UNIVERSITÀ
DEGLI STUDI
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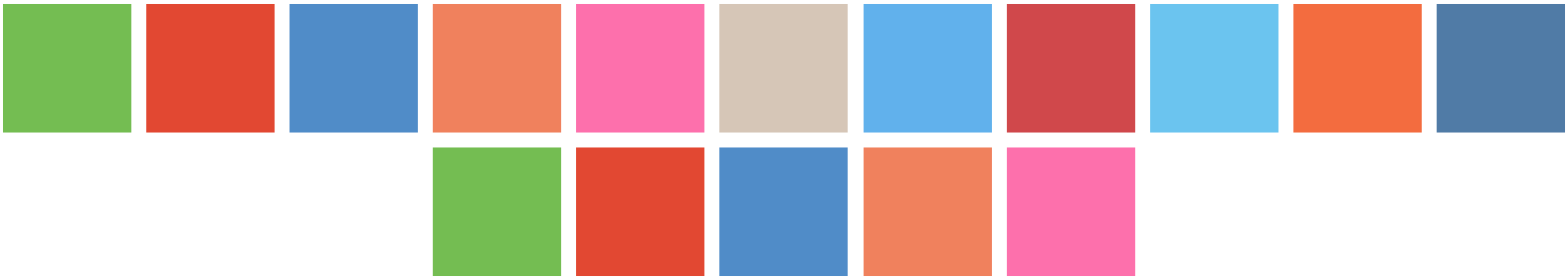
COURSES BROCHURE



MedInTO Medicine and Surgery

ADE - ACQUIRED AND INHERITED THROMBOPHILIA: DIAGNOSIS AND MANAGEMENT

Acquired and inherited thrombophilia: diagnosis and management

Academic year:	2018/2019
Course ID:	SCB0319
Teacher:	Dott. Savino SCIASCIA (Lecturer)
Teacher contacts:	savino.sciascia@unito.it
Year:	2nd year
Type:	Elective
Credits/recognition:	1
Course SSD (disciplinary sector):	MED/05 - patologia clinica
Delivery:	Formal authority
Language:	English
Attendance:	Optional
Type of examination:	Practice test

Course webpage: http://www.medinto.unito.it/do/corsi.pl/Show?_id=gl1s

ADE - ADVANCED INTERPRETATION OF THE URINE SEDIMENT

Advanced interpretation of the urine sediment

Academic year:	2018/2019
Course ID:	SCB0321
Teacher:	Prof. Elisa MENEGATTI (Lecturer)
Teacher contacts:	011- 6707765, elisa.menegatti@unito.it
Year:	2nd year
Type:	Elective
Credits/recognition:	1
Course SSD (disciplinary sector):	MED/05 - patologia clinica
Delivery:	Formal authority
Language:	English
Attendance:	Optional
Type of examination:	Practice test

NOTE

Course webpage: http://www.medinto.unito.it/do/corsi.pl/Show?_id=spro

ADE - CLINICAL CASES: A METHODOLOGICAL PATH

Clinical cases: a methodological path

Academic year:	2018/2019
Course ID:	SCB0324
Teacher:	Prof. Marco DE GOBBI (Lecturer) Prof. Isabelle Perroteau (Lecturer) Prof. Antonio Giulio PIGA (Lecturer)
Teacher contacts:	0119026656, 0119026305, marco.degobbi@unito.it
Year:	2nd year
Type:	Elective
Credits/recognition:	1
Course SSD (disciplinary sector):	MED/09 - medicina interna
Delivery:	Formal authority
Language:	English
Attendance:	Optional
Type of examination:	Practice test

Course webpage: http://www.medinto.unito.it/do/corsi.pl/Show?_id=jag0

ADE - CLINICAL INTERPRETATION OF PRINCIPAL IMMUNOLOGICAL LABORATORY TESTING

Clinical interpretation of principal immunological laboratory testing

Academic year:	2018/2019
Course ID:	SCB0322
Teacher:	Prof. Elisa MENEGATTI (Lecturer)
Teacher contacts:	011- 6707765, elisa.menegatti@unito.it
Year:	2nd year
Type:	Elective
Credits/recognition:	1
Course SSD (disciplinary sector):	MED/05 - patologia clinica
Delivery:	Formal authority
Language:	English
Attendance:	Optional
Type of examination:	Practice test

NOTE

Course webpage: http://www.medinto.unito.it/do/corsi.pl/Show?_id=16r4

ADE - ELEMENTS OF MOLECULAR MEDICINE

ADE - ELEMENTS OF MOLECULAR MEDICINE

Academic year:	2017/2018
Course ID:	SCB0280
Teacher:	Marco Arese (Lecturer) Sophie Michelle Doublier (Lecturer)
Teacher contacts:	0119933536, marco.arese@unito.it
Year:	1st year
Type:	Elective
Credits/recognition:	2
Course SSD (disciplinary sector):	BIO/10 - biochimica
Delivery:	Formal authority
Language:	English
Attendance:	Mandatory
Type of examination:	Practice test

PREREQUISITES
Attendance to chemistry and biochemistry courses

COURSE OBJECTIVES

Understand the basics of a scientific approach to a medical problem

COURSE AIMS

At the end of the course, the student will catch the following concepts:

Angiogenesis and vasculogeneis

Activators and inhibitors of angiogenesis in medicine

The hystory of the two most notorius angiogenesis inhibitors

The complexity of cancer biology

COURSE DELIVERY

Interactive lecture

LEARNING ASSESSMENT METHODS

In class discussion of open questions.

SUPPORT ACTIVITIES

Support material is provided on the moodle platform in the BMBM page

PROGRAM

Topic 1: Tumor angiogenesis. Starving tumors to death? Think again.

Elements covered:

Basis of Angiogenesis

Discovery of angiogenesis inhibitors and activators

From model mice to humans: everything changes!

Tumor blood vessels are inefficient at delivering chemotherapeutics

A new concept: tumor blood vessels normalization

Topic 2: Effects of nutritional status of cancer cells on the response of cancer cells to chemotherapy.

SUGGESTED TEXTBOOKS AND READINGS

Support material is provided on the moodle platform in the BMBM page

Course webpage: http://www.medinto.unito.it/do/corsi.pl/Show?_id=96hz

ADE - GLOBAL HEALTH

Global health

Academic year:	2018/2019
Course ID:	SCB0318
Teacher:	Prof. Giuseppe COSTA (Lecturer)
Teacher contacts:	011-40188202/221, giuseppe.costa@unito.it
Year:	2nd year
Type:	Elective
Credits/recognition:	1
Course SSD (disciplinary sector):	MED/42 - igiene generale e applicata
Delivery:	Formal authority
Language:	English
Attendance:	Optional
Type of examination:	Practice test

NOTE

Course webpage: http://www.medinto.unito.it/do/corsi.pl/Show?_id=sbni

ADE - GLOBALIZATION AND RISK OF INFECTIONS

Globalization and risk of infections

Academic year:	2018/2019
Course ID:	SCB0317
Teacher:	Prof. David LEMBO (Lecturer)
Teacher contacts:	0116705484, david.lembo@unito.it
Year:	2nd year
Type:	Elective
Credits/recognition:	1
Course SSD (disciplinary sector):	MED/07 - microbiologia e microbiologia clinica
Delivery:	Formal authority
Language:	English
Attendance:	Optional
Type of examination:	Practice test

NOTE

Course webpage: http://www.medinto.unito.it/do/corsi.pl/Show?_id=7edy

ADE - HEALTH IN LOW-INCOME COUNTRIES: CHALLENGES AND OPPORTUNITY

Health in low-income countries: challenges and opportunity

Academic year:	2018/2019
Course ID:	SCB0323
Teacher:	Prof. Annamaria Fantauzzi (Lecturer)
Teacher contacts:	annamaria.fantauzzi@unito.it
Year:	2nd year
Type:	Elective
Credits/recognition:	1
Course SSD (disciplinary sector):	
Delivery:	Formal authority
Language:	English
Attendance:	Optional
Type of examination:	Practice test

Course webpage: http://www.medinto.unito.it/do/corsi.pl/Show?_id=rld9

ADE - INTRODUCTION TO MEDICAL BIOCHEMISTRY

Introduction to medical biochemistry

Academic year:	2018/2019
Course ID:	SCB0309
Teacher:	Marco Arese (Lecturer) Alberto Puliafito (Lecturer)
Teacher contacts:	0119933536, marco.arese@unito.it
Year:	1st year
Type:	Elective
Credits/recognition:	2
Course SSD (disciplinary sector):	BIO/10 - biochimica
Delivery:	Formal authority
Language:	English
Attendance:	Optional
Type of examination:	Practice test

Course webpage: http://www.medinto.unito.it/do/corsi.pl/Show?_id=pa2r

ADE - LABORATORY AND EXPERIMENTAL TECNIQUES FOR RADIATION MEASUREMENT

ADE - LABORATORY AND EXPERIMENTAL TECNIQUES FOR RADIATION MEASUREMENT

Academic year:	2018/2019
Course ID:	SCB0278
Teacher:	Prof. Roberto Cirio (Lecturer)
Teacher contacts:	0116707302, roberto.cirio@unito.it
Year:	1st year
Type:	Elective
Credits/recognition:	1
Course SSD (disciplinary sector):	FIS/07 - fisica applicata (a beni culturali, ambientali, biologia e medicina)
Delivery:	Formal authority
Language:	English
Attendance:	Mandatory
Type of examination:	Practice test

COURSE OBJECTIVES

Students will practice in the lab with radiation detectors with the goal of understanding what is behind radiation measurements used in clinics.

COURSE AIMS

To succeed in using basic instrumentation used in the measurement of radiation.

COURSE DELIVERY

Two afternoons as formal lesson in class and one afternoon in the lab, in groups formed by 3 Students each.

LEARNING ASSESSMENT METHODS

Hands-on measurement of a radioactive sample.

PROGRAM

Subjects treated during the Physics course.

SUGGESTED TEXTBOOKS AND READINGS

Books suggested in the Physics course.

Course webpage: http://www.medinto.unito.it/do/corsi.pl/Show?_id=staw

ADE - MEDICINE IN ART: A DIAGNOSTIC JOURNEY

Medicine in art: a diagnostic journey

Academic year:	2018/2019
Course ID:	SCB0325
Teacher:	Prof. Antonio Giulio PIGA (Lecturer)
Teacher contacts:	0119026032, antonio.piga@unito.it
Year:	2nd year
Type:	Elective
Credits/recognition:	1
Course SSD (disciplinary sector):	MED/38 - pediatria generale e specialistica
Delivery:	Formal authority
Language:	English
Attendance:	Optional
Type of examination:	Practice test

NOTE

Course webpage: http://www.medinto.unito.it/do/corsi.pl/Show?_id=32qg

ADE - MICROSCOPY LAB (ANATOMY)

ADE - MICROSCOPY LAB (ANATOMY)

Academic year:	2018/2019
Course ID:	SCB0279
Teacher:	Prof. Stefano GEUNA (Lecturer) Prof. Stefania RAIMONDO (Lecturer)
Teacher contacts:	0116705433, stefano.geuna@unito.it
Year:	1st year
Type:	Elective
Credits/recognition:	2
Course SSD (disciplinary sector):	BIO/16 - anatomia umana
Delivery:	Formal authority
Language:	English
Attendance:	Mandatory
Type of examination:	Practice test

COURSE OBJECTIVES

Acquisition of basic morphological skills for the execution of traditional histological techniques.

COURSE AIMS

Understanding the potential of modern imaging techniques through practical experiences.

COURSE DELIVERY

Practice

LEARNING ASSESSMENT METHODS

Tutoring

PROGRAM

Embedding, cut and histological stains for optical and confocal microscopy.

SUGGESTED TEXTBOOKS AND READINGS

Di Scipio F*, Raimondo S*, Tos P, Geuna S. A simple protocol for myelin sheath staining with osmium tetroxide for light microscope observation. Microscopy Research and Technique, 2008; 71: 497-502.

