC AND LABORATORY TECHNIQUES"</p> <p>This course is composed of two Modules : A) Biomedical Laboratory Methods, B) Clinical Biochemistry</p>		
<p>D0442, Compulsory</p> <p>1st Cycle Degree in BIOMEDICAL LABORATORY TECHNIQUES, 2nd year, 1st semester</p>		
<p>Number of ECTS credits: 7 (total workload: 175 hours; 1 credit = 25 hours)</p>		
<p>A) BIOMEDICAL LABORATORY METHODS (3 ECTS)</p>		
<p>Teacher: Benedetta CINQUE</p>		
1	Course objectives	The objectives of the module are to provide the students with the practice of continuing formation and the knowledge of modern laboratory techniques.
2	Course content and Learning outcomes (Dublin descriptors)	<p>Topics of the Module include:</p> <ul style="list-style-type: none"> - Medical Laboratory and the phases of testing: preanalytical, analytical, postanalytical. Biological variability. - Flow cytometry applications - Separation Methods. Electrophoresis, principles and applications and Western Blotting - Chromatographic methods: principles and applications, biological hazards - Cytopathology methods, innovative methods for immune response analysis. <p>On successful completion of these modules the students are expected to understand the role of laboratory testing in health care. They should:</p> <ul style="list-style-type: none"> o acquire the theoretical and practical knowledge of laboratory methodologies, with particular emphasis on innovative methodologies;

		<ul style="list-style-type: none"> ○ acquire the ability to express concepts using appropriate technical language and the capacity to continue learning. ○ have profound knowledge of flow cytometry techniques and their diagnostic applications; ○ have knowledge of optical microscopy and understanding of specimen preparation procedures; ○ understand and explain immunochemical techniques; ○ demonstrate skills in the preparation of slides for microscopy and competences in flow cytometry analysis; ○ be able to describe the steps involved in tissue processing in the clinical histopathology laboratory and apply the principles.
3	Prerequisites and learning activities	The students must know Cell Biology, Chemistry and Biochemistry
4	Teaching methods and language	<p>Teaching methods: Lectures, team-work and scientific papers reading</p> <p>Language: Italian/English</p> <p>Ref. Text books:</p> <ul style="list-style-type: none"> -Wilson K e Walker J: <i>Biochimica e biologia molecolare: Principi e tecniche</i>- Raffaello Cortina Ed. 2006. - Federici G., Bernardini S, et al.: <i>Medicina di laboratorio</i> - McGraw-Hill; III° Ed., 2005. - Spandrio L. : <i>Principi e tecniche di chimica clinica</i>, Piccin, 2006
5	Assessment methods and criteria	<p>Formative Assessment: the students are invited to make some home work and to participate to discussions on concrete examples. The active participation is supported and stimulated also by short Q&A sessions.</p> <p>Summative Assessment: Formal Oral Examination (100%)</p> <p>Oral exam: Half an hour discussion and presentation of the flow cytometry techniques and their diagnostic applications, of immunochemical techniques and of the steps involved in tissue processing in the clinical histopathology laboratory.</p>
B) CLINICAL BIOCHEMISTRY (4 ECTS)		
Teachers: Mariagrazia PERILLI		
1	Course objectives	The objective of this module is to introduce students to the basic concepts of clinical biochemistry and laboratory medicine, providing them with the basic techniques of clinical biochemistry and clinical molecular biology. It provides an overview of the key aspects of clinical chemistry, the science behind many of the diagnostic tests used in medicine. The module includes how the measurements are performed and how they can be setup to ensure reliability of results.
2	Course content and Learning outcomes (Dublin descriptors)	<p>Topics of the Module include:</p> <ul style="list-style-type: none"> - Serum proteins: classification and clinical application. Pre-albumin, Albumin, C-reactive protein (CRP), Transferrin, Ferritin. Determination of blood proteins concentration. Electrophoresis of blood proteins. - Enzymology: clinical significance of blood enzymes. Enzyme kinetics. Alkaline and acid phosphatases, enzymes LDH, CK-MB, AST. - Lipoproteins: Classification, Clinical Applications. Chylomicron, VLDL, LDL, HDL. Lipoprotein physiology and metabolism: exogenous and endogenous pathways. Lipoproteins receptors. Dislipidemias. Lipid and Lipoprotein analysis: cholesterol and triglycerides measurements. - Metabolism of carbohydrates. Hyperglycemia and Diabetes. Criteria for the diagnosis of Diabetes. The action of hormones: insulin and glucagon. Biochemical tests for diagnosis of Diabetes. - Spectrophotometry and photometry. - Molecular biology techniques in molecular diagnosis. DNA and RNA extraction from eukaryotic and prokaryotic cells. - Nucleic acids amplification: PCR. Allele-specific mutation detection by PCR-ARMS and PCR-ASO. - Quantitative PCR - Competitive oligopriming - Enzymatic and chemical cleavage methods to identify genetic variation. - Eteroduplex analysis. SSCP. DGGE - Capillary Electrophoresis - Sanger sequencing and next generation sequencing.

		<p>On successful completion of this module the students are expected to understand the role of laboratory testing in health care. They should be able to:</p> <ul style="list-style-type: none"> ○ demonstrate the theoretical and practical knowledge of laboratory methodologies, with particular emphasis on innovative methodologies; ○ Discuss the function, structure, laboratory investigation and diseases of the different body systems. ○ Describe how chemical and biochemical analysis are applied to the study of disease. ○ Outline a step-by-step approach to the use of the laboratory in diagnosis. ○ Correlate laboratory findings in clinical samples to pathological processes. ○ Perform complex data handling exercises associated with biochemical analysis. ○ Demonstrate an awareness of the processes needed to validate and quality assure clinical chemistry analyses ○ Critically evaluate methods used in clinical chemistry ○ Demonstrate an understanding of a range of clinical chemistry tests and their application to the diagnosis and/or monitoring of disease ○ Understand the principles and application of therapeutic drug monitoring ○ demonstrate the ability to express concepts using appropriate technical language and the capacity to continue learning.
3	Prerequisites and learning activities	The students must know Cell Biology, Chemistry and Biochemistry
4	Teaching methods and language	<p>Teaching methods: Lectures, team-work and scientific papers reading Language: Italian/English Ref. Text books: - Zatti, Goglio et al., <i>Medicina di Laboratorio</i> –Ed. Idelson-Gnocchi, 2006. - Luigi Spandrio, <i>Biochimica Clinica</i> – Ed. Sorbona, 2008. - G.P. Patrinos and W. Ansoerge, <i>Molecular Diagnostics</i> – Elsevier, 2005.</p>
5	Assessment methods and criteria	<p><u>Formative Assessment:</u> the students are invited to make some home work and to participate to discussions on concrete examples. The active participation is supported and stimulated also by short Q&A sessions.</p> <p><u>Summative Assessment:</u> Formal Oral Examination (100%) Oral exam: Half an hour discussion and presentation of the function, structure, laboratory investigation and diseases of the different body systems, of chemical and biochemical analysis application to the study of disease and of the processes needed to validate and quality assure clinical chemistry analyses.</p>