Raimondo S, Fornaro M, Di Scipio F, Ronchi G, Giacobini-Robecchi MG, Geuna S. Methods and protocols in peripheral nerve regeneration experimental research: part II-morphological techniques. Int Rev Neurobiol. 2009; 87: 81-103

Course webpage: http://www.medinto.unito.it/do/corsi.pl/Show?_id=4txi

ADE - PEDIATRICS BY IMAGE

Pediatrics by image

Academic year:	2018/2019
Course ID:	SCB0316
Teacher:	Prof. Antonio Giulio PIGA (Lecturer)
Teacher contacts:	0119026032, antonio.piga@unito.it
Year:	2nd year
Type:	Elective
Credits/recognition:	2
Course SSD (disciplinary sector):	MED/38 - pediatria generale e specialistica
Delivery:	Formal authority
Language:	English
Attendance:	Optional
Type of examination:	Practice test

Course webpage: http://www.medinto.unito.it/do/corsi.pl/Show?_id=njt8

ADE - PRACTICAL OVERVIEW ON RHEUMATIC DISEASES

Practical overview on rheumatic diseases

Academic year:	2018/2019
Course ID:	SCB0320
Teacher:	Dott. Savino SCIASCIA (Lecturer)
Teacher contacts:	savino.sciascia@unito.it
Year:	2nd year
Type:	Elective
Credits/recognition:	1
Course SSD (disciplinary sector):	MED/05 - patologia clinica
Delivery:	Formal authority
Language:	English
Attendance:	Optional
Type of examination:	Practice test

Course webpage: http://www.medinto.unito.it/do/corsi.pl/Show?_id=qa6e

ADE - PRECLERKSHIP ITALIAN LANGUAGE

Pre-clerckship italian language

Academic year:	2018/2019
Course ID:	SCB0328
Teacher:	Dott. Ermelinda MASSARI (Lecturer)
Teacher contacts:	0116708924, ermelinda.massari@unito.it
Year:	1st year
Type:	Elective
Credits/recognition:	2
Course SSD (disciplinary sector):	NN/00 - nessun settore scientifico
Delivery:	Formal authority
Language:	Italian
Attendance:	Optional
Type of examination:	Practice test

Course webpage: http://www.medinto.unito.it/do/corsi.pl/Show?_id=gq2e

ADE - RARE DISEASES: A CHALLENGE FOR TOMORROW MEDICINE

Rare diseases: a challenge for tomorrow medicine

Academic year:	2018/2019
Course ID:	SCB0326
Teacher:	
Teacher contacts:	
Year:	2nd year
Type:	Elective
Credits/recognition:	1
Course SSD (disciplinary sector):	
Delivery:	Formal authority
Language:	English
Attendance:	Optional
Type of examination:	Practice test

Course webpage: http://www.medinto.unito.it/do/corsi.pl/Show?_id=o6q1

ADE-PRECLERKSHIP ITALIAN LANGUAGE

ADE-PRECLERKSHIP ITALIAN LANGUAGE

Academic year:	2018/2019
Course ID:	SCB0328
Teacher:	Dott. Ermelinda MASSARI (Lecturer)
Teacher contacts:	0116708924, ermelinda.massari@unito.it
Year:	1st year
Type:	Basic
Credits/recognition:	2
Course SSD (disciplinary sector):	NN/00 - nessun settore scientifico
Delivery:	Formal authority
Language:	Italian
Attendance:	Optional
Type of examination:	Practice test

PREREQUISITES
No prerequisites

COURSE OBJECTIVES

The course syllabus aims to provide the non- native Italian speaking Student with the basic skills and knowledge of the Italian language for the future understanding of a medical-clinical context to enable interaction and communication during the clerkship of the medical degree course in English.

The Italian Language Course for non-Italian native speakers (20 hours):

- Teaching of grammar concepts above all verb tenses, the use of definite and indefinite articles, and prepositions; reading, listening, speaking and comprehension techniques, at a basic level for non- Italian native speakers;
- reading, listening and comprehension exercises using scientific-medical terms with appropriate feedback and debate;
- role play of medical clerkship contexts

COURSE AIMS

At the end of the Pre- clerkship Italian Language Course the student will be able to:

- read and grasp the meaning of specific medical texts as per clerkship;
- know and understand the meaning of specific medical vocabulary;
- translate basic documents into Italian;
- provide personal information/details in Italian;
- ask and answer health related questions in Italian;
- interact and communicate in Italian at a satisfactory level (A1/2 level)

COURSE DELIVERY

The learning Modality is based on various teaching techniques:

- face-to-face learning;(in-class/in class time with online learning) through Moodle and course text book Pathways 16 by Massari-Teriaca (specific course text book);
- activities, such as role play, to enhance oral/aural communication skills

LEARNING ASSESSMENT METHODS

The Italian Language Test.

This practice test will be carried out at the end of the first semester. Total time 1 hour 15 minutes.

The test, aimed at non-Italian native speakers, will consist of a pass/fail test based on concepts learned during the Italian Language Course.

A short conversation in Italian, exchanging personal details, will also be included

SUPPORT ACTIVITIES

Support activities

Support Activities and Recommended teaching material:

Campusnet Handouts, Moodle besides the following:

Useful Websites for the Italian language

http://www.uvm.edu/~cmazzoni/3grammatica/grammatica/

http://onlineitalianclub.com/free_italian_exercises/A1_presente_verbi_regolar i.html

http://www.italianlanguageguide.com/languagetools/italianbasictest2.asp

https://www.babbel.com/registration/new

http://italianencounter.com/en/free-italian-exercises/

PROGRAM

During the course the following topics will be covered in the Italian language as per book Pathway 16 Massari/Teriaca Italian Notes (Massari)

- basic grammar concepts, above all verb tenses, modal verbs;
- principal language functions;
- medical language functions;
- medical vocabulary;
- basic medical comprehension exercises;
- structure, language and terminology for clerkship.

The 20 hours of the Pre-Clerkship Italian Language Course focusses on:

- teaching of grammar concepts, reading, listening and comprehension techniques at a basic level;
- reading, listening and comprehension of basic medical texts with appropriate feedback ;
- introducing medical-clinical topics with guided questions for interaction;
- role play of clerkship situations in a medical- clinical context.

SUGGESTED TEXTBOOKS AND READINGS

Recommended Book

Pathway 16 Scientfic English Series di Massari/Teriaca,

Course webpage: http://www.medinto.unito.it/do/corsi.pl/Show?_id=o88n

Basic pathology and immunology

Basic pathology and immunology

Academic year:	2018/2019
Course ID:	SCB0205
Teacher:	Prof. Federica CAVALLO (Lecturer) Prof. Fiorella BIASI (Lecturer) Dott. Paola Francesca GAMBA (Lecturer) Prof. Gabriella Leonarduzzi (Lecturer)
Teacher contacts:	011 670 6457, federica.cavallo@unito.it
Year:	2nd year
Type:	Basic
Credits/recognition:	10
Course SSD (disciplinary sector):	MED/04 - patologia generale
Delivery:	Formal authority
Language:	English
Attendance:	Mandatory
Type of examination:	Written

PREREQUISITES
Having a solid background on the basis of genetics and biology.

COURSE OBJECTIVES

The course will be divided into two main subjects: Immunology and Basic Pathology

Immunology objectives: An understanding of the immune system is central to the understanding of how the body interacts with its surroundings, and how it both protects itself and responds to infectious disease. The course leads the student through both innate and adaptive immunity, how infection is detected, and how the cells of the immune system interact to generate a response. The mechanisms underlying allergy and hypersensitivity and the immune response to tumors are also provided. The aim is to provide the understanding of the essential aspects of immunity required to understand immunological diseases, investigations and treatment.

Basic Pathology objectives:this part of the course will provide molecular basis for understanding causes, mechanisms and evolution of human diseases. Main processes such as necrosis, inflammation and tissue degeneration, which are fundamental for understanding disease development and progression, will be considered. A group of lessons will be dedicated to ONCOLOGY for understanding biomolecular mechanisms involved in tumor development and growth, as well as becoming familiar with tumor nomenclature and classification.

COURSE AIMS

Students will achieve knowledge on fundamental principles of the disease and recognizing disease processes regarding the impairment of tissue homeostasis, immune responses and cancer.

In particular, the students will have to understand the main cellular and molecular mechanisms by which the immune system contributes to the prevention, healing, and its interplay with cellular and tissue responses that can lead to disease development in human pathology.

COURSE DELIVERY

The exam will consist of a written test including multiple-choice and open questions.

LEARNING ASSESSMENT METHODS

The course mainly consists of lectures associated with practical activities (regarding immunology, some case studies in which the immune system plays and important role will be presented and discussed with small groups of students).

SUPPORT ACTIVITIES

Basic Pathology - Practical activities and seminars will be provided in order to give deep informations on the topics of the lessons

Immunology - For those that show gross deficiencies in the prerequisites, support is offered individually or in small groups outside lesson. Updated reviews (mainly from Nature Reviews Immunology) on topics covered in class will be provided for those students that want to deepen their knowledge in the field.

PROGRAM

BASIC PATHOLOGY

- Tissue damage: adaptation conditions (hypertrophy, hyperplasia, atrophy, regression, metaplasia, dysplasia)
- Cell death: morphological, biochemical and molecular aspects of necrosis and apoptosis. The role of cellular redox balance
- Acute inflammation (angiophlogosis): structure and function of the blood microvascular system. Exudate formation
- Inflammatory mediators: fluid phase mediators and cellular mediators
- Chronic inflammation (histophlogosis) - Classification and mechanism of formation of different unspecific and specific (granulomas) types of chronic inflammation
- Wound healing: tissue regeneration and reintegration
- Environmental causes of damage - physical (extreme temperatures and pressures; ionizing and exciting radiations) and chemical factors
- Fever: causes, mechanisms, stages and classification
- Degenerative processes: thesaurismoses by lysosomal enzyme deficit, amyloidosis, alcoholic and non-alcoholic steatosis, fibrosis and sclerosis, hepatic cirrhosis

IMMUNOLOGY

- Overview of the immune system
- The natural immune response. The pattern recognition receptors and their ligands.
- The cytokine network.
- The complement system: activation and effector functions
- The Major Histocompatibility Complex: genomic organization and polimorfisms. Antigen presentation to T cells.
- Cells of the adaptive immune response.
- The T cell receptor. Thymic education and antigen recognition by T cells. T cell activation and effector mechanisms.
- B cells. The generation of antibodies diversity. T and B cell cooperation. Antibody production. AID and its role in class switching and somatic hypermutation. Molecular structure and effector functions of antibodies.
- Functional anatomy of the immune system
- Self-tolerance and tolerance induction to exogenous antigens.
- Hypersensitivity and Autoimmunity.
- Basic concepts in tumor immunology and immunotherapy.

ONCOLOGY

- Definition of neoplasia. The neoplastic multiphasic process
- Normal and neoplastic proliferation - Oncogenes and tumor suppressor genes
- Cancer growth and invasiveness: molecular mechanisms of tumor infiltration and angiogenesis
- Tumor metastases - principal routes of cancer spreading
- Epidemiology and classification of tumors. Tumor grading and staging
- Cancer etiology: chemical, physical, biological and genetic causes
- Inflammation and cancer. Epithelial-mesenchymal transition
- Tumor cachexia
- Hereditary cancers

SUGGESTED TEXTBOOKS AND READINGS

Immunology lessons: 1) "Janeway's Immunobiology, Ninth edition, K Murphy, Garland Science"; 2) "The Immune System, Fourth Edition, P Parham, Garland Science"

Basic Pathology lessons:"Robbins & Cotran Pathologic Basis of Disease, 9th Edition; Authors:Vinay Kumar, MBBS, MD, FRCPath, Abul K. Abbas, MBBS and Jon C. Aster, MD, PhD; Elsevier Ed."

Course webpage: http://www.medinto.unito.it/do/corsi.pl/Show?_id=6mbp

Basis of human morphology 1

Basis of human morphology 1

Academic year:	2018/2019
Course ID:	SCB0200
Teacher:	Prof. Stefano GEUNA (Coordinator) Silvia GIORDANO Prof. Stefania RAIMONDO Dott. Giulia RONCHI
Teacher contacts:	0116705433, stefano.geuna@unito.it
Year:	1st year
Type:	Basic
Credits/recognition:	8
Course SSD (disciplinary sector):	BIO/16 - anatomia umana BIO/17 - istologia
Delivery:	Formal authority
Language:	English
Attendance:	Mandatory
Type of examination:	Written and oral

COURSE OBJECTIVES

The course will illustrate the organization of the various tissues, organs and systems by integrating topographic and systematic approaches. Particularly, the histological study of the organ structure will be emphasized, due to its fundamental importance in understanding both physiopathology and organ position within the body. Special attention will be paid to the relations significant to understand the functional mechanisms of the most common diagnostic and therapeutic operations.

COURSE AIMS

The course will address human morphology with the aim of providing the basis for medical education. The course will also provide the basis for the disciplines of the following semesters (such as physiology, pathology etc.) and to understand the physio-pathological bases of the main human diseases that will be addressed along the entire medical curriculum. At the end of the course the students shall demonstrate to know the morphological bases of the human body.

COURSE DELIVERY

The teaching methods of the course will be interactive and stimulating for the students, and will facilitate the acquisition of the basic knowledge necessary to pursue the course of study (core curriculum). This aim is reached by setting the lessons based on the primary health issues of our Region. Furthermore, as far as the complementary teaching is concerned, the teaching methods will be interactive, constantly correlating the biological topics covered during the lessons to the clinical issues, also stimulating a more active participation of the students.

Students will also receive training at the microscope to become able to distinguish different tissues and organs.