<p>Programme of “PATOLOGIA GENERALE E CLINICA” “GENERAL AND CLINICAL PATHOLOGY” This course is composed of two Modules : A) General Pathology, B) Clinical Pathology</p>		
<p>D0496, Compulsory 1st Cycle Degree in BIOMEDICAL LABORATORY TECHNIQUES, 2nd year, 1st semester</p>		
<p>Number of ECTS credits: 7 (total workload: 175 hours; 1 credit = 25 hours)</p>		
<p>A) GENERAL PATHOLOGY (3 ECTS)</p>		
<p>Teacher: Maria Grazia CIFONE</p>		
1	Course objectives	<p>The goal of the module is to provide the student with the necessary knowledge for understanding the manifestations of the disease, its process and sequelae, its possible cause (etiology) and the underlying mechanisms (pathogenesis).</p>
2	Course content and Learning outcomes (Dublin descriptors)	<p>The General Pathology Module deals with how tissues respond to injury, cell death, inflammation, ischemia, thrombosis, embolism, infarction, and so forth. It also deals with response to infections, environmental pollutants, and disease states related to abnormal immune responses. Mechanisms of tumor development and tumor spread are studied under “neoplasia.”</p> <p>Topics of the Module include:</p> <ul style="list-style-type: none"> - The immune response: innate immunity and inflammatory response, antigens and antibodies, cell mediated immunity, hypersensitivity (hypersensitivity diseases); - Immune deficiency: general aspects of the syndrome - Mutations and Neoplastic degeneration

		<p>On successful completion of this module, it is expected that the student should:</p> <ul style="list-style-type: none"> ○ Have acquired knowledge of the disease starting and the body response to the infections and to the antigen contacts. ○ Demonstrate knowledge of the allergic response ○ Understand and explain the neoplastic degeneration ○ demonstrate the ability to identify and explain the etiology, pathogenesis, gross and microscopic appearances, relevant laboratory investigations, complications and the usual outcome of common diseases. ○ Be able to correlate the important clinical features of the disease with the pathologic changes. ○ Be able to use the new terminology learnt in pathology in the appropriate context. ○ Develop study techniques for self-learning to achieve the learning objectives for each lesson utilizing the lecture handouts, textbooks and other web based resources. ○ Be able to provide a good description of the morphology of lesions. ○ Demonstrate capacities to analyse and interpret clinical data with links to basic sciences.
3	Prerequisites and learning activities	The student must know Cell Biology, Anatomy, Chemistry and Biochemistry
4	Teaching methods and language	<p>Teaching methods: Lectures and practical experience in lab</p> <p>Language: Italian/English</p> <p>Ref. Text books:</p> <p>– All books of General pathology are good</p>
5	Assessment methods and criteria	<p><u>Formative Assessment:</u> the students are invited to make some home work and to participate to discussions on concrete examples. The active participation is supported and stimulated also by short Q&A sessions.</p> <p><u>Summative Assessment:</u> Formal Oral Examination (100%)</p> <p>Oral exam: Half an hour discussion and presentation of body response to the infections and to the antigen contact, of the allergic response, of the neoplastic degeneration and of the related laboratory investigations, complications and the usual outcome of common diseases.</p>
B) CLINICAL PATHOLOGY (4 ECTS)		
Teacher: Vincenza DOLO		
1	Course objectives	The goal of this module is to provide the student with the necessary knowledge of the general and clinical pathology enabling them to understand disease pathogenesis, to correlate the important clinical features of the disease with the pathologic changes and to perform routinary exams.
2	Course content and Learning outcomes (Dublin descriptors)	<p>The Clinical Pathology Module involves the principles of General Pathology but applied in detail to individual organ systems like cardiovascular, respiratory, and so forth. It will also include interpretation of laboratory data for some of the major disease processes.</p> <p>The topics include:</p> <ul style="list-style-type: none"> - The clinical laboratory, general concepts. Pre-analysis: pre-collection variables, the test order, times of collection. Blood collection, additives and anticoagulants. Blood collection devices, storage and preservation. Urine collection: storage and preservation. Other body fluids. Specimen processing: pre-centrifugation phase, centrifugation phase. Principles of instruments functioning. Hematology, hematopoiesis. Blood composition. Erythrocytes: color, size, shape, structure. Leucocytes: neutrophil (morphology and function); Eosinophil (morphology and function). Basophil (morphology and function). Monocyte (morphology and function). Platelets: morphology and function. - Hemoglobin, hematocrit, erythrocyte indices. Erythrocyte sedimentation rate. Erythrocytic disorders. Leucocytic disorders. Plasma proteins, Protein structure, Techniques of protein separation: Electrophoresis. Physiologic amount and pattern of serum protein, abnormalities. Enzyme Linked Immuno-Sorbent Assay, Serologic tumor markers. Serum marker as a tool for diagnosis and monitoring of cancer. Functional classification of tumor markers and their clinical applications: screening, diagnosis, prognosis (recurrence, metastasis, survival). Monitoring treatment response. Recommendation for ordering tumor marker tests. Individual tumor markers. - Routine venipuncture guidelines. Materials, safety, procedures. <p>On successful completion of this module, the student is expected:</p> <ul style="list-style-type: none"> ○ To know <ul style="list-style-type: none"> • the disease starting and the body response to the infections and to the antigen

		<ul style="list-style-type: none"> contacts. • the allergic response • the neoplastic degeneration ○ to be able to understand and perform the main clinical exams and techniques to detect the disease pathogenesis. ○ Be able to identify the etiology, pathogenesis, morphologic changes, structural basis for clinical symptoms and signs, relevant investigations and course of the illness of common/prototypic diseases discussed in the course. ○ Be able to solve clinical problems based on data provided and demonstrate scientific logic. ○ to demonstrate understanding of the inter-relationships among the pathologic processes. ○ To demonstrate the practice of evidence based medicine. ○ Demonstrate the ability to analyze new and previously "not-discussed" clinical situations using scientific approach.
3	Prerequisites and learning activities	The student must know Cell Biology, Anatomy, Chemistry and Biochemistry
4	Teaching methods and language	Teaching methods: Lectures and practical experience in lab Language: Italian/English Ref. Text books: - J. B. Henry., <i>Clinical Diagnosis and management by laboratory methods</i> , Elsevier 2012
5	Assessment methods and criteria	Formative Assessment: the students are invited to make some home work and to participate to discussions on concrete examples. The active participation is supported and stimulated also by short Q&A sessions. Summative Assessment: Formal Oral Examination (100%) Oral exam: Half an hour discussion and presentation of the main clinical exams and techniques to detect the disease pathogenesis, of the aetiology, pathogenesis, morphologic changes, structural basis for clinical symptoms and signs, of common/prototypic diseases discussed in the course.

Programme of "IGIENE E STATISTICA MEDICA" "HYGIENE AND MEDICAL STATISTICS" The course is composed of two modules: A) Hygiene and Epidemiology, B) Medical Statistics		
D04241, Compulsory 1st Cycle Degree in BIOMEDICAL LABORATORY TECHNIQUES, 2nd Year , 1st Semester		
Number of ECTS credits: 6 (total workload: 150 hours; 1 ECTS credit = 25 hours)		
A) HYGIENE AND EPIDEMIOLOGY (3 ECTS)		
Teacher: Anna Rita GIULIANI		
1	Course objectives	The course explains the methods for prevention and protection of the human body at home and in the work environments. It shows the main techniques to control infections and chemical risks.
2	Course content and Learning outcomes (Dublin descriptors)	Topics of the module include: <ul style="list-style-type: none"> - Areas of intervention and Hygiene goals. Factors defining health status, and its frequency measures (rough and specific major rates). - Epidemiological studies : descriptive, analytical, experimental and molecular. - Infectious diseases (the epidemiological triangle: characteristics of the infection source, of the environment and receptive host, transmission and spread of infection diseases in the population). - Primary prevention of infectious diseases (notification, detection, isolation, environmental remediation, immuno-prophylaxis). - Secondary prevention of infectious diseases: post-exposure prophylaxis. The laboratory biohazard and preventive measures. - Chronic degenerative diseases: primary and secondary prevention, screening. - Chemical hazards, toxicity and prevention measures, labelling of chemicals. - Microclimate: chemical and physical properties of air in confined spaces, influence on biohazard and chemical hazard. - Potable water characteristics and health effects.

		<p>On successful completion of the module, the student should:</p> <ul style="list-style-type: none"> ○ demonstrate a general knowledge of Hygiene rules and of methods to perform an epidemiological investigation. ○ be able to describe and discuss pathogens that are associated with human infection and disease and the routes for disease transmission. ○ be able to explain the essential principles of infection control. ○ demonstrate capacity to design outbreak strategies to control the spread of infectious disease. ○ understand the use of serological and molecular diagnostic techniques. ○ be able to define the major types of antimicrobial drugs and analyse the results. ○ know and understand the minimal standards for environmental hygiene within communities. ○ be able to track waste and contamination sources. ○ understand how water systems and waste disposal systems work in communities.
3	Prerequisites and learning activities	The student should have basic knowledge of microbiology and virology
4	Teaching methods and language	<p>Lectures and seminars Language: Italian/English Ref. Text books: -Barbuti S., Belevi E., Fara G. <i>Igiene</i> - Monduzzi Ed. 2002. -Meloni C., Pellissero G. <i>Igiene</i> – Monduzzi Ed. 1992. The student may consult any text on hygiene and preventive medicine for the exam.</p>
5	Assessment methods and criteria	<p><u>Formative Assessment:</u> the students are invited to make some home work and to participate to discussions on concrete examples. The active participation is supported and stimulated also by short Q&A sessions. <u>Summative Assessment:</u> Formal Oral Examination (100%) Oral exam: Half an hour discussion and presentation of pathogens that are associated with human infection and disease and the routes for disease transmission, of the Hygiene rules and methods to perform an epidemiological investigation, of the essential principles of infection control and strategies to control the spread of infectious disease.</p>
B) MEDICAL STATISTICS (3 ECTS)		
Teacher: Antonella MATTEI		
1	Course objectives	This Module explains the main statistical methods and the basis of clinical research. It does not go into great detail about how to perform the myriad statistical tests available, since the goal is less on how to perform these tests, but rather on understanding a range of statistical methods for the analysis of medical data. One outcome is that the students become comfortable "speaking the language" of statistics .
2	Course content and Learning outcomes (Dublin descriptors)	<p>Topics of the module include:</p> <ul style="list-style-type: none"> - Observational and experimental studies, statistical distributions. - Means and their properties. How to measure the variability. Normal distribution. - Rates and proportions, stressing the difference between prevalence ratio and incidence rate. - How to measure the strength of the association between two variables, especially referring to the relationship between exposition to a risk factor and presence of a disease. - Introduction to probability and its applications in Medicine. Random sampling. - Basic concepts of the Statistical Inference: parameter, estimator, standard error, confidence intervals, statistical tests. Statistical methods in clinical studies with respect to the phase. <p>On successful completion of the module, the student should:</p> <ul style="list-style-type: none"> ○ understand the role of laboratory testing in health care; ○ understand the management of results and data from biological phenomena, and the study of the variability in individual observations with tables and graphics; ○ perform analyses of data interpreting the obtained results; ○ achieve ability in critically reading the results of a clinical study.
3	Prerequisites and learning activities	The student should have basic knowledge of Mathematics

4	Teaching methods and language	Lectures and seminars Language: Italian/English Ref. Text books: - E. Ballatori, <i>Foundations of the Scientific Medicine</i> - Margiacchi-Galeno Ed. Perugia, 2006.
5	Assessment methods and criteria	<u>Formative Assessment</u> : the students are invited to make some home work and to participate to discussions on concrete examples. The active participation is supported and stimulated also by short Q&A sessions. <u>Summative Assessment</u> : Formal written Examination (60%) and Oral Examination (40%) Written exam: 2-hour Multiple choice test on the main statistical methods for clinical research Oral exam: the student must provide evidence of the acquired knowledge and skills by proving in half an hour the achievement of the main Learning Outcomes.

**Programme of "CITOGENETICA E GENETICA MEDICA"
"CYTOGENETICS AND MEDICAL GENETICS"**

The course will provide an overview on molecular genetics and genomics techniques focused on the diagnosis of human genetic disorders and related genetic treatments.

The course is composed of two modules: A) Medical Genetics, B) Cytogenetics, Molecular genetics and genomics

D0500, Compulsory

1st Cycle Degree in BIOMEDICAL LABORATORY TECHNIQUES, 2nd Year, 2nd Semester

Number of ECTS credits: 4 (total workload: 100 hours; 1 ECTS credit = 25 hours)

A) MEDICAL GENETICS (2 ECTS)

Teachers: Elvira D'ALESSANDRO

1	Course objectives	This module aims to provide students with the knowledge of the laws of heredity transmission, of genes and their function. The relevance of heredity will be deepened especially focusing on the human genome project. The students will: Develop their understanding of the genetic basis of hereditary diseases; Relate disease phenotype to mutations in gene products or to aberrations in gene expression; Appreciate recent developments in medical genetics such as genetic therapeutic strategies.
2	Course content and Learning outcomes (Dublin descriptors)	Topics of the module include: <ul style="list-style-type: none"> - Genealogical tree, Mendelian simple heredity, Chromosome X and Y-linked heredity, DNA - sequencing, gene family and cluster, transcribed and non transcribed sequences, - polymorphisms and pseudogenes. - Mitochondrial DNA and its characteristics. - Mitochondrial heredity. - Differential marker techniques and molecular cytogenetic. - Morphology of chromosomes. - Mutations and mosaicisms. Mutagen agents. <p>On successful completion of this module the student should:</p> <ul style="list-style-type: none"> o understand the role of chromosomes in gene transmission; o be able to apply the main techniques for investigating the chromosome morphology and function; o be able to explain the role of chromosomes in gene transmission; o be able to apply the main techniques to investigate the chromosome morphology and function; o know the main gene mapping methods and assess how genetics has impacted upon the practice of medicine; o be able to outline the problems and advances in using genetics to understand complex diseases; o be able to illustrate the ways in which genetic knowledge is impacting on cancer therapeutics. o demonstrate a knowledge of the contribution of genetics to the study of brain diseases, heart disease and cancer. o be able to research and integrate information from a range of sources in order to give a critical appraisal of a chosen specialist area. o appraise a current research paper and give an oral presentation on it.