LEARNING ASSESSMENT METHODS

Test - Written - Anatomy and Histology

- Program: the whole exam program

- 40 multiple-choice questions (from 0 to 4 correct answers/question - 15 Histology and 25 Anatomy (highly crossed programs). 40 minutes time.

- Evaluation: [Correct answer = +1, no answer = 0, wrong answer = -0,5].

- The test will be replayed EVERY EXAM SESSION and it is compulsory

- Validity throughout the reference academic year (until the Easter session of the following calendar year). However, the student who has not passed the oral test shall repeat the written one.

Test - Oral - Anatomy and Histology

The student usually undergoes three "moments":

- Illustration of a Microscopy Anatomy preparation

- 1-2 Histology questions

- 1-2 Anatomy questions

- Evaluation: the student can reach a grade of +/- 6 from the written score (also taking into account the score obtained in the 1st written test).

PROGRAM

- Introduction to microscopy and histological techniques.
- Hints of embryology.
- The epithelia: classification, morphology, functional aspects.
- Exocrine and endocrine glands: classification, morphology, functional aspects.
- Sensory epithelia
- Connective tissues: classification, morphology, functional aspects.
- Bone, cartilage, adipose tissue
- Morpho-functional aspects of plasma and blood cells; hints on hematopoiesis, bone marrow and the immune system.
- Structure and function of smooth, striated and cardiac muscle tissues.
- The cells of the nervous system: classification, morphology, functional aspects.
- Anatomic organization of the human body.
- Head and neck.
- The chest cavity: pulmonary cavities and mediastinum.
- The abdomino-pelvic cavity.
- Respiratory system: i) Nasal cavities and paranasal sinuses; ii) Larynx: position, hints of constitution, morphology; iii) The tracheobronchial tree: morphology, position and relations; iv) The lung: external morphology and partition of the parenchyma; v) The pleura and the pleural cavity.
- Digestive system: i) The oral cavity: partition and limits. The tongue. The teeth. The major salivary glands. The pharynx. Position and cavity morphology: ii) The digestive tract: morphology and position of the different tracts. iii) The peritoneum: the peritoneal cavity and its content; iv) The liver and the pancreas.
- Urinary system: morphology, position and relations of the urinary tract and kidney.
- Reproductive system: anatomic organization of female and male reproductive system; gonads.
- Endocrine system: morphology, position, relations, and structure of the endocrine glands

SUGGESTED TEXTBOOKS AND READINGS
Gray's Anatomy, 41st Edition The Anatomical Basis of Clinical Practice Editor-in-Chiefs: Susan Standring

Imprint: Elsevier

Course webpage: http://www.medinto.unito.it/do/corsi.pl/Show?_id=ky43

Basis of human morphology 2

Basis of human morphology 2

Academic year:	2018/2019
Course ID:	SCB0202
Teacher:	Prof. Alessandro VERCELLI (Lecturer) Prof. Stefano GEUNA (Lecturer) Dott. Giulia RONCHI (Lecturer)
Teacher contacts:	0116707700/6617, alessandro.vercelli@unito.it
Year:	2nd year
Type:	Basic
Credits/recognition:	5
Course SSD (disciplinary sector):	BIO/16 - anatomia umana
Delivery:	Formal authority
Language:	English
Attendance:	Mandatory
Type of examination:	Written

PREREQUISITES
Histology of the nervous system and Anatomy I.

COURSE OBJECTIVES

The course aims to support the basic knowledge of the morphological organization, of the architecture and of the fundamental functional properties of the central, peripheral and autonomic nervous system, and of sense organs.

The course aims also to support the basic knowledge of the cardiovascular system (heart and vessels)

COURSE AIMS

The student should be able to describe the structures of the central nervous system, and in particular the nuclei and the laminar structures, together with their anatomical connections. She/he must be able to describe the pathway and the innervation of the peripheral nerves and of the autonomic nerves. Moreover, for each structure she/he should know the basic functional anatomy and the relevance of anatomy in relationship with some neural pathologies.

Students should also be able to describe the structure of the skull

Finally, students should be able to describe the anatomy of the heart and the structure of blood vessels, together with the main arteries and veins.

COURSE DELIVERY

Frontal lectures, microscopic and macroscopic anatomy lab, virtual cadaver.

LEARNING ASSESSMENT METHODS

Written and/or oral exam.

SUPPORT ACTIVITIES

Practical exercises of microscopical (slides) and macroscopical (brain and sections) anatomy. Virtual anatomic table. Movies of patients affected by nervous diseases.

PROGRAM

Central Nervous System: overall organization. Macro- and micro-anatomy of the spinal cord, brainstem, cerebellum, diencephalon, telencephalon. Sensory, motor, correlative and associative pathways. Lymbic system. Encephalic and spinal meninges. Cerebral ventricles and liquor circulation.

Peripheral Nervous System: organization (macro- and micro-anatomy) of cranial and spinal nerves.

Autonomic Nervous System: sympathetic and parasympathetic systems. Enteric nervous system.

Sense Organs: overall organization; fundamental morphological characteristics of eye, ear, gustative receptors, olfactory receptors, sense corpuscles and proprioceptors.

Structure of the skull

Cardiovascular System: Mediastinum; Anatomy of the heart (chambers, valves, cardiac skeleton, cardiac conduction system, pericardium and wall); Structure of blood vessels; Major arteries and veins; Fetal circulation

SUGGESTED TEXTBOOKS AND READINGS

Gray's Anatomy

Nieuwenhuys. The central nervous system. Springer.

Paxinos. The human nervous system. Elsevier.

Course webpage: http://www.medinto.unito.it/do/corsi.pl/Show?_id=sita

Biochemical and molecular basis of metabolism

Biochemical and molecular basis of metabolism

Academic year:	2018/2019
Course ID:	SCB0314
Teacher:	Prof. Michele De Bortoli (Coordinator) Marco Arese Santina CUTRUPI
Teacher contacts:	0116705058, michele.debortoli@unito.it
Year:	1st year
Type:	Basic
Credits/recognition:	11
Course SSD (disciplinary sector):	BIO/10 - biochimica BIO/11 - biologia molecolare INF/01 - informatica
Delivery:	Formal authority
Language:	English
Attendance:	Mandatory
Type of examination:	Written

COURSE OBJECTIVES

The program aims to introduce students to the biochemical basis necessary to deal effectively with medical problems. In particular, the production of energy and its use represent the core of the program as a paradigmatic example to understand life at a mechanistic level. The key concepts under study will focus on how complex molecules that are found in living organisms create structures, carry out chemical reactions, and store and use the information to generate the remarkable properties of living organisms. Metabolism is also a key level in which a myriad of interactions between molecules illustrate the concepts of living cells and organisms as complex systems.

The biomedical knowledge is increasingly organized today in databases and knowledge repositories, spanning from genomics to metabolomics and pharmacogenomics. Consequently, the awareness of the biomedical data available and basic bioinformatic tools to deal with data is an absolute requirement in any Medicine curriculum, in order to guarantee the ability to access to certified, robust and constantly adjourned information. This will be spent in many other courses in the following years.

COURSE AIMS

At the end of the course, the student will have and in-depth knowledge of the chemical processes that extract energy from cells. Moreover the student will mature the ability to observe biological phenomena and think of them as the result of complex interactions between single molecules. As a future MD, the student will be eager to search for disease causing errors within this network of interactions, and think of drugs as agents that can restore the physiological status.

In addition, the Student will be able to obtain basic information on genes and proteins and how they are interacting at a network level, by interrogating the most common genomic and biomedical databases. This ability will be gained through tutored and autonomous bioinformatic activities in the computer room.

COURSE DELIVERY

Teaching is organized in both lectures and active learning parts. Lectures will accomplish for a total of 122 hours. For each Lecture package (6-8 hours), an accompanying active learning part will be accomplished both in the classrooms and on-line, based on the Moodle platform. Simple molecular design and modeling is performed on-line using JME and JSMol. Introductory use of biological databases are exercised using the NCBI and ENSEMBL websites. Knowledge databases as NCBI Gene, Gene Ontology, GEO, are used to recover information on specific components of simple metabolic pathways. Network and pathway analytical tools as those offered in KEGG, Wikipathways, REACTOME, are used to describe examples. Finally, specific examples of metabolic pathway alterations are explored using OMIM, TCGA and other phenotype-genotype databases.

LEARNING ASSESSMENT METHODS

The exam will be based on a test, which is normally administered on the Moodle platform. The test will include

multiple-choice questions, exercises and open questions, covering all the topics in the syllabus. Specific questions will be dedicated to verify the acquisition of a global and integrated vision of the topics. Exercises will test acquired abilities, such as interpreting a database screenshot or genome browser image. The test will give a score of up to 25/30 points. Participation in the practical classroom activities, as well as on-line complements, will be evaluated to up to 7/30 points at the exam. An oral discussion may follow this test whenever the teachers or the students request to do so (for example in order to clarify and discuss specific topics of the written exam, or in general to increase the overall quality of the learning assessment). Oral interview can modify the final score up to +/- 4 points.

SUPPORT ACTIVITIES

A number of optional activities are available on the Moodle Platform (http://medicina.i-learn.unito.it/), concerning further exercises on molecular structures, and verification quizzes at the end of each part (or Chapter)..

PROGRAM

Metabolic Biochemistry

Metabolism.

- Introduction to mechanisms of regulation of metabolic pathways. The metabolome.

The metabolism of carbohydrates.

- Glycolysis.
- The metabolism of glycogen in the liver and muscles.
- The citric acid cycle.
- Electron transport, oxidative phosphorylation and regulation of ATP production.
- Pentose phosphates.
- Gluconeogenesis.
- Digestion of carbohydrates.
- Utilization of galactose, fructose, mannose.
- Genetic diseases related to carbohydrate metabolism. Regulation of carbohydrate metabolism by hormones and transcriptional circuits

Lipid metabolism.

- The oxidation of fatty acids
- Biosynthesis of fatty acids.
- Biosynthesis of phospholipids.
- Biosynthesis of cholesterol, and bile acids.
- Prostanoids.
- Regulation of lipid metabolism by hormones and transcriptional circuits.
- The production and the effects of oxygen radicals.

Nucleic acid metabolism.

- Purine biosynthesis.

- Pyrimidine biosynthesis.
- Purine catabolism.
- Pyrimidine catabolism.
- Genetic diseases related to nucleotide metabolism
- Regulation of nucleotide metabolism.

Protein metabolism.

- The anabolic pathways of nitrogen:
- Nitrogen fixation,
- The synthesis of glutamate, glutamine, carbamoyl phosphate.
- Paradigmatic examples of synthesis of amino acids: alanine, aspartate, cysteine, tyrosine. The urea cycle.
- The metabolism of heme

Integration of metabolism.

overview of metabolism connections and separation in the body

- The metabolism during stress, aerobic and anaerobic activity.
- metabolis of alcohol

Metabolisms as molecular networks

- Basics of the graph theory
- Circuits and Networks
- Metabolic networks.
- Interaction between macromolecules: protein-protein, protein-DNA, protein-RNA, RNA-RNA.
- Methods to assess molecular interactions.
- Analysis of protein-DNA interaction and chromatin accessibility on a global scale

.

Special topic biochemistry

Steroid Hormones

- Classes of Steroid Hormones
- Biosynthesis steroid hormones

Food digestion

- Digestion, Absorption, and Transport of Carbohydrates
- Digestion and Transport of Dietary Lipids
- Protein Digestion and Amino Acid Absorption

Metabolism of the central nervous system

- Introduction
- Compartmentalization of metabolism
- Relations between glucose and ketone bodies in development
- brain glucose and glycogen
- Metabolism of neurotransmitters
- damage from cerebral ischemia reperfusion
- metabolic encelopathies

Overview of metabolism in cancer cells

Genomic Regulation

- Genome expression, regulation and control in development, homeostasis and disease.
- Global analysis of gene structure and expression.
- Epigenetic control of the genome
- Networks of transcriptional and post-transcriptional control of gene expression.
- microRNA, lncRNA and their role in the circuits controlling acute, damped, homeostatic and cyclic responses. Other roles of lncRNAs.

Functional genomics.

- The genome projects and their functional significance: ENCODE, GWAS, TCGA, 1000 Genomes and others.
- Biological databases. Primary and secondary databases. Knowledge databases.
- Reference database for medicine. OMIM, TCGA, and other databases of interest.
- Tools for network and pathway analysis and visualization..

SUGGESTED TEXTBOOKS AND READINGS

Biochemistry, 5th edition Jeremy M Berg, John L Tymoczko, and Lubert Stryer.New York: W H Freeman; 2002.

Nelson, D.L., Lehninger, A.L. and Cox, M.M., 2008. Lehninger principles of biochemistry. Macmillan.

Molecular Biology Scientific Reviews Provided as Reference Materials on the Moodle Platform: http://medicina.i-learn.unito.it/course/view.php?id=104 . Online presentations of database purpose, structure and content are available as "guides" or "help" or "tutorials" on Database websites.

Course webpage: http://www.medinto.unito.it/do/corsi.pl/Show?_id=q9oc

Cell Biology and Genetics

CBG

Academic year:	2018/2019
Course ID:	SCB0198
Teacher:	Prof. Isabelle Perroteau (Coordinator) Prof. Adriano Ceccarelli Claudia GIACHINO Prof. Saverio Francesco RETTA
Teacher contacts:	0116705401, isabelle.perroteau@unito.it
Year:	1st year
Type:	Basic
Credits/recognition:	11
Course SSD (disciplinary sector):	BIO/13 - biologia applicata MED/03 - genetica medica
Delivery:	Blended
Language:	English
Attendance:	Mandatory
Type of examination:	Written and oral (optional)

PREREQUISITES

- B2 English level (Common European Framework of Reference for Languages - CEFRL)
- Students with IMAT biology score below 25% will be given additional online instruction and materials and will have to demonstrate as soon as possible they regain prerequisites.

PROPEDEUTIC FOR
all biological and clinical courses

COURSE OBJECTIVES

CBG is a basic course in modern medical education, the purpose of which is to make medical students master the structure and functions of cellular components, as well as genetic regulation and mechanisms; and know the development and trends of the science and the application of new technology. This knowledge will provide a solid foundation for studying other related courses (basic and clinical).

COURSE AIMS

At the end of the CBG course the student is expected to have:

- Deep knowledge and understanding of cell structures and the dynamic functional activities of cells
- Reached awareness that all pathologies result ultimately from dysfunctions - of genetic or environmental origin - in cellular activities.
- Knowledge of the effects of growth, development, and aging on cells
- An understanding of and ability to interpret cell morpho-functional abnormalities in various diseases
- Acquired the ability to critically interpret the scientific data present in the relative international literature.

COURSE DELIVERY

Instructional techniques include direct instruction, question and answer, problem-solving and discovery learning. Molecular Genetics module is delivered using the flipped classroom instructional strategy. Students gain first exposure to new material outside of class, usually via reading or lecture videos, and then class time is used to do the harder work of assimilating that knowledge through strategies such as collaborative and peer learning, problem-solving, discussion or debates. The key purpose of the flipped classroom is to engage students in active learning where there is a greater focus on students' application of conceptual knowledge rather than factual recall.

LEARNING ASSESSMENT METHODS

Assessment will be both formative and summative.

Formative assessment is designed to provide the immediate, explicite feedback to adjust ongoing teaching and learning to improve students' achievement of intended instructional outcomes. Formative assessment is a method of continually evaluating students' academic needs and development within the classroom and precedes summative assessments. Formative assessment includes self- and peer-assessment and is not used in the formal grading process.

Summative assessment includes end-of-unit and end-of-term tests exams created in the following formats:

multiple choice, true/false, matching, drag and drop onto image, fill in the blank, extended written response and performance assessment.

- Cell biology summative assessment: Mean value of two tests, respectively on units 1-3 and 4-6 . Each test will be a 45 min quiz, consisting in 15 questions created in the same format as the formative assessments. The test on units 1-3 will be held at the end of part 01 and the test on units 4-6 at the end of part 02. Cell Biology summative assessment is optional.
- Molecular genetics summative assessment: best 3/4 end-of-unit tests and assays. Molecular Genetics summative assessment is mandatory.

Due to the difference in the teaching method:

- Cell Biology summative assessment mark will be taken in account for formal grading only in the exam session of february 2019.
- Molecular genetics summative assessment mark will be taken in account for formal grading up to december 2019.

Exam sessions:

- February 20, 2019 exam session:
    - Students accepting the summative Cell Biology mark (mean value of tests on part 01 and 02) will sit for a one hour test consisting in 5 open- and problem-solving questions on Human Genetics.
    - Students that didn't sit for the two summative assessments or deny their mark (mean value of tests on part 01 and 02) will sit for a unique moodle test of either 120 or 90 min, consisting in 15 questions on CB-part 01 and/or 15 questions on CB part 02 and 5 questions on Human genetics.
- Other exam sessions:
    - 18/06/2019; 24/07/2019; 18/09/2019; 18/12/2019
    - All students will sit for a unique moodle test of 120 min consisting of 15 questions on CB-part 01, 15 questions on CB part 02 and 5 questions on Human genetics (9 ECTS). Questions will be created in the same formats as for the summative assessments.

Formal grading

- Al marks are expressed as a value out of 30 points. The formal grading process is caculated as the weighted sum of Cell Biology (6 ECTS), Molecular genetics (3 ECTS) and Human genetics (2 ECTS) marks.
- Weighted sum less than 18/30 will be considered as failed and students will have to sit again.
- Students with a weighted sum of 30/30 and that have demonstrated high level of particpation to lectures and activities, both online and in class, can also be granted "30/30 cum lauda" as a commun decision of the 4 lecturers.

SUPPORT ACTIVITIES

Students with disorders that may affect learning (e.g. color blind students, visually impaired, hearing impaired, dyslexic or with physical disabilities) are encouraged to contact the lecturers to adapt learning materials, activities and testing methods.

PROGRAM

((Human Genetics - SCB0198A (MED/03, 2ECTS) Lecturer: C. Giachino))

This part of the course will be delivered according to the traditional classroom instructional strategy

Unit 01 Genetic heredity in eukaryotes

Lectures (8 hrs)

-Genetic stability and variability
-Monofactorial characters and Mendel's laws

-Autosomal and X-linked characters

-Mitochondrial inheritance of diseases
-Herediting polygenic characters
-Molecular analysis of human loci

Student activities (4 hrs)
-Adaptive thinking and reasoning skills: Interpretation of family trees

-Reasoning skills: Problem solving on human disease inheritance

Unit 02 Mutations, population genetics and innovative therapies

Lectures (8 hrs)
-Point, chromosomal and genomic mutations

-Genetic variability and its modulation inside populations

-Immunogenetics and gene therapy

-Stem cell genetics and regenerative medicine

Student activities (4 hrs)

-Reasoning skills: problem solving on population genetics

-Critical thinking and inquiry skills: problem-based discussion on innovative therapies

((Cell Biology part 01 - SCB0198B (BIO/13, 3 ECTS) Lecturer: I. Perroteau))

This part of the course will be delivered according to the traditional classroom instructional strategy

Unit 01 Introduction to the cell

Lectures (8 hrs)
-Subcellular compartments
-Cell cultures and live cell imaging
-Protein analysis. Light and electron microscopy in cell biology

Student activities (4 hrs)
-Cognitive skills: Formative assessment (0.5hr, online)
-Adaptive thinking and reasoning skills: Reading of optical and electron micrographs (0.5hr, online)
-Critical thinking and inquiry skills: visit to research labs and discussion on experimental study of cell structure and functions (2hrs, face to face)

Unit 02 Cell structures and functions

Lectures (8 hrs)
-Protein synthesis and sorting to nucleus, mitochondria and peroxisomes
-The secretory pathway and vesicle-mediated transport
-Exocytosis, exosomes and microvesicles. Endocytosis, phagocytosis and macropinocytosis
-Transporters and channels

Student activities (4 hrs)
-Cognitive skills: Formative assessment on biological membranes (1hr, online)
-Reasoning skills: Problem solving on molecular sorting (2 hr, face to face)
-Case study discussion: CFRT and Cystic fibrosis (1hr, online)

Unit 03: Cell communication and signaling

Lectures (8 hrs)

-Principle of cell communication
-G-protein coupled receptors - Heterotrimeric G protein-linked signal transduction - AC, PKA, PLC, PKC, PI3K
-Enzyme-linked receptors and cytokine receptors: RSTK, TKR, RPTPs, cytokine receptors
-Alternative signalings: adhesion receptors, protease-activated receptors, nuclear receptors and circadian clocks

Student activities (4 hrs)
-Cognitive skills: Formative assessment on cell communication and signalling (3hr, online)
-Reasoning skills: Problem solving on signal transduction (1hr, online)
-Problem-based discussion on cell communication and GPCR and enzyme-linked receptors signal transduction (2hr, face to face)
-Problem-based discussion on alternative signalings (2Hr, face to face)

((Cell Biology part 02 - SCB0198B (BIO/13, 3 ECTS) Lecturer: S.F. Retta))

This part of the course will be delivered according to the traditional classroom instructional strategy

Unit 04: Cell shape and motility

Lectures (8 hrs)
- Cytoskeleton: Microfilaments, microtubules and intermediate filaments assembly and regulation
- Motor proteins of microfilaments and microtubules. Specialized structures: mitotic spindle, flagella, axon
- Cell-cell and cell-matrix adhesion and signaling

- Motility processes and cell migration. Chemotaxis

Student activities (4 hrs)
- Cognitive, reasoning and communication skills: development and presentation of cooperative studies (group learning and group work at home) aimed at deeper understanding and contextualization in the medical field of the biological topics covered (4hrs, face to face).

Unit 05: Cell proliferation and survival

Lectures (10 hrs)
- Cell cycle regulation
- Mitosis and meiosis
- Accidental and programmed cell death
- Autophagy in cell survival and death

Student activities (4 hrs)
- Cognitive, reasoning and communication skills: development and presentation of cooperative studies (group learning and group work at home) aimed at deeper understanding and contextualization in the medical field of the biological topics covered (4hrs, face to face).

Unit 06 Cell differentiation

Lectures (6 hrs)
- Stem cells, cell differentiation, and development of multicellular organisms. Cell tracing
- Nuclear reprogramming and induced pluripotent stem cells (iPSCs)
- Genetically modified animal models

Student activities (4 hrs)
- Cognitive, reasoning and communication skills: development and presentation of cooperative studies (group learning and group work at home) aimed at deeper understanding and contextualization in the medical field of the biological topics covered (4hrs, face to face).

((Molecular Genetics - SCB0198B (BIO/13, 3ECTS) Lecturer: A. Ceccarelli))

This part of the course will be delivered according to the flipped classroom instructional strategy

Nucleus and DNA: how genetic information is organized, propagated and maintained

Online lectures (12 hrs)

-Pro- and eukaryotic genomes
-The ENCODE project
-Chromatin and higher order nuclear organization of DNA
-DNA replication
-DNA damage and repair mechanisms
-Mitosis and meiosis
-Mobile Genetic Elements and genome evolution
-Molecular Medicine*: higher order chromatin organization and human diseases

Student activities (6 hrs)

-Critical thinking skills: problem-based discussion on DNA manipulation and genetic engineering basics (0,5 hr - group activity)
-Problem solving and collaborative skills: group activity on problems about gene definition, eukaryotic gene structure (1 hr - Group Activity)
-Problem solving and collaborative skills: group activity on problems about regulation of genome 3D architecture, relationship between 3D organization and genetic phenomena such as chromosomal rearrangements (1,5 hrs - Group activity)

-Critical thinking skills and problem solving skills: discussion the need for the quantitative regulation of DNA replication - eukaryotic vs prokaryotic (1 hr - group activity)
-Reasoning skills: problems on DNA replication-DNA repair/cell cycle relationship (1 hr - group activity)
-Reasoning skills: problems on replication of epigenome and discussion on its implications (1 hr - Group activity)

Nucleus and RNA: copying and distributing genetic information

Online lectures (6 hrs)
-Pro- and Eukaryotic Transcription -
-Eukaryotic RNA processing and editing

-Transcriptional and post-transcriptional control of gene expression
-Molecular Medicine: exploiting transcriptional control for the therapy of human diseases

Student activities (3 hrs)
-critical thinking skills: focus on bacterial and eukaryotic gene regulation (20 - individual test followed by group activity)
-mini lecture 1 on experimental approach to eukaryotic gene regulation (5'- ppt slides)
-critical thinking skills: problems on minilecture 1 (15' group activity)
-minilecture 2 on experimental approach to eukaryotic gene regulation (5'- ppt slides)
-critical thinking skills: problems on minilecture 2 (15' group activity)
-minilecture 3 on experimental approach to eukaryotic gene regulation (5'- ppt slides)
-critical thinking skills: problems on minilecture 3 (15' group activity)
-minilecture 4 on experimental approach to eukaryotic gene regulation (5'- ppt slides)
-problem solving skills: problems on minilecture 4 (15' group activity)
-Problem based discussion and critical thinking skills: discussion of paper Intron-early/Intron-late and the exon theory of gene and of its implication fo eukaryotic (human) genome evolution (80' - peer-to-peer discussion followed by problem solving group activity)

RNA in the cytoplasm: usage of coding and non-coding genetic information

Online lectures (6 hrs)
-The genetic code - Translation
-Non-coding regulatory RNAs - RNA interference and other regulatory networks
-The mitochondrial genetic system

Student activities (3 hrs)
-Reasoning skills: problems on relevance of abnormal splicing to protein structure (1 hr - group activity)
-Reasoning skills: problems on non-coding RNA regulatory roles (1 hr - Group activity)
-Reasoning skills: problems on protein synthesis and relevance of differences between prokaryotic and eukaryotic mechanisms

SUGGESTED TEXTBOOKS AND READINGS

- Adopted textbook: Molecular Biology of the Cell, B. Alberts, 6th edition, Garland Sciences (eTextbook edition recommended for inclass activities)

Course webpage: http://www.medinto.unito.it/do/corsi.pl/Show?_id=2q5m

Clinical methodology and semeiotics

Clinical methodology and semeiotics

Academic year:	2018/2019
Course ID:	SCB0209
Teacher:	Prof. Piero Paccotti (Lecturer) Prof. Emiliano AROASIO (Lecturer) Prof. Giuseppe Maina (Lecturer) Prof. Andrea VELTRI (Lecturer) Dott. Savino SCIASCIA (Lecturer) Paolo De Giuli (Lecturer)
Teacher contacts:	0119026871, piero.paccotti@unito.it
Year:	2nd year
Type:	Basic
Credits/recognition:	11
Course SSD (disciplinary sector):	MED/05 - patologia clinica MED/09 - medicina interna MED/18 - chirurgia generale MED/25 - psichiatria MED/36 - diagnostica per immagini e radioterapia
Delivery:	Formal authority
Language:	English
Attendance:	Mandatory
Type of examination:	Written and oral

PREREQUISITES
Fundamentals of human anatomy and physiology

COURSE OBJECTIVES

This course will provide a foundation in knowledge and skills necessary for medical students to recognize the most important medical problems and to construct clinical reasoning models.