3	Prerequisites and learning activities	The student must know Cell Biology and Biochemistry.
4	Teaching methods and language	Lectures Language: Italian Ref. Text books: - T. Strachan, A. Read, <i>Genetica moleculare Umana</i> , UTET 2007.
5	Assessment methods and criteria	<u>Formative Assessment:</u> the students are invited to make some home work and to participate to discussions on concrete examples. The active participation is supported and stimulated also by short Q&A sessions. <u>Summative Assessment:</u> Formal written Examination (60%) and Oral Examination (40%) Written exam: 2-hour Multiple choice test aiming to ascertain the knowledge of the role of chromosomes in gene transmission and of the main techniques for investigating the chromosome morphology and function; Oral exam: the student must provide evidence of the acquired knowledge and skills by proving in half an hour the achievement of the main Learning Outcomes especially the capacity to apply the knowledge and understanding to the impact of genetics upon the practice of medicine .
B) CYTOGENETICS, MOLECULAR GENETICS AND GENOMICS (2 ECTS)		
Teacher: Claudio LIGAS		
1	Course objectives	The student must know DNA and RNA functioning in the regulation of cell cycle and differentiation. The chromosomes and the clinical meaning of their mapping also have to be known.
2	Course content and Learning outcomes (Dublin descriptors)	Topics of the module include: - The DNA and RNA. Basic laws of gene coding and transmission. DNA and RNA functions. - Different shapes and functions of chromatin. - Cell cycle and DNA coding in the different phases. - Molecular organization of chromosomes. - Mitosis induction methods and the main techniques for human chromosome study and gene mapping. Upon the successful completion of this module the student should: o Understand the basic mechanisms of heredity and their applications to genetic research o Critically analyse inheritance patterns associated with human diseases and their cellular and molecular basis o Describe the structure of a wide range of genetic elements o Understand how recombinant DNA technology can be used to analyze and manipulate genes and genomes o explain the role of chromosomes in gene transmission; o apply the main techniques to investigate the chromosome morphology and function; o know the main gene mapping methods.
3	Prerequisites and learning activities	The student must know Cell Biology and Biochemistry.
4	Teaching methods and language	Lectures and practical classes will be used to show some of the techniques of gene mapping and chromosome studying methods. Language: Italian Ref. Text books: - T. Strachan, A. Read, <i>Genetica moleculare Umana</i> , UTET 2007.
5	Assessment methods and criteria	<u>Formative Assessment:</u> the students are invited to make some home work and to participate to discussions on concrete examples. The active participation is supported and stimulated also by short Q&A sessions. <u>Summative Assessment:</u> Formal written Examination (50%) and Oral Examination (50%) Written exam: 2-hour Multiple choice test on the laws of gene coding and transmission. DNA and RNA functions and Ddfferent shapes and functions of chromatin. Oral exam: the student must provide evidence of the acquired knowledge and skills by proving in half an hour the achievement of the main Learning Outcomes, mainly how recombinant DNA technology can be used to analyse and manipulate genes and genomes and the role of chromosomes in gene transmission.

**Programme of “TECNICHE DI ANATOMIA PATOLOGICA”
”HISTOPATHOLOGY TECHNIQUES”**

The course discusses the techniques to process the cell and organ samples (single cell and different tissues) so as to observe and study them by optical and electronic microscopies (fixing, inclusion, cutting and staining). It is composed of two modules: A) Histopathological Techniques - Post mortem examination, B) Immunohistochemistry and cytochemistry

D3835, Compulsory

1st Cycle Degree in BIOMEDICAL LABORATORY TECHNIQUES, 2nd Year , 2nd Semester

Number of ECTS credits: 4 (total workload: 100 hours; 1 ECTS credit = 25 hours)

A) HISTOPATHOLOGY TECHNIQUES (3 ECTS)

Teacher: Alessandro CHIOMINTO

1	Course objectives	The goal of the module is to provide the student with the necessary knowledge of modern histopathology and postmortem examination techniques.
2	Course content and Learning outcomes (Dublin descriptors)	<p>Topics of the module include:</p> <ul style="list-style-type: none"> - Histopathology laboratory organization - Risk management - Handling common samples from surgical operations - Slide preparation for histology and cytology - Electron microscopy techniques - Postmortem examination and autopsies. <p>On successful completion of this module, the student should:</p> <ul style="list-style-type: none"> o have profound knowledge of histopathology techniques o have knowledge of postmortem examination and autopsies o understand and manage the histopathology lab organization
3	Prerequisites and learning activities	The student must know Histology, Anatomy and General Pathology
4	Teaching methods and language	<p>Lectures and homework</p> <p>Language: Italian</p> <p>Ref. Text books:</p> <p>-Maria Rosaria Cardillo - <i>Nozioni di tecniche diagnostiche di anatomia patologica</i> - Antonio Delfino Ed. 2009.</p>
5	Assessment methods and criteria	<p><u>Formative Assessment:</u> the students are invited to make some home work and to participate to discussions on concrete examples. The active participation is supported and stimulated also by short Q&A sessions.</p> <p><u>Summative Assessment:</u> Formal Oral Examination (100%)</p> <p>Oral exam: Half an hour discussion and presentation of the main histopathology techniques, of postmortem examination and autopsies and of the histopathology lab organization</p>

B) IMMUNOHISTOCHEMISTRY AND CYTOPATHOLOGY (1 ECTS)

Teacher: Giuseppe CALVISI

1	Course objectives	The goal of the module is to show and discuss the modern cytopathology and immunohistochemistry techniques.
2	Course content and Learning outcomes (Dublin descriptors)	<p>Topics of the module include:</p> <ul style="list-style-type: none"> - Immunohistochemistry laboratory organization - Risk management - Collecting and handling cellular materials from any part of the body - Slide preparation for cytochemistry - Slide preparation for immunohistochemistry - Molecular biology techniques <p>On successful completion of this module, the student should:</p> <ul style="list-style-type: none"> o have profound knowledge of collecting and performing immunohistochemistry methods o have knowledge of cytochemistry techniques o understand and explain some special methods in handling samples
3	Prerequisites and learning activities	The student must know Histology, Anatomy and General Pathology

4	Teaching methods and language	Lectures and practical work Language: Italian Ref. Text books: -Maria Rosaria Cardillo - <i>Nozioni di tecniche diagnostiche di anatomia patologica</i> - Antonio Delfino Ed. 2009.
5	Assessment methods and criteria	<u>Formative Assessment:</u> the students are invited to make some home work and to participate to discussions on concrete examples. The active participation is supported and stimulated also by short Q&A sessions. <u>Summative Assessment:</u> Formal Oral Examination (100%) Oral exam: Half an hour discussion and presentation of the main immunohistochemistry methods, cytochemistry techniques and of special methods in handling samples