Upon successful completion of this course, students will be able to formulate a differential diagnosis, assessment and a prioritized plan for the standardized patient. They will be able to gather a focused history and physical examination in a timed simulated testing environment and to critically examine and reflect on most common laboratory tests, and radiological techniques.

Students will be required to achieve a general understanding of all the major subject areas of clinical pathology testing, including clinical chemistry, full blood count interpretation, coagulation, immunology, transfusion medicine and basic concept of molecular diagnostics.

Students will be required to achieve a general understanding of all the major subject areas of intervention in surgical diseases, with a special focus on signs and symptoms of abdominal surgical diseases.

Interactive teaching: students will be skilled a) to transform a patient's story into a meaningful clinical problem, b) to perform a hypothesis driven, focused history, c) to perform a hypothesis driven, focused physical examination.

LEARNING ASSESSMENT METHODS

The exam test covers all the disciplines included in the course and the final score proportionally takes into account results of each module.

EXAMINATION ARRANGEMENTS : written and oral

WRITTEN

Number and type of questions:

; & nbsp; &nb sp; ; & nbsp; long-essay multiple-choice

Internal medicine &n bsp; (CFU 6) 5 6

Surgery &nbs p; &n bsp; (CFU 1) 2 & nbsp; 2

Clinical pathology ; & nbsp; (CFU 1) 0 & nbsp; 8

Clinical research &n bsp; (CFU 1) 0 & nbsp; 8

Diagnostic imaging & nbsp; &nb sp; (CFU 1) 0 & nbsp; 8

Psychiatry & nbsp; &nb sp; ; (CFU 1) 0 & nbsp; 8

Scores:

Long-essay questions:

0 to 10 points for each answer

Multiple-choice questions (1 out of 4):

+ 1 point for each right answer

; 0 point for each missing answer

- 0.25 point for each wrong answer

Students must reach at least the 25% of each discipline's score threshold (2 out of 8), and the 50% of the overall score threshold in the written test (55 out of 110) to have granted access to the oral part of the exam.

The result of the written test may be valid, at the student's discretion, until the next exam session.

If a student fail the oral exam, the written test has to be taken again.

ORAL

Critically examine and reflect on the outcomes of written tests.

Demonstrate understanding of all the disciplines part of the integrated course.

PROGRAM

Clinical reasoning and critical thinking

- what is "a problem" in medicine: its perception and interpretation; discuss the definition of an illness script and why it is important to clinical reasoning when compared to "normal" picture;

- initial concept and multiple diagnostic hypotheses, to be verified or falsified;

- probability, certainty and mistake in the diagnostic procedure; List several classic diagnostic errors and how to avoid them.

- measurable variables of clinical reasoning: likelihood of illness, diagnostic power

of the tests;

- psychological aspects of clinical thinking;

- the diagnosis as a correct selection among competing theories;

- the steps of medical acting: diagnosis, prognosis, observation, therapy.

Collecting clinical information and documents

Anamnesis: aspects and techniques; general physical examination; laboratory and radiology tools; medical record; cooperation with different healthcare givers; informed consent; professional confidentiality.

Diagnostic methods in most important clinical problems

Pain (thorax, abdomen, joints, lower limb ischemia); bowel occlusion; gastrointestinal bleeding and perforation; fever; altered state of consciousness; paleness, cyanosis, icterus/ jaundice; oedema; dyspnea; cough; hemoptysis; hypertension; coronary artery disease; arrhythmias; cardiac failure; pre-syncope, syncope, shock; urinary tract diseases; acute renal failure and chronic kidney disease; nephritic and nephrotic syndrome; portal vein hypertension; anemia, polycythemia; hepatomegaly, splenomegaly; acid-base and electrolyte (Na/K) disorders.

Clinical nutrition

Students will be required to achieve a general understanding about the medical use of nutrients in cases of deficiency or excess, including macronutrients (energy, protein, lipids) and micronutrients (vitamins, minerals). Special focus will be given to the identification of individual nutrients deficiency or excess, the medical use of diets and the concept of dietary goals and guidelines.

Psychiatry

The student learns what a mental disorder is and how a mental disorder is diagnosed.

Particular attention will be given to learning the mental status examination; a systematic format for recording findings about mental status and behavior will be provided.

Basics of diagnostic imaging

Fundamentals of radiological techniques (conventional radiology, US, CT, MRI and nuclear medicine) in terms of equipment (including physical principles) and operating principles; contrast agents; radiological anatomy and semiotics, according to different imaging modalities.

Clinical Pathology

The course represents an introduction to Clinical Pathology and will provide key concepts in laboratory medicine, correlate them to the associated clinical or laboratory information, and apply them to the diagnosis and management of human disease. Laboratory testing key concepts will be covered, including variability, quality control, reference intervals, predictive value, decision levels.

Basic concepts in clinical research methodology

Introduction to clinical research. Classification of clinical studies. Concept of primary sources, observational and experimental studies, secondary sources, systematic reviews. Concept of guidelines and randomized clinical trials. Method for evaluating a guideline. Principles for setting up an experimental clinical study.

SUGGESTED TEXTBOOKS AND READINGS

Harrison's, Principles of Internal Medicine, McGraw Hill Education

Goldman-Cecil Medicine, Elsevier

Greenfield's Surgery: Scientific Principles and Practice, 6th ed, Wolters-Kluwer

John M. Boone. The Essential Physics of the Medical Imaging, 3rd ed. Philadelphia, Pa: Lippincott Williams & Wilkins, 2012. ISBN: 978-0-7817- 8057-5

NOTE

MED/05 - clinical pathology - 1 CFU MED/09 - internal medicine - 6 CFU MED/18 - surgery - 1 CFU MED/25 - psychiatry - 1 CFU MED/36 - diagnostic imaging and radiotherapy - 1 CFU	Course webpage: http://www.medinto.unito.it/do/corsi.pl/Show?_id=k571

INTERPROFESSIONAL CLERKSHIP 1

INTRODUCTION TO PATIENT CARE

Academic year:	2018/2019
Course ID:	SCB0232
Teacher:	Elisabetta VERSINO Prof. Antonio Giulio PIGA (Lecturer)
Teacher contacts:	0119026032, antonio.piga@unito.it
Year:	1st year
Type:	Basic
Credits/recognition:	1
Course SSD (disciplinary sector):	NN/00 - nessun settore scientifico
Delivery:	Formal authority
Language:	English
Attendance:	Mandatory
Type of examination:	Practice test

PREREQUISITES

BACKGROUND Interprofessional education (IPE) in medicine is a process of field education. IPE develops students abilities to interact with individuals or groups that have different perspectives on the patient. This strengthens cooperation skills, as well as a holistic approach to health care problems. This approach is consistent with the guidelines of the Orbassano Medicine & Surgery course, which require student-centered learning and early exposure to clinical practice.

COURSE OBJECTIVES

INTENDED STUDENTS

1st year MD students in tandem with 3rd year nursing students.

At the teaching location, students will be supported by 3rd year nursing students, who will act as peer coaches, under the supervision of a clinical tutor.

GENERAL COURSE OBJECTIVES

Identifying key aspects of caretaking.

Identifying and experimenting with tools and the practice of caretaking.

SPECIFIC COURSE OBJECTIVES

At the end of the course, students will have had an introduction to:

-Understand the centrality of the person

-Identify basic rules and dynamics in the relationship and communication with the patient

-Perform self-reflection, as persons, potential patients, and professionals belonging to an organization

-Identify and experiment with some skills like moving patients confined to bed, checking arterial pressure and vital signs

-Set patient reception.

COURSE DELIVERY

ATTENDANCE

The clerkship will run during the second semester, from April 16 to the end of May.

Fifty pairs of students will be formed, on the basis of skill in the two languages (1 student with proficient Italian + 1 student with proficient English).

They will spend time in a single ward during a week, for at least 3 afternoons, from 14:00 to 18:00 and Saturday from 8:00 to 16:00.

On average, each ward will host 5 groups.

https://docs.google.com/spreadsheets/d/1CPzOqQLBA7SF9T5UjfMHVt3XJkhVBmkZ-37bQN AAImw/edit?

usp=sharing

LEARNING ASSESSMENT METHODS

ASSESSMENT

This clerkship does not require a formal assessment with an exam.

Evaluation will be linked, in particular, to how the log book is used.

LOGBOOK

A tool to reflect during/after the clerkship

A room for analysis and ideas, useful for:

-teachers, in order to keeping courses increasingly consistent with the needs of learners

-learners, to train in analysis and self-analysis for an increasingly full awareness of their professional role.

To pass the clerkship the student must:

-attend the whole scheduled program

-complete the logbook in a file named: SURNAME-Name-IP Clerkship-logbook.doc (or .txt)

-send it ,within 5 days after the end of clerkship, to:

antonio.piga@unito.it

elisabetta.versino@unito.it

laura.simionato@unito.it

ginetto.menarello@unito.it

fcl-med-did-sanluigi@unito.it

PROGRAM

TRAINING REQUIREMENTS AND OUTLINE FOR THE LOGBOOK

Therapeutic environment and professional roles (max 200 words)

Objective: To document the main elements of the structure and organization of a medical ward, taking into consideration the type of patients
and the roles and activities of the staff

Methods: With the help of the nursing student (and nursing tutor), students must collect and report information, in summary, regarding:

- ward structure and main medical equipment

- type of patients (main illnesses and needs for care)

- main care activities

Body contact with the patient (max 200 words)

Objective: To describe and analyze the experience of first contact with patients

You will see some patients. Their clinical condition and treatment needs will be introduced with the help of the student nurse, or ward nurse, or both.

You will participate in activities that involve body contact with the patient
(example: mobility, physical preparation for surgical intervention, arterial pressure assessment, etc.).

After these experiences, please write down:

- brief description of the patients (age, reason for admission, independence level in basic life skills)

- treatment activities you took part in; your role

- your thoughts and feelings; any difficulty in the physical interaction with a sick person.

- follow-up observations comparing yourself with the nurse or student who participated with you.

Communication with patient/family (max 200 words)

Objective: to describe and analyze the first direct experiences of communication with patients

You will participate in activities that foster a meaningful relationship
(examples: treatment at admission or dismissal, medical examination, information on procedures or treatments, informed consent, preparation for surgical procedures, etc.).

After one or more of these activities, please write down a description of any significant aspect of communication (content and feelings) with the patient, yourself, or other professionals.

In particular:

- emotional condition of the patients, and what needs they expressed

- behaviors/attitudes of the nurse or student, that you felt effective (or not).

Future professional role

Objective: to compare the expectations for your future professional role with this first experience in the ward.

Follow a ward or internal doctor in activities such as:

treatment at admission or dismissal, medical examination, information on procedures or treatments, informed consent, etc.

After one or more of these activities, please write down:

- a brief description of any significant activity

- comparison between your expectations about the doctor's role and your observation

- any comment on:

- skills required in the doctor's role

- expectations about learning these skills in future clerkships

- suggestions for future clerkships.

Blood pressure (BP) (max 200 words)

Objective: acquire the skill of assessing BP and start using it in early steps of clinical reasoning.

Before or at start of IP clerkship:

1-Go to teaching material and look at a video (in Italian) on basics in measuring BP (……..)