Programme of “PRINCIPI DI FARMACOTERAPIA E PRONTO SOCCORSO” “PHARMACO-THERAPY AND EMERGENCY IN MEDICINE”		
The course presents the Pharmacotherapy of common diseases and the First aid in clinical emergencies. It is composed of two modules: A) Principles of Drug Therapy, B) First Aid in clinical emergency.		
D0504, Compulsory 1st Cycle Degree in BIOMEDICAL LABORATORY TECHNIQUES, 3rd Year - 1st semester		
Number of ECTS credits: 6 (total workload: 150 hours; 1 ECTS credit = 25 hours)		
A) PHARMACOTHERAPY (3 ECTS)		
Teacher: Roberto MAGGIO		
1	Course objectives	The module introduces the fundamental concepts of drug action at molecular and cellular level and explains the principles guiding and affecting the action of drugs to produce therapeutic benefit or untoward effect.
2	Course content and Learning outcomes (Dublin descriptors)	Topics of the module include: <ul style="list-style-type: none"> - receptor activation and inhibition and effect of drugs on cell signalling; - drug absorption, distribution, elimination and metabolism; - mechanism of drug action, therapeutic and side effects; - basis of drug interaction and implications for patient care; - basis of pharmaco-genetics and of individual response to drugs; - drug development and safety evaluation processes. <p>On successful completion of this module, the student should:</p> <ul style="list-style-type: none"> o acquire knowledge of basic concepts of pharmacology; o acquire knowledge of the pharmacokinetic processes and of the drug metabolism in the body and how they can produce therapeutic and side effects; o understand the patho-physiology of each disease state; o be able to discuss the pharmaco-therapeutic agents employed for each disease state; o understand the relative efficacy and safety of drugs used in each disease state; o be able to monitor the clinical outcomes in terms of efficacy and safety of each drug used; o demonstrate capacity for reading and understanding texts on related topics.
3	Prerequisites and learning activities	The student must know Human Anatomy and Physiology, Cell and molecular biology, Biochemistry.
4	Teaching methods and language	Lectures and practical reports Language: Italian/English Text book: - Bertram G. Katzung, Susan B. Masters, Anthony J. Trevor - <i>Basic and Clinical Pharmacology</i> , 12 th Edition- Editor: Mc Graw Hill LANGE™
5	Assessment methods and criteria	<u>Formative Assessment:</u> the students are invited to make some home work and to participate to discussions on concrete examples. The active participation is supported and stimulated also by short Q&A sessions. <u>Summative Assessment:</u> Formal Oral Examination (100%) Oral exam: Half an hour discussion and presentation of the basic concepts of pharmacology, of the pharmacokinetic processes and of the drug metabolism in the body and how they can produce therapeutic and side effects.

B) FIRST AID IN CLINICAL EMERGENCY (3 ECTS)		
Teacher: Alessandra CICOZZI		
1	Course objectives	The module ensures that the student acquires and retains skill and knowledge that will enable him to act correctly in the most frequent clinical emergencies
2	Course content and Learning outcomes (Dublin descriptors)	<p>Topics of the module include:</p> <ul style="list-style-type: none"> - Cardiovascular pathophysiology and shock: classification, etiopathogenesis, signs and symptoms, therapy. Anaphylaxis and respiratory pathophysiology. Respiratory failure, airway management, endotracheal intubation, oxygen therapy devices. - Cardiovascular and respiratory monitoring in pre-hospital phase. - Acid-Base disturbances: pathophysiology, classification, therapy. - Hemogasanalysis. Blood volume restoration and fluid therapy. - Head injury: cerebral blood flow pathophysiology, intracranial pressure, neurologic evaluation - (GCS), pre-hospital care of head-injured patients. - Consciousness disturbances: coma, vegetative state. - Cardiac Arrest: etiopathogenesis, physiopathology, signs and symptoms. - Basic Life Support and Defibrillation (BLS). - Advanced Life Support (ALS). - Cardiac and vasoactive agents in emergency <p>On completion of this module, students are expected to be able to:</p> <ul style="list-style-type: none"> o Summarise and explain the key legal and ethical responsibilities to patients, self and colleagues. o Apply the principles of moving and handling and techniques of first aid, including resuscitation, and be able to adopt an appropriate role in a clinical emergency. o Define the roles and responsibilities of the professionals within the interdisciplinary team. o Communicate appropriately for effective working in the practice setting. o Demonstrate professional documentation writing skills. o Demonstrate an understanding of use of problem solving skills when dealing with crisis.
3	Prerequisites and learning activities	The student must know Human Anatomy and Physiology
4	Teaching methods and language	Lectures and practical training Language: Italian/English Ref. Text Books: Notes of the teacher
5	Assessment methods and criteria	<p>Formative Assessment: the students are invited to make some home work and to participate to discussions on concrete examples. The active participation is supported and stimulated also by short Q&A sessions.</p> <p>Summative Assessment: Formal Oral Examination (80%), Practical examination (20%) Oral exam: Half an hour discussion and presentation of the key legal and ethical responsibilities to patients, self and colleagues. The principles of moving and handling and techniques of first aid, including resuscitation. Practical examination: concrete application of theoretical notions to clinical emergency and to problem solving when dealing with crisis.</p>

Programme of "SCIENZE INTERDISCIPLINARI CLINICHE"	
"CLINICAL INTERDISCIPLINARY SCIENCES"	
The course presents the most frequent pathologies affecting human health and ageing, focusing on the basic methods aimed at the correct diagnosis.	
It is composed of three modules: A) Laboratory Hematology, B) Rheumatology, C) Oncology.	
D0509; Compulsory	
1st Cycle Degree in BIOMEDICAL LABORATORY TECHNIQUES, 3rd Year - 1st semester	
Number of ECTS credits: 9 (total workload 225 hours; 1 ECTS credit = 25 hours)	
A) LABORATORY HEMATOLOGY (3 ECTS)	
Teacher: Stefano BALDONI	

1	Course objectives	The module will provide an overview and analysis of most frequent hematologic disorders focusing on the role of clinical lab in guiding the diagnosis.
2	Course content and Learning outcomes (Dublin descriptors)	<p>Topics of the module include:</p> <ul style="list-style-type: none"> - Staminal hematopoietic cell, methods of identification, functional and molecular characterization. - Hematopoiesis: eritropoiesis, myelopoiesis, megagaryocytopoiesis, limfopoiesis. Anemia classification, hemoglobin pathology. - Chronic myelo-proliferative syndromes, myelodisplastic syndromes, leukemias and lymphomas. - Plasma-cell disorders, Hemophilia, platelet physiology and pathology. Bone marrow grafts. All the related specific clinical investigation methods. <p>At the end of this Module the student will be able to:</p> <ul style="list-style-type: none"> o Demonstrate a comprehensive understanding of the fundamental processes involved in blood cell formation. o Describe, discuss and diagnose diseases of blood including anaemia, leukaemia and disorders of haemostasis and thrombosis. o Demonstrate an in depth knowledge of the role played by haematology in the investigation of disease in general. o Describe a critical awareness of the key provisions required for competent transfusion practice. o autonomously develop problem-solving skills, demonstrating the ability to continuously seek self-learning opportunities; o use self-assessment methods to maintain the high level of knowledge required by professional practice.
3	Prerequisites and learning activities	The student must know Anatomy, Pathology and Physiology, Cell Biology and Biochemistry of human blood cells
4	Teaching methods and language	Lectures, discussion with the teachers, problem and case studies, group works. Language: Italian and English Ref. Text books: -Sante Tura – <i>Lezioni di Ematologia</i> – Ed. Esculapio, 2003.
5	Assessment methods and criteria	<u>Formative Assessment:</u> the students are invited to make some home work and to participate to discussions on concrete examples. The active participation is supported and stimulated also by short Q&A sessions. <u>Summative Assessment:</u> Formal Oral Examination (100%) Oral exam: Half an hour discussion and presentation of the fundamental processes involved in blood cell formation, the diseases of blood including anemia, leukemia and disorders of haemostasis and thrombosis and of the role played by hematology in the investigation of disease in general.

B) RHEUMATOLOGY (3 ECTS)

Teacher: Paola CIPRIANI		
1	Course objectives	The module will provide an overview and analysis of most frequent rheumatologic disorders focusing on the role of clinical lab in guiding the diagnosis.
2	Course content and Learning outcomes (Dublin descriptors)	<p>The student is expected to acquire knowledge of the main mechanisms determining rheumatic and autoimmune diseases. Similarly, he should know the correct use of laboratory tests for immune activity assessment, and their importance in the diagnosis and monitoring of the autoimmune diseases.</p> <p>Topics of the module include:</p> <ul style="list-style-type: none"> - Pathogenesis, clinical features and diagnostic tools of osteoarthritis. - Rheumatoid arthritis as model of inflammatory arthritis, Systemic lupus, Scleroderma, Sjogren syndrome, Vasculitis, Antiphospholipid syndromes. <p>On completion of this module the student should be able to:</p> <ul style="list-style-type: none"> o acquire profound knowledge of the laboratory tests in rheumatic and autoimmune diseases; o understand which tests would be most useful in the evaluation, diagnosis, and prognosis of frequently occurring rheumatic diseases and in the serologic associations of rheumatic diseases; o apply the concepts of sensitivity, specificity, likelihood ratio, and the operator characteristics curve of a diagnostic test in the clinical practice of laboratory testing;

		<ul style="list-style-type: none"> o understand and assess the different laboratory procedures applied to different clinical situations, also concerning diagnostic parameters, based on national and international guidelines; o respond effectively to the needs of individual and/or community health as part of a multidisciplinary team; o assess the effectiveness of their own work, identifying criticalities and taking part in their resolution.
3	Prerequisites and learning activities	The student must know Human Anatomy, Pathology and Physiology, Cell Biology and Biochemistry.
4	Teaching methods and language	Lectures, discussion with the teachers, problem and case studies, group works. Language: Italian and English Ref. Text books: Tozzoli, Bizzaro et al., <i>Il laboratorio nelle malattie autoimmuni d'organo</i> , Ed.Maggio 2009
5	Assessment methods and criteria	<u>Formative Assessment:</u> the students are invited to make some home work and to participate to discussions on concrete examples. The active participation is supported and stimulated also by short Q&A sessions. <u>Summative Assessment:</u> Formal Oral Examination (100%) Oral exam: Half an hour discussion and presentation of the laboratory tests in rheumatic and autoimmune diseases, of the most useful methods in the evaluation, diagnosis, and prognosis of frequently occurring rheumatic diseases and in the serologic associations of rheumatic diseases.
C) ONCOLOGY (3 ECTS)		
Teacher: Enrico RICEVUTO		
1	Course objectives	The module will provide an overview and analysis of most frequent Oncological disorders focusing on the role of clinical lab in guiding the diagnosis.
2	Course content and Learning outcomes (Dublin descriptors)	<p>Topics of the module include:</p> <ul style="list-style-type: none"> - Epidemiology and oncological prevention, biology of cancer. - Oncology and all the related specific clinical investigation methods. <p>On successful completion of this module, the student should:</p> <ul style="list-style-type: none"> o have an appropriate knowledge-base that includes basic scientific principles of pathology and cell biology, basic pharmacology, epidemiology, statistics, radiobiology; o have the appropriate attitudes and communication skills for dealing with colleagues and patients ; o have experience based on clinical presentations and problem-solving; o succinctly formulate a diagnosis or differential diagnosis; o autonomously develop problem-solving skills, demonstrating the ability to continuously seek self-learning opportunities; o undertake responsibility for his own professional advancement and respond to the continuous changes in knowledge and health and social needs; o use self-assessment methods to maintain the high level of knowledge required by professional practice.
3	Prerequisites and learning activities	The student must know Human Anatomy, Pathology and Physiology, Cell Biology and Biochemistry.
4	Teaching methods and language	Lectures, discussion with the teachers, problem and case studies, group works. Language: Italian and English Ref. Text books: A.R. Bianco – <i>Manuale di Oncologia</i> , McGraw-Hill 2007.
5	Assessment methods and criteria	<u>Formative Assessment:</u> the students are invited to make some home work and to participate to discussions on concrete examples. The active participation is supported and stimulated also by short Q&A sessions. <u>Summative Assessment:</u> Formal Oral Examination (100%) Oral exam: Half an hour discussion and presentation of basic scientific principles of pathology and cell biology, basic pharmacology, epidemiology, statistics, radiobiology, of diagnosis or differential diagnosis, and of concrete oncological cases

**Programme of “SCIENZE TECNICHE MEDICHE APPLICATE”
“APPLIED TECHNICAL MEDICAL SCIENCES”**

This course is composed of three modules: A) Advanced Methods in Bacteriology and Virology , B) Advanced Laboratory Methods in Blood clotting, C) Professional Organization Rules

D0513, Compulsory

1st Cycle Degree in BIOMEDICAL LABORATORY TECHNIQUES , 3rd Year - 2nd semester

Number of ECTS credits: 9 (total workload is 225 hours;1 credit = 25 hours)

A) ADVANCED METHODS IN BACTERIOLOGY AND VIROLOGY (3 ECTS)

Teacher: Anna TOMEI

1	Course objectives	The course is aimed to explain the new methods and techniques for bacteria and virus detection, isolation and identification.
2	Course content and Learning outcomes (Dublin descriptors)	<p>Topics of the module include:</p> <ul style="list-style-type: none"> - advanced technologies for bacteria identification and antibiogramme - advanced methods in TBC bacteria isolation (IGRA,PCR). - advanced methods for isolation and identification of human viruses. <p>At the end of the course the student should be able to:</p> <ul style="list-style-type: none"> o demonstrate profound knowledge of the new methods and techniques to isolate and recognize the human pathogen bacteria and viruses; o demonstrate profound knowledge of the newest techniques for special diagnosis o Describe in details the morphology, the culture, spread, biochemical activities, antigenic characters, pathogenesis, laboratory diagnosis, treatment, prevention, control measures of each bacteria; o Define the organs commonly involved in the infection; o Recall the relationship of the infection to symptoms, relapse and the accompanying pathology; o Explain the methods of microorganisms control, e.g. chemotherapy and vaccines; o Solve problems in the context of this understanding; o Demonstrate practical skills in fundamental microbiological techniques; o Present and interpret results obtained from using these techniques; o Present information clearly in both written and oral form.
3	Prerequisites and learning activities	The student must know microbiology and clinical pathology.
4	Teaching methods and language	Lectures and lab experiences about applied new microbiology and virology techniques Language: Italian Ref. Text book: The literature references will be provided directly by the teacher.
5	Assessment methods and criteria	<u>Formative Assessment:</u> the students are invited to make some home work and to participate to discussions on concrete examples. The active participation is supported and stimulated also by short Q&A sessions. <u>Summative Assessment:</u> Formal Oral Examination (100%) Oral exam: Half an hour discussion and presentation of the new methods and techniques to isolate and recognize the human pathogen bacteria and viruses, of the newest techniques for special diagnosis and of the morphology, the culture, spread, biochemical activities, antigenic characters, pathogenesis, laboratory diagnosis, treatment, prevention, and control measures of each bacteria.