2-Read basic parts of reference guidelines on BP Guideline for the Prevention, Detection, Evaluation, and Management of High Blood Pressure in Adults:
(Sections 3 & 4, pages 21-38)

3-During clerkship, with the help of the student nurse or ward nurse or both, train yourself to measure BP

4-In any case of elevated BP/hypertension, ask for help or read reference guidelines for an orientation on diagnosis and clinical reasoning
(Section 5, pages 39-54) and general measures (Section 6, pages 55-61).

5-Write down what you learned most about this topic.

YOUR ASSESSMENT (max 300 words)

Express your opinions about this clerkship. They will be taken into account to improve it in the future.

Please, focus on:

Positive aspects

What needs improvement

Suggestions

Course webpage: http://www.medinto.unito.it/do/corsi.pl/Show?_id=4n8l

Introduction to medicine

Introduction to medicine

Academic year:	2018/2019
Course ID:	SCB0195
Teacher:	Prof. Giuseppe Saglio (Coordinator) Prof. Giuseppe COSTA Prof. Giovanni MAINA Prof. Antonio Giulio PIGA Elisabetta VERSINO (Lecturer)
Teacher contacts:	0119026060, elisabetta.versino@unito.it
Year:	1st year
Type:	Basic
Credits/recognition:	4
Course SSD (disciplinary sector):	MED/09 - medicina interna MED/42 - igiene generale e applicata
Delivery:	Formal authority
Language:	English
Attendance:	Mandatory
Type of examination:	Written

Course webpage: http://www.medinto.unito.it/do/corsi.pl/Show?_id=cs85

Medical language

Medical language

Academic year:	2018/2019
Course ID:	SCB0315
Teacher:	Dott. Ermelinda MASSARI (Lecturer)
Teacher contacts:	0116708924, ermelinda.massari@unito.it
Year:	1st year
Type:	Basic
Credits/recognition:	4
Course SSD (disciplinary sector):	NN/00 - nessun settore scientifico
Delivery:	Formal authority
Language:	English
Attendance:	Mandatory
Type of examination:	Written

PREREQUISITES
B2 Level of English

COURSE OBJECTIVES

The course syllabus aims to provide the Student with the necessary skills and knowledge for the future understanding of scientific-medical-clinical texts in order to advance in the medical degree course in English.

COURSE AIMS

Results of learning outcomes

At the end of the Course the student will be able to:

- read and grasp the meaning of specific scientific texts in order to advance in the medical degree course in English;
- listen to and understand the meaning of specific scientific and non-specific texts;
- describe a chart in English as per IELTS exam;
- translate and/or summarize a listening/reading text in English/Italian;
- interact and communicate in English at a good level (beyond B2 level)

COURSE DELIVERY

The learning Modality is based on various teaching techniques:

1) face-to-face learning;

2) blended learning and face to face learning (in-class/in class time with online learning) through Moodle and course text book Pathways 16 by Massari-Teriaca (specific course text book);

3) face-to-face learning/peer learning using various activities to enhance oral/aural communication skills.

LEARNING ASSESSMENT METHODS

Exam Modality for the English language. Total time 2 hours 30 minutes.

The final exam will consist of a written paper beyond B2 level lasting about 150 minutes and a final oral exam .

The written paper is divided into four tests:

The 1° test consists of a multiple choice test based on the use of the most common grammar structures used in Scientific English. (approx. 20 sentences/300 words).

The 2° test is made up of exercises principally based on the use of verbs (approx. 40 sentences/300 words).

The 3° and 4° test is a listening and comprehension test with a gap-fill exercise. (insert 50-60 words into the gaps during the listening exercise). The true /false comprehension exercise is based on the same passage. (20 questions)

The oral test is the description of a chart and a conversation in English.

Results of the Exam

Pass/Fail result.

In order to pass the exam, the student must obtain 70% correct answers in each individual test.

Partial pass exam results will not be considered for other exam sessions.

SUPPORT ACTIVITIES

Support Activities and Recommended teaching material

Campusnet Handouts, Moodle besides the following:

Useful Websites for the English language

*http://www.cambridgeesol.it/candidati/index.php

*http://www..englishaula.it (CAE)

*http://www.usingenglish.com

*http://www.tedtalks.com/health/medicine

*http://www.ielts-net-exam.com

PROGRAM

Syllabus

During the course the following topics will be covered as per book Pathway 16 Massari/Teriaca, Handouts "Notes" (Massari), Italian Notes (Massari), Use of English gapfill exercises (Massari) which are available on Campusnet will be used as reference.

- grammar concepts, above all verb tenses, modal verbs, active/passive voice, if clauses, the use of the definite and indefinite article, bearing in mind the most commonly used forms in scientific literature;
- principal language functions;
- scientific language functions;
- medical-scientific and non-scientific vocabulary;
- reading, listening and comprehension exercises;
- structure, language and terminology for the description of a chart

The 80 hours of lessons (divided into 1st edition for early enrolment and 2nd edition for late enrolment) include:

The English Language Course for all students:

- teaching of grammar concepts, use of English, reading, listening and comprehension techniques at a B2 level or higher;
- correcting exercises of grammar, reading, listening and comprehension with appropriate feedback and debate;
- teaching of graph description as per Ielts Exam programme;
- teaching by means of code switching, alternating both languages above all in a scientific-medical-clinical setting.
- introducing scientific-medical-clinical topics with guided questions based on Tedtalk videos.

SUGGESTED TEXTBOOKS AND READINGS

Recommended Book

Pathway 16 Scientfic English Series by Massari/Teriaca

Course webpage: http://www.medinto.unito.it/do/corsi.pl/Show?_id=r0kn

Microbiology

Microbiology

Academic year:	2018/2019
Course ID:	SCB0204
Teacher:	Prof. David LEMBO (Lecturer) Dott. Manuela DONALISIO (Lecturer)
Teacher contacts:	0116705484, david.lembo@unito.it
Year:	2nd year
Type:	Basic
Credits/recognition:	7
Course SSD (disciplinary sector):	MED/07 - microbiologia e microbiologia clinica
Delivery:	Formal authority
Language:	English
Attendance:	Mandatory
Type of examination:	Written and oral

COURSE OBJECTIVES

This course covers principles of medical microbiology with emphasis to microorganisms (bacteria, viruses, fungi and protozoa) and human infectious disease. Topics include an overview of microbial structures and virulence factors, the host-parasite interactions, the pathogenic mechanisms of the most important infectious diseases, the principal concepts regarding sterilization, microbiological diagnosis, antibiotic and antiviral therapy, the conditions promoting the rise up of infections and the prevention options.

COURSE AIMS

By the end of this course, the student will have acquired basic knowledge of pathogenesis of microbial and virus infections to be able to implement a rational approach to the diagnosis and treatment of infectious diseases. The student shall learn the basic knowledge in the following topics:

1. General features of bacteriology, virology, mycology and parasitology

2. Pathogenicity, virulence, and epidemiology

3. Disease transmission and physical and chemical microbial control

4. Microbiological diagnostic techniques

5. Antimicrobial therapy

6. Common bacterial, fungal, protozoa and viral diseases

COURSE DELIVERY

Teaching is organized in both lectures and active learning parts, including microscopic observation of pathogens and main microbial laboratory techniques in teaching room with devices. This active learning promotes the acquisition of knowledge.

LEARNING ASSESSMENT METHODS

The exam will consist of a written and oral examination. The written test includes multiple-choice questions. The positive result of this test allows access to the oral exam.

SUPPORT ACTIVITIES

Students with disorders that may affect learning (e.g. color blind students, visually impaired, hearing impaired, dyslexic or with physical disabilities) are encouraged to contact the lecturers to adapt learning materials, activities and testing methods.

PROGRAM

- Introduction to Medical Microbiology:

- History of microbiology
- Koch's postulates
- Classification of microbes

- General Bacteriology:

- Structure
- Endospore
- Human microbiome and concept of opportunism
- Virulence factors
- Microbial growth
- Bacterial genetics
- Laboratory diagnosis of bacterial diseases
- Methods of Sterilization
- Antibiotics

    - Systematic Bacteriology:

- Staphylococcus
- Streptococcus
- Bacillus
- Listeria
- Mycobacterium
- Neisseria
- Haemophilus
- Legionella
- Enterobacteriaceae
- Yersinia
- Vibrio
- Pseudomonas
- Campylobacter and Helicobacter
- Clostridium
- Spirochetes (Treponema, Borrelia, Leptospira)
- Brucella
- Mycoplasma and Ureaplasma
- Rickettsia, Ehrlichia
- Clamydia
- Bordetella

    - Mycology:

- Structure, replication, pathogenesis, laboratory diagnosis of fungal disease and antifungal agents
- Superficial, cutaneous, subcutaneous and systemic mycoses
- Opportunistic mycoses (Candida, Criptococcus, Aspergillus and Pneumocystis)

    - Parasitology:

- Parasitic classification, structure, replication, pathogenesis of parasitic diseases, laboratory diagnosis and antiparasitic agents
- Intestinal protozoa (Giardia, Cryptosporidium, Entamoeba)
- Urogenital protozoa (Trichomonas)
- Blood and tissue protozoa (Plasmodium, Toxoplasma, Leishmania, Trypanosoma)
- Main concepts on infections by common nematodes, trematodes and cestodes

    - General virology:

- Structure
- Classification
- Replication mechanisms
- Laboratory diagnosis of viral diseases
- Antiviral chemotherapy

    - Systematic virology:

- Herpesviruses
- Papillomaviruses and Polyomaviruses
- Adenoviruses
- Poxviruses
- Parvoviruses
- Paramyxoviruses
- Rhabdoviruses
- Arenaviruses and Bunyaviruses
- Orthomyxoviruses
- Retroviruses
- Reoviruses
- Caliciviruses
- Togaviruses
- Picornaviruses

- Hepatitis Viruses
- Flaviviruses
- Coronaviruses
- Filoviruses

SUGGESTED TEXTBOOKS AND READINGS

Textbooks suggested:

- Medical Microbiology 8th Edition Authors: Patrick Murray, Ken Rosenthal, Michael Pfaller, Elsevier
- Sherris, Medical Microbiology (sixth edition), Mc Graw Hill Education

Course webpage: http://www.medinto.unito.it/do/corsi.pl/Show?_id=bb3u

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Pathology e pathophysiology

Pathology e pathophysiology

Academic year:	2018/2019
Course ID:	SCB0207
Teacher:	Prof. Gabriella Leonarduzzi (Lecturer) Prof. Fiorella BIASI (Lecturer) Dott. Paola Francesca GAMBA (Lecturer) Prof. Giuseppe Poli (Lecturer)
Teacher contacts:	0116705434, gabriella.leonarduzzi@unito.it
Year:	2nd year
Type:	Basic
Credits/recognition:	5
Course SSD (disciplinary sector):	MED/04 - patologia generale
Delivery:	Formal authority
Language:	English
Attendance:	Mandatory
Type of examination:	Written

COURSE OBJECTIVES

Understanding of pathophysiological events that undergo during the main human diseases, with particular emphasis on metabolic diseases, which include diabetes, inborn errors of metabolism and lipid disorders, as well as degenerative diseases and tumor-associated systemic disorders.

COURSE AIMS

x

COURSE DELIVERY

The exam will consist of a written test including multiple-choice and open questions.

LEARNING ASSESSMENT METHODS

The course mainly consists of lectures associated with practical activities, even with small groups of students.

SUPPORT ACTIVITIES

Practical activities and seminars will be provided in order to give deep informations on the topics of the lessons

PROGRAM

- Blood diseases: classification and pathogenesis.
- Hemostasis in pathology
- Jaundice
- Primary and secondary dyslipidemia. Metabolic syndrome-an outline
- Atherosclerosis: formation, progression and complications of the atherosclerotic lesion
- Thrombosis and embolism
- Shock
- Ischemia-reperfusion syndrome
- Diabetes
- Gastrointestinal diseases
- Pathophysiology of nutrition: dysvitaminosis, essential mineral deficit, unbalanced diets
- Adverse reactions to foods: intolerances and food allergies; toxic effects of oxidized lipids in the diet
- The diet and Cancer
- Paraneoplastic syndromes
- Neurodegenerative and demyelinating diseases
- The frailty syndrome
- Congenital disorders and Hereditary diseases

SUGGESTED TEXTBOOKS AND READINGS

Robbins & Cotran Pathologic Basis of Disease, 9th Edition,By Vinay Kumar, MBBS, MD, FRCPath, Abul K. Abbas, MBBS and Jon C. Aster, MD, PhD, Elsevier Ed.