B) ADVANCED LABORATORY METHODS IN BLOOD CLOTTING (3 ECTS)

Teacher: Benedetta CINQUE

1	Course objectives	The aim of this course is to ensure that students acquire skill and knowledge about the advanced techniques to investigate the different phases of blood clotting process and its regulation.
2	Course content and Learning outcomes (Dublin descriptors)	<p>The module covers an advanced combination of the interrelationship between Clinical Biochemistry, Haematology, and Transfusion Science.</p> <p>Topics of this Module include:</p> <ul style="list-style-type: none"> - Disease diagnosis and monitoring in haematology and clinical biochemistry, the principles of stem cell and solid organ transplantation, tissue and bone banking, organ transplantation, prophylaxis and immunotherapy; - Cytofluorimetric techniques for lymphocytes and basophils identification. Blood clotting

		<p>diseases and related advanced diagnostic methods;</p> <p>On successful completion of this module, the student should:</p> <ul style="list-style-type: none"> ○ have profound knowledge of the new methods and techniques to investigate the blood clotting process and its steps. ○ have profound knowledge of the newest techniques for special hematologic diagnosis; ○ be able to compare and contrast of the principles and practice of chemical pathology, hematology and transfusion science; ○ have the capacity to execute specified analyses with due attention to QC, evaluate obtained and researched experimental data and communicate conclusions effectively; ○ be able to produce reasoned discourse on a topical issue within the arena of blood science ○ show an awareness of the research interface and developing technologies; ○ be able to critically assess the principles of quality control and quality assurance in relation to clinical biochemistry, hematology and transfusion science; ○ develop and assess the principles and practice of transfusion science.
3	Prerequisites and learning activities	The student must know Hematology, Blood clotting and Clinical pathology
4	Teaching methods and language	<p>Lectures and lab experiences about applied new hematologic techniques</p> <p>Language: Italian</p> <p>Ref. Text book:</p> <p>The literature references about the explained techniques will be provided directly by the teacher.</p>
5	Assessment methods and criteria	<p><u>Formative Assessment:</u> the students are invited to make some home work and to participate to discussions on concrete examples. The active participation is supported and stimulated also by short Q&A sessions.</p> <p><u>Summative Assessment:</u> Formal Oral Examination (100%)</p> <p>Oral exam: Half an hour discussion and presentation of the new methods and techniques to investigate the blood clotting process and its steps, of the newest techniques for special hematologic diagnosis; of quality control and quality assurance in relation to clinical biochemistry, hematology and transfusion science and of the principles and practice of transfusion science.</p>
C) PROFESSIONAL ORGANIZATION RULES (3 ECTS)		
Teacher: Benedetta CINQUE		
1	Course objectives	<p>The course is aimed to provide the students with the necessary knowledge about the leadership, management and administration of public and private biomedical labs. It introduces the learner to the concept of quality management for the medical laboratory. It subsequently translates those concepts into the practical tools of a quality management system.</p>
2	Course content and Learning outcomes (Dublin descriptors)	<p>Topics of this Module include:</p> <ul style="list-style-type: none"> - National and international laws about health care management. The privacy laws. The professional rules for the Biomedical Lab Technologist - Management Theories: principles of management, quality assurance management, quality assessment, accreditation, resource management, and health care research. Planning and Decision-Making: organizational goals, barriers to planning, management by objectives, models of decision making, decision-making process. - Performance Management: managing individual performance, rewarding performance, ethics of managing performance. - Teamwork and Communication Skills: individual differences, dynamics of groups and teams at work, managing teams, barriers to effective communication. <p>On successful completion of this module, students should be able to:</p> <ul style="list-style-type: none"> ○ Know and apply the national rules and laws for the overall functioning of organizations; ○ Appreciate the similarities and differences between various management perspectives; ○ Discuss the evolving Italian Health Service; ○ Establish how clinical governance is a framework through which the health organization is accountable for its practices; ○ Outline the role of financial management in the clinical laboratory; ○ Explain the principles of a quality management system and apply the quality management system to the medical laboratory;

		o Recognise that quality and delivery of a laboratory health care service are inter-related.
3	Prerequisites and learning activities	No prerequisites for this module are required
4	Teaching methods and language	Lectures and lab experiences about applied new microbiology and virology techniques Language: Italian Ref. Text book: The text of laws and the international literature references will be provided directly by the teacher.
5	Assessment methods and criteria	<u>Formative Assessment:</u> the students are invited to make some home work and to participate to discussions on concrete examples. The active participation is supported and stimulated also by short Q&A sessions. <u>Summative Assessment:</u> Formal Oral Examination (100%) Oral exam: Half an hour discussion and presentation of the national rules and laws for the overall functioning of organizations, of similarities and differences between various management perspectives, of the evolving Italian Health Service, and of the role of financial management in the clinical laboratory.

Programme of “SCIENZE DEL MANAGEMENT SANITARIO” “HEALTH CARE MANAGEMENT SCIENCES”		
The course is composed of two modules: A) Health care Organizations, B) Employment Laws		
D4278, Compulsory		
1st Cycle Degree in BIOMEDICAL LABORATORY TECHNIQUES - 3rd Year - 2nd semester		
Number of ECTS credits: 6 (total workload : 150 hour); 1 credit = 25 hours)		
A) HEALTH CARE ORGANIZATIONS (3 ECTS)		
Teacher for both modules: Lorena LATTANZI		
1	Course objectives	Goals of this Module are: -To provide an introduction to health care organization and practice; -To demonstrate the ways in which health care practice and organization is shaped by science, society and individuals; -To develop understanding of how health care organizations shape the practices of professionals working within them.
2	Course content and Learning outcomes (Dublin descriptors)	This module provides an introduction to health care organization, practice and policy, presenting an overview of healthcare that emphasizes the interplay between science, society, and individuals. Key features of current and future trends in healthcare practice and delivery are identified, described and applied through worked examples to develop students' understanding of the various contexts of health care practice nationally and internationally. Topics of the Module include: - The evolution of the Health Care System in the Italian economic business perspective: the three reforms. - The right to health and the Public Health Service: basics and approaches to study Health Care organizations as " public companies for the production of Health Care Services". - Health care private companies and their laws. - The subjects of the Health Service Profiles organization and the management in Health Care. - The departmentalization in health care organizations. - Detection systems and communication of information in Health Care. - Economic measures in the public Health Care. On successful completion of these modules, the student should be able to: o demonstrate knowledge of the laws about the public and private Health Care System functioning in Italy and in U.E.; o demonstrate knowledge of the main rules related to the health-care professional profile; o describe connections between social, psychological, biological, and political aspects of health care; o demonstrate an awareness of the value of different approaches to understanding health care organization and practice; o discuss key features of health care context that shape the practices of professionals

		<p>working in health.</p> <ul style="list-style-type: none"> o Apply taught material to formulate arguments in relation to a case study.
3	Prerequisites and learning activities	No prerequisites are requested
4	Teaching methods and language	<p>Lectures and analysis of the health-care specific protocols</p> <p>Language: Italian</p> <p>Ref. Text book:</p> <p>-A. Zangrandi: <i>Economia e management per le professioni sanitarie</i>, Ed. McGraw Hill 2010.</p> <p>-P.O. Achard, V. Castello, S. Profili - <i>Il governo del processo strategico nelle aziende sanitarie</i> - Ed. Franco Angeli 1997.</p>
5	Assessment methods and criteria	<p><u>Formative Assessment:</u> the students are invited to make some home work and to participate to discussions on concrete examples. The active participation is supported and stimulated also by short Q&A sessions.</p> <p><u>Summative Assessment:</u> Formal Oral Examination (100%)</p> <p>Oral exam: Half an hour discussion and presentation of the laws about the public and private Health Care System functioning in Italy and in U.E., of the main rules related to the health-care professional profile, and of the value of different approaches to understanding health care organization and practice.</p>
B) EMPLOYMENT LAWS (1 ECTS)		
Teacher for both modules: Lorena LATTANZI		
1	Course objectives	The goal of both modules is to provide the students with the necessary knowledge about the leadership, management and administration laws of the Italian public Health system, health care system, hospitals and hospital networks. Many information will be also given on the laws and rules specific of the health-care professional profile.
2	Course content and Learning outcomes (Dublin descriptors)	<p>Topics of the Modules include:</p> <ul style="list-style-type: none"> - Understanding the Healthcare Environment : Population Health, Law, Marketing - Managing People in Healthcare Organisations: Management and Organisational Behaviour, Human Resource Management, Organisation Development - The right to health and the Public Health Service: basics and approaches to study Health Care organizations as " public companies for the production of Health Care Services". - Health care private companies and their laws. - The financing system and the logic of programming in Health Care. - The subjects of the Health Service Profiles organization and the management in Health Care. - The system of general and analytical accounting. - The balance sheet in Health Care organizations: function and patterns of preparation. - The budget in Health Care organization. - The laws and rules about work management and professional profile of the biomedical laboratory technologist. The privacy respect. <p>By the end of the module, students should:</p> <ul style="list-style-type: none"> o Develop a good understanding of core financial accounting and control principles e.g. double entry accounting, accruals, prepayments, liabilities, assets, duty segregation and the need for solid controls. o develop a robust understanding of the work of management accounting, incorporating budget preparation, budget appraisal, costing, and financial appraisal techniques. o Take a practical approach to funding negotiation and negotiation in general. o Be able to understand and apply principles and concepts of management to the organisation and delivery of Italian healthcare services. o Appreciate the advantages and disadvantages of different approaches to collaboration across professional and organisational boundaries in health and social care and able to select an approach most suited to the change process within their particular service. o Develop an in-depth understanding of the drivers behind health reforms and can implement strategies for effective management within a broader climate of systemic change. o Appreciate the steps involved in formulating and implementing health policies at national and organisational levels. o Become both users and producers of quality health services research that enables evidence-informed decision making. o Become innovative in addressing issues that arise in service delivery organization.

3	Prerequisites and learning activities	No prerequisites are requested
4	Teaching methods and language	Lectures and analysis of the health-care specific protocols Language: Italian Ref. Text book: -A. Zangrandi, <i>Economia e management per le professioni sanitarie</i> , Ed. Mc Graw Hill 2010. -P.O. Achard, V. Castello, S. Profili, <i>Il governo del processo strategico nelle aziende sanitarie</i> - Ed. Franco Angeli 1997.
5	Assessment methods and criteria	<u>Formative Assessment:</u> the students are invited to make some home work and to participate to discussions on concrete examples. The active participation is supported and stimulated also by short Q&A sessions. <u>Summative Assessment:</u> Formal Oral Examination (100%) Oral exam: Half an hour discussion and presentation of core financial accounting and control principles e.g. double entry accounting, accruals, prepayments, liabilities, assets, duty segregation and the need for solid controls, of the work of management accounting, incorporating budget preparation, budget appraisal, costing, and financial appraisal techniques and of practical approach to funding negotiation.

Programme of “PSICOLOGIA GENERALE” “GENERAL PSYCHOLOGY”		
The course will give a general introduction to psychology as a science, and to the psychological approach with patients.		
D0517, Compulsory 1st Cycle Degree in BIOMEDICAL LABORATORY TECHNIQUES, 3rd year, 2nd semester		
Number of ECTS credits: 3 (total workload: 75 Hours; 1 ECTS credit = 25 hours)		
Teacher: Domenico PASSAFIUME		
1	Course objectives	The module will give an introduction to various theoretical approaches to psychology, and the development of psychology as a science is discussed. The module also focuses on the main personality theories. Students are introduced to the various paradigmatic approaches in psychology.
2	Course content and Learning outcomes (Dublin descriptors)	The topics of the module are: <ul style="list-style-type: none"> - the qualitative and quantitative methods for psychological assessment - experiments - the central nervous system and its function - the learning process - the memory process - the emotions - the human personality <p>successful completion of this module, the student should have acquired:</p> <ul style="list-style-type: none"> o knowledge of the main professional behaviors specially aimed to the psychological approach of suffering persons; o ability to communicate both verbally and in writing with physicians, relatives, colleagues and other professional groups in multidisciplinary and multi-professional collaboration; o knowledge of the fundamental concepts in developmental psychology, personality and intelligence, and an appreciation of the major issues, research and theories in each of these areas.
3	Prerequisites and learning activities	No prerequisites are requested
4	Teaching methods and language	Lectures, exercises, lab work. Language: Italian/English Ref. Text book: Anolli L., <i>Psicologia generale</i> , Il Mulino Editore 2012.
5	Assessment methods and criteria	<u>Formative Assessment:</u> the students are invited to make some home work and to participate to discussions on concrete examples. The active participation is supported and stimulated also by short Q&A sessions. <u>Summative Assessment:</u> Formal written Examination (60%) and Oral Examination (40%)

		<p>Written exam: 2-hour Multiple choice test on the main professional behaviors specially aimed to the psychological approach of suffering persons</p> <p>Oral exam: the student must provide evidence of the acquired knowledge and skills by proving in half an hour the achievement of the main Learning Outcomes mainly of the fundamental concepts in developmental psychology, personality and intelligence, and an appreciation of the major issues, research and theories in this area.</p>
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