Course webpage: http://www.medinto.unito.it/do/corsi.pl/Show?_id=s6m6

Physics

Physics

Academic year:	2018/2019
Course ID:	SCB0196
Teacher:	Prof. Roberto Cirio (Coordinator)
Teacher contacts:	0116707302, roberto.cirio@unito.it
Year:	1st year
Type:	Basic
Credits/recognition:	3
Course SSD (disciplinary sector):	FIS/07 - fisica applicata (a beni culturali, ambientali, biologia e medicina)
Delivery:	Formal authority
Language:	English
Attendance:	Mandatory
Type of examination:	Written and oral

PREREQUISITES
Mathematics and Physics as learnt at College

PROPEDEUTIC FOR
Physiology

COURSE OBJECTIVES

The Student will acquire the tools of analysis necessary for a reasonable understanding of the physical phenomena involved in life sciences.

COURSE AIMS

The Student will acquire the tools of analysis necessary for a reasonable understanding of the physical phenomena involved in life sciences.

COURSE DELIVERY

Each lesson, 2 hours long, will feature problem solving performed by Students followed by formal lecture by Professor.

LEARNING ASSESSMENT METHODS

Written test containing 6-7 exercises, each with 2-3 questions, to be solved in full.

Oral test featuring 3 questions, one on a subject chosen by the student.

PROGRAM

Physics and physical measures. Dimensional analysis and significant digits. Conversions. Vectors. 2D kinematics. Newton's laws and applications. Work and energy. Collisions. Circular motion. Biomechanics. Ideal and real fluids. Molecular phenomena. Thermodynamics. Diffusion and osmosis. Electrical phenomena. Magnetism. Waves and sound. Doppler effect and ultrasounds. Electromagnetic waves. Geometrical and physical optics. Application of radiation in medicine. Nucleus and radioactivity.

SUGGESTED TEXTBOOKS AND READINGS

Giambattista, Richardson, Richardson - College Physics - 4th edition - Mc Graw-Hill international edition ISBN 978-0-07-131794-8.

Giancoli - Physics - 7th edition - Pearson - ISBN 978-1-292-05712-5

Herman - Physics of the human body - 2016 - Springer - ISBN 978-3-319-23932-3

Serway - College Physics - 11th edition - Cengage - ISBN-13 978-1-337-62033-8

Walker - Physics - 5th edition - Pearson - ISBN 9780321976444

Course webpage: http://www.medinto.unito.it/do/corsi.pl/Show?_id=by7j

Physiological basis of human body

Physiological basis of human body

Academic year:	2018/2019
Course ID:	SCB0203
Teacher:	Prof. Filippo TEMPIA (Lecturer) Prof. Annalisa Buffo (Lecturer)
Teacher contacts:	0116708169, filippo.tempia@unito.it
Year:	2nd year
Type:	Basic
Credits/recognition:	4
Course SSD (disciplinary sector):	BIO/09 - fisiologia
Delivery:	Formal authority
Language:	English
Attendance:	Mandatory
Type of examination:	Written

PREREQUISITES
Physiology is the study of the normal function of living organisms and of their components, by the application of mathematics, physics, chemistry, biochemistry, histology and anatomy. Knowledge of these disciplines applied to the human body is necessary for the study of Physiology.

PROPEDEUTIC FOR
Pharmacology and all disciplines regarding pathology and clinical medicine.

COURSE OBJECTIVES

Introducing the basic principles underlying the functions of the human body. Completing the knowledge of cell biology and biophysics by teaching the mechanisms of electrical signaling and synaptic transmission. Teaching the principles of sensory systems and of the main sensory organs. Teaching the mechanisms of muscle contraction.

COURSE AIMS

Understanding of the basic design of the integrated functions of the human body, derived from the concepts of internal environment and homeostasis. Knowledge of the cellular mechanisms of electrical signaling and synaptic transmission. Understanding of the basic principles of sensory systems. Knowledge of the physiology of the main sensory organs. Knowledge of the mechanisms of muscle contraction.

COURSE DELIVERY

Formal class (lesson) and interactive learning.

LEARNING ASSESSMENT METHODS

Quiz followed by oral examination.

SUPPORT ACTIVITIES

Interactive learning in the afternoon sessions.

PROGRAM

Basic principles underlying the functions of the human body.

Internal environment and homeostasis. Mechanisms of homeostasis: control systems, negative and positive feedback, feedforward. Local control. Reflex control: elements and properties of reflexes. Biological rhythms.

Movement of molecules across cell membranes. Passive processes: diffusion, permeability, flow through ion channels. Ion channels: permeation, selectivity, gating, inactivation, modulation, classification. Patch-clamp and single channel current. Processes mediated by a membrane carrier: facilitated diffusion, primary and secondary active transport. Principles of transport across epithelia.

Physiology of the neuron.

Axonal transport. Physiological functions of glia: astrocytes, oligodendrocytes, Schwann cells, microglia, radial glia, neuroepithelial stem cells. Cerebrospinal fluid. Blood brain barrier.

Biophysics of excitable membranes. Diffusion potential. Equilibrium potential and Nernst law. Goldman equation. Role of Na+/K+ pump to maintain ionic gradients. Resting potential. Action potential: ionic currents, membrane

permeability, single channel currents, all-or-none law, refractory period. Passive electrophysiology and electrotonic propagation: effects of electrical currents on the membrane; time and space constants. Action potential conduction along unmyelinated fibers: relationship between diameter, space and time constant and conduction velocity. Saltatory conduction in myelinated fibers. Conduction velocity and nerve fibers classifications.

Synaptic transmission.

Electrical synapse. Presynaptic mechanisms in the chemical synapse: role of Ca2+, miniature endplate potentials, molecular mechanisms of neurotransmitter release, synaptic vesicles cycle. Neurotransmitters: synthesis, storing in vesicles, release, removal by diffusion, reuptake, inactivation. Functional differences between small molecule neurotransmitters and neuropeptides. Diffuse projection systems. Postysnaptic mechanisms: reversal potential and ionic mechanism of endplate potential and of central excitatory and inhibitory postsynaptic potentials. Synaptic signal integration: temporal and spatial summation. Short and long-term synaptic plasticity. Neurotransmitter receptors: receptor channels and G-protein coupled receptors.

Physiology of muscle

Mechanism of muscular contraction. Sliding filament theory. Cross-bridge cycle.

Skeletal muscle: excitation-contraction coupling, muscle twitch, summation, tetanus, isometric and isotonic contraction, force-length and velocity-load curves, lengthening contraction, mechanical power, energetics, muscular fatigue, heat production, efficiency, subtypes of skeletal muscle fibers, control of force generation in the whole muscle, motor units recruitment and firing frequency.

Smooth muscle: single unit and multi unit muscle. Contraction mechanism. Excitation-contraction coupling and regulation of contraction. Cross-bridge cycle and latch-bridge mechanism. Control and modulation mechanisms.

The autonomic nervous system

Sympathetic, parasympathetic and enteric divisions. Preganglionic neurons. Synaptic transmission in autonomic ganglia and target organs. Sympathetic and parasympathetic tone. Principles of organization of visceral spinal reflexes.

The endocrine system

General physiology of the endocrine system. The hypothalmus/pituitary axis. Growth hormone. Thyroid hormones (T3 and T4). Glucocorticoids. Hormonal control of energy metabolism: insuline and glucagon. Sexual hormones. Homonal control of pregnancy and lactation.

SUGGESTED TEXTBOOKS AND READINGS

Dale Purves, George J. Augustine, David Fitzpatrick, William C. Hall, Anthony-Samuel LaMantia, and Leonard E. White (editors). Neuroscience (6th edition). Oxford University Press.

John E. Hall. Guyton and Hall Textbook of Medical Physiology (13th edition). Elsevier.

Eric R. Kandel, James H. Schwartz, Thomas M. Jessell, Steven A. Siegelbaum and A. J. Hudspeth. Principles of neural science (5th edition). McGraw-Hill.

Course webpage: http://www.medinto.unito.it/do/corsi.pl/Show?_id=pgw9

Physiology of systems

Physiology of systems

Academic year:	2018/2019
Course ID:	SCB0208
Teacher:	Prof. Pasquale PAGLIARO (Lecturer) Prof. Raffaella RASTALDO (Lecturer)
Teacher contacts:	0116705430, pasquale.pagliaro@unito.it
Year:	2nd year
Type:	Basic
Credits/recognition:	7
Course SSD (disciplinary sector):	BIO/09 - fisiologia
Delivery:	Formal authority
Language:	English
Attendance:	Mandatory
Type of examination:	Written and oral

COURSE OBJECTIVES

Starting from anatomical, biochemical, biological and physical basis, the teaching program aims to illustrate the function of the various organs and systems. Control mechanisms and functions of body systems and their clinical relevance will be the core of the course.

To provide an in-depth of knowledge in the physiological concepts essential for understanding mechanisms of disease. In particular, the student should be able to:

Describe Cardiac Muscle Function and Properties

Discuss Unique Characteristics of Cardiac Muscle

Discuss Electrophysiology of the Heart: the conduction system

Describe Normal Electrocardiogram (ECG), and the Main Changes of ECG in Cardiac Arrhythmias; Myocardial infarction and Myopathies

Describe cardiac function in relation to change of preload, afterolad and contractility

Describe and graph Cardiac Cycle details

Understand the pressure, volume and flow changes during cardiac cycle

Describe expected Auscultation Sounds in Physiology and Pathophysiology (murmurs)

Discuss factors that affect cardiac output and venous return

Delineate the way cardiac output can be regulated

Discuss the fundamentals of Fluid Dynamics and methods to measure blood flow and pressure.

Describe and graph Arterial Pressure in systemic and pulmonary circulations

Describe Microcirculation and Lymphatics

Discuss regulation of Arterial Pressure (brief term, middle term and long-term regulation)

Outline the neural, metabolic and auto-regulative aspects of cardiovascular system

Discuss local control of Blood Flow (autoregulation and paracrine effects)

Discuss unique characteristics and phasic aspects of Coronary Flow

Describe Cerebral, Splanchnic, and Cutaneous Circulation

Discuss Hemorrhage, and Shock

Describe transcapillary transport

Describe Renal body fluids regulation

Describe Structure and Function of the Kidney and Nephrons

Describe and discuss Renal Clearance

Describe Glomerular Filtration Rate and Renal Hemodynamics

Describe Transport Properties of Nephron Segments

Discuss about Urine Concentration and Dilution

Describe Na+ Balance and Regulation of Extracellular Fluid Volume

Discuss K+ Balance

Describe Ca2+ and Phosphate Balance

Discuss Integrative and Pathophysiological Aspects; Hypertension

Describe Pulmonary Mechanics (pressure, volume, compliance, resistance, wall tension)

Describe and graph Lung Volumes and Capacity and Alveolar Ventilation

Describe unique characteristics of Pulmonary Circulation

Describe Pulmonary Gas Exchange

Discuss and graph Oxygen and Carbon Dioxide Transport

Discuss Respiratory Control

Discuss Acid-Base Balance and role of buffers, kidneys and lungs

Describe the characteristics of the enteric nervous system and its interaction with extrinsic nervous system in the regulation of the functions of each GI segment.

Describe of GI reflexes and neurotransmitters involved.

Describe the functions of each GI segment (secretion, digestion, absorption and motility).

Indicate the composition of secretion of each GI segment and annexed glands; description of the functions of their components.

Discuss the regulation of the secretory processes.

Describe the cell type and anatomical location of the endocrine cells responsible for the production of the major GI hormones and their cellular targets; describe the stimuli that promote and inhibit the release.

Describe the digestion of the nutrients (starch, protein and lipid) and of the relevant enzymes.

Describe the membrane transport mechanisms responsible for the absorption of: digestion products of sugars, proteins, lipids, vitamins and electrolytes by the intestinal epithelial cells.

Describe the enterohepatic circulation and re-uptake of bile acids/salts.

Describe the characteristics of the spontaneous and stimulated electrical activity of GI smooth muscles (electrical slow waves, action potentials, and contraction). Role of Cajal cells.

Describe the stomach emptying and its regulation, as well as of the major motor patterns and their regulation in the stomach, small and large intestine.

italiano

Scrivi testo qui...

english

Write text here...

COURSE AIMS

At the end of the course, the students shall have an in-depth knowledge of the functional mechanisms of the human body. To this aim, the student should be able to describe and discuss the main physiological mechanisms and, when necessary, draft and explain the graphs relative to the physiology of cardiovascular, renal, pulmonary and gastro-enteric systems. As a future MD, the student should also be able to discuss physiological phenomena of different organs ad their integrations, for a better understanding of diseases and therapeutic approaches to restore the physiological conditions.

COURSE DELIVERY

Teaching is organized both as lectures and active learning. The course includes lectures with projection of slides and video-clips, home readings and vision of movies based on physiology topics. Activities in small groups will be organized in teaching rooms with devices and simulation. This active learning promotes the acquisition of knowledge.

LEARNING ASSESSMENT METHODS

Evaluation tests:

At the end of each section of the course, as evaluation test, the students will be given a series of questions (multiple choice and open questions). A final score will be calculated on a scale from 0 to 30, in proportion to the number of questions correctly answered.The evaluation test has the main aim to indicate the student the degree of his/her understanding of the discipline.

EXAM:

At the end of the entire course a written and oral examination will be taken with an Examination Board, including all the teachers of the course.

Written tests (preparatory to oral tests):

The written test will be composed as follow:

- Four (4) closed questions for each CFU (generally multiple choice questions: only 1 answer is correct and the other answers are wrong distractors).

plus

- A single open-ended question.

The students will have 1 minute for each closed question plus 3 min for the open-ended question to complete the written text.

Score:

- Closed questions: +1 point for each right answer; 0 points for each answer not given; - 0.25 points for each wrong answer.

- Open-ended questions: from - 2 to + 4 points.

The score for each written test will be then expressed in in thirtieths.

The Score obtained in the written exam:

a) If less than half of the maximum achievable score (equal or less than 15/30), the student is automatically considered "Retired from the exam"

b) If it is superior a half (15/30 or more) the student is admitted to the oral examination;

The written test score is valid for maximum 6 months (the deadline is the last day of the 6th month).

Oral exam: It consists of a discussion of the results of the written tests and a check of the overall preparation.

The oral examination can be sustained in the same day and the final grade will be assigned ass follow: adding or subtracting from the written test score a maximum of 7 points. The student passes the exam if is final grade is equal or greater than 18/30.

N.B.: Even if the written test score is equal to or greater than 25/30, the Board has the duty and right to invite the student to withdraw from the exam and return to the next useful examination appeal, if serious deficiencies are found in the knowledge of the discipline topics. This decision requires the unanimity of the Examination Board.

Those who do not pass the oral exam must repeat the entire exam: written test and oral examination.

PROGRAM

Cardiovascular system

General organization and functional anatomy of heart and vessels.

Physiology of the cardiac muscle. Comparison of cardiac versus skeletal and smooth muscle: action potential and refractory period, excitation-contraction coupling, mechanical features.

The tissues of the heart: cardiac muscle (myocardium), pacemaker tissue and conductive tissue. The properties of the heart: chronotropy, dromotropy, inotropy and bathmotropy.

The heart as a pump; the cardiac cycle; cardiac volumes; heart sounds.

Regulation of heart pumping; Intrinsic regulation Starling's law. Preload and afterload. Extrinsic regulation: nervous, humoral and pharmacological regulation. Cardiac work.

Specialized Exicitatory, conductive system of the heart and the spread of the impulse.

Electrophysiology of the heart: The normal electrocardiogram: electrocardiographic leads (bipolar, augmented unipolar and precordial leads): vectorial analysis and electrocardiographic interpretation; cardiac arrhythmias and their interpretation.

Pressure flow and vascular resistance. Regulation of cardio-vascular function: intrinsic and extrinsic control. Microcirculation and lymphatic system. Local and humoral control of blood flow by the tissues.

Baroreceptor reflex and other cardiovascular reflexes. Control of Arterial pressure: rapid, middle and long term regulation. Cardiac output, Venous return and their regulation. Control of cardiac output.

Coronary circulation and other specialized circulations (Cerebral, cutaneous, skeletal muscle circulation). Physiological adaptations to specific conditions. Blood: a liquid tissue.

Respiratory system

Pulmonary circulation. Structure, function and mechanisms of respiratory system. Pulmonary Ventilation. Anatomical and functional dead spaces. Alveolar ventilation.

Mechanics of the respiration. Alveolar and pleural pressures and volume changes during respiration. Pulmonary volumes and capacity and their determination methods. Compliance of the lung. Surfactant and surface tension. Lung hysteresis and respiration work. Pneumothorax.

Exchange and transport of gases: physical principle of gas; composition of air; diffusion of gas through the respiratory membranes; ventilation/perfusion ratio; transport of oxygen and carbon dioxide in the blood: Bohr and Haldane effects. Oxyhemoglobin dissociation curve and factors that shift it.

Control of breathing: respiratory center in the central nervous system; chemical control of respiration; peripheral chemoreceptor system.

Renal system

The body fluids and kidneys. The nephron and the renal circulation.

Formation and composition of urine. Glomerular filtration mechanism and glomerular filtration rate (GFR). Tubular processing of the glomerular filtrate from the beginning of the proximal tubule to the end of the collecting duct. Autoregulation of GFR and renal blood flow. Hyperosmolarity of renal medulla and the countercurrent multiplier and exchanger. Dilution and concentration of urine and ADH.

Bicarbonate Reabsorption, and Urine Acidification.

Renal clearances: methods to quantify kidney function. Clearance of inulin, PAI, urea and glucose. Osmolar clearance and free water clearance. The filtration fraction. Tubular secretion and reabsorption: TmPAI and TmG.

Juxtaglomerular apparatus; Renin-Angiotensin-Aldosterone system.

Regulation of extracellular fluid, osmolarity and sodium concentration. Renal regulation of potassium, calcium, phosphate and magnesium. Micturition.

Regulation of acid-base balance: buffers, respiratory regulation and renal control of acid-base balance. Concepts of base excess; anion gaps and osmolar gap in acid-base disorders.

Gastrointestinal physiology

General principles of gastrointestinal function. Neural control of gastrointestinal function: Autonomic extrinsic and intrinsic nervous systems and their connections. Gastrointestinal reflexes.

Processes in the mouth: Mastication. Saliva secretion, composition and function. Nervous control of salivary secretion. Swallowing. Physiology of the esophagus.

Processes in the stomach: Gastric mucosa and glands. Filling of the stomach. Secretion, composition and activity of the gastric juice. Movement of the stomach. Emptying of the stomach. Nervous and humoral controls of gastric activities.

Processes in the small intestine. Pancreatic secretion and its nervous and humoral control. Composition of the

pancreatic juice and activity of the relevant enzymes.

The bile: composition, production and storage in the gallbladder. Function of the biliary salts. Biliary pigments. Entero-hepatic circulation of biliary salts.

Small intestine secretion and enzyme activity. Digestion and absorption of macro- and micronutrients. Motility: Segmentation and propulsive movements; Ileocecal valve and emptying of small intestine. Nervous and humoral controls of motility.

Processes in the large intestine: secretion, absorption. Motility: haustrations and mass movements. Defecation.

SUGGESTED TEXTBOOKS AND READINGS

PowerPoint slides provided and video-clips suggested by professors.

Textbooks suggested:

Guyton and Hall, Textbook of Medical Physiology, Elsevier

Ganong's, Review of Medical Physiology, McGraw-Hill Education

Berne and Levy, Physiology, Elsevier

Further reading:

Levick JR. An Introduction to Cardiovascular Physiology. 3rd Edition Arnold

Course webpage: http://www.medinto.unito.it/do/corsi.pl/Show?_id=r8ty

Preparatory biochemistry

Preparatory biochemistry

Academic year:	2018/2019
Course ID:	SCB0313
Teacher:	Marco Arese (Lecturer) Alberto Puliafito (Lecturer)
Teacher contacts:	0119933536, marco.arese@unito.it
Year:	1st year
Type:	Basic
Credits/recognition:	7
Course SSD (disciplinary sector):	BIO/10 - biochimica
Delivery:	Formal authority
Language:	English
Attendance:	Mandatory
Type of examination:	Written and oral (optional)

PROPEDEUTIC FOR
Biochemical and Molecular Basis of Metabolism

COURSE OBJECTIVES

The syllabus aims to provide the knowledge required to undertake the second semester course "Biochemical and molecular basis of metabolism". In particular it will provide essential concepts on the nature of chemical bonds and chemical reactions, the role of catalysts in advancing the chemical reactions, as well as the role of electron transfer (oxidation - reduction) as the key step for energy extraction from nutrients. Moreover, the structure and classification of sugars, lipids, amino acids, proteins and nucleic acids will be learned during the course. The catalytic role of enzymatic proteins and its regulation will be proposed as a central topic for the future understanding of metabolism.

This kind of basic knowledge is essential not only for the following courses in metabolic biochemistry and molecular biology, but also for a number of courses concerning both basic and applied biology and for many medical and clinical courses in the MD programme. Basic organic chemistry and biochemistry knowledge is essential for future MDs.

COURSE AIMS

At the end of the course, the Student will know basics of organic chemistry and molecular representation, and know the structural classification of basic biochemical molecules (sugars, lipids, aminoacids, nucleotides). They will also have introductory knowledge on the structure of proteins and molecular representation models, together with a basic knowledge of biochemical catalysis and macromolecular interaction principles.

The Student will have a clear understanding of how form and function of molecules are inextricably linked and how basic chemistry can explain the life of cells. On this framework the student will develop a true curiosity for the specific reactions that make up metabolism and make cells complex functional entities. The Student will be able to draw simple biochemical molecules (monosaccharides, fatty acids, aminoacids, nucleotides) and to recognize more complex molecules in the most common molecular representation formalisms.

COURSE DELIVERY

Core activities consist of lectures given to the full class (56 hours), accompanied by exercises, made in the full class with the help of personal laptops + Ipads (provided by the Department) or online

LEARNING ASSESSMENT METHODS

The exam is based on a test, which is normally administered on the Moodle platform. The test will include multiple-choice questions and exercises, covering all the topics in the syllabus. Specific questions will be dedicated to verify the acquisition of a global and integrated vision of the topics.

An oral discussion may follow this test whenever the teachers or the students request to do so (for example in order to clarify and discuss specific topics of the written exam, or in general to increase the overall quality of the

learning assessment). The oral interview can increase or decrease the final score.

PROGRAM

GENERAL CHEMISTRY

- Short review of atoms, elements, molecules, compounds.
- The periodic table.
- Basics of thermochemistry.
- The chemical bonds.
- Features and classification of bonds in molecules. .
- Chemical reactions of precipitation, oxidation-reduction, acid-base.
- The oxidation number.
- Solutions, suspensions, colloids.
- Colligative properties.
- The speed of reactions: the rate equation, reaction mechanisms.
- Chemical equilibrium: the equilibrium constant, law of mass action.
- Acids and bases: definitions and equilibria in solutions of acids and bases.
- Salts and and buffers.

ORGANIC CHEMISTRY

- Hydrocarbons: physical-chemical properties, nomenclature and general reaction mechanisms. Isomers.
- Nomenclature, physical and chemical properties of and main reactions of: alkanes, alkenes, aromatic hydrocarbons, alcohols, aldehydes, ketones, carboxylic acids and derivatives, amines, amides.

PROPAEDEUTIC BIOCHEMISTRY

The molecules of life

- Carbohydrates.
    - The monosaccharides and derivatives: esters, acids, lactones, alditols, aminosugars. Disaccharides. The O-glucoside and N-glucoside bonds.
    - Maltose, lactose, fructose, cellobiose.
    - Omopolisaccarides and heteropolysaccarides.
    - Glycogen storage diseases
    - Glycoproteins.
- Lipids.
    - Fatty acids.
    - Triglycerides.
    - Glycerophospholipids and Sphingolipids.
    - Role of cholesterol in membranes.
    - Phospholipids and cell membranes.
- Amino acids: structure and properties, proteic and non proteic
    - modified aminoacids, titration curves, the peptidic bond

- Vitamins: a brief review of the classes and functions

Biochemical catalysis

- Enzyme kinetics: What is an enzyme?
- Michaelis' equation, Vmax and Michaelis' constant.
- Effect of enzyme concentration on reaction speed.
- Kinetic analysis using v/[S] curve.
- Lineweaver-Burk, Eadie-Hofstee and Hanes methods for kinetic enzyme analysis.
- Reversible and irreversible inhibitors.
- Competitive, noncompetitive and competitive inhibitors.
- Product inhibition.
- Substrate driven inhibition. Inhibition constant (Ki).
- Multi-substrate reactions.
- Kinetic mechanisms (ordered sequential, random sequential, Ping-pong). Substrate concentration effects.
- Product and substrate inhibition.
- Kinetic parameters: Definitions.
- Allosteric enzymes characteristics.
- Allosteric mechanism.
- The catalytic mechanism: the example of proteases.

Protein: from structure to function

- Protein structure: primary structure.
- Secondary structure components.
- Introduction to tertiary and quaternary protein structure.
- Domain organization in tertiary structure.
- Globins: Tertiary and quaternary structure.
- Functional characteristics of myoglobin and hemoglobin.
- Post-translational protein modifications.

SUGGESTED TEXTBOOKS AND READINGS

1) F.A Bettelheim, W.H. Brown, M.K. Campbell, S.O. Farrell. Introduction to General, Organic, and Biochemistry.

2) Biochemistry. Jeremy M Berg, John L Tymoczko, and Lubert Stryer. W. H. Freeman and Company- New York (from the 5th edition on).

This book will also be largely used in the second-semester course "Biochemical and molecular basis of metabolism"

Course webpage: http://www.medinto.unito.it/do/corsi.pl/Show?_id=5nnd