



## **SAN RAFFAELE INTERNATIONAL MD PROGRAM**

**YEAR 1**

**Academic Year 2014/2015**

- Statistics and Bioinformatics
- Medical Physics
- Medical Humanities
- Chemistry and Biochemistry
- Cell and Molecular Biology
- Genetics and Developmental Biology

Academic Calendar IMDP 2014-2015



SAM RAFFAELE INTERNATIONAL MD PROGRAM - 1st YEAR

oct-2014		nov-14		dec-2014		jan-2015		Feb-15		mar-15		apr-15		may-2015		jun-2015		jul-2015		aug-2015		sep-2015	
1	Beginning A.Y	1		1		1	Holidays	1		1	Beginning Sem.2	1	BANK HOLIDAY	1		1		1	EXAMS	1		1	EXAMS
2		2		2		2	Holidays	2	EXAMS	2	Beginning Sem.2	2	Easter Holiday	2		2	BANK HOLIDAY	2	EXAMS	2		2	EXAMS
3	1.	3		3		3		3	EXAMS	3		3	Easter Holiday	3		3		3	EXAMS	3	Holidays	3	EXAMS
4		4		4		4		4	EXAMS	4		4	Easter Holiday	4		4		4		4		4	EXAMS
5		5		5	10.	5		5	EXAMS	5		5	EASTER	5		5	13.	5		5		5	EXAMS
6		6		6		6	EPYPHANY	6	EXAMS	6	1.	6	Easter Holiday	6		6		6	EXAMS	6		6	EXAMS
7		7	6.	7	S.AMBROGIO	7		7	EXAMS	7		7	Easter Holiday	7		7		7	EXAMS	7		7	EXAMS
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22		22		22	Holidays	22		22		22		22		22	11.	22	Study Leave	22	EXAMS	22		22	EXAMS
23		23		23	Holidays	23		23	EXAMS	23		23		23		23		23	EXAMS	23		23	EXAMS
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25		25		25	CHRISTMAS	25		25	EXAMS	25		25	BANK HOLIDAY	25		25	Study Leave	25	EXAMS	25		25	EXAMS
26		26		26	BOXING DAY	26		26	EXAMS	26		26		26		26		26	EXAMS	26		26	EXAMS
27		27		27		27		27	EXAMS	27	4.	27		27		27		27	EXAMS	27		27	EXAMS
28		28	9.	28		28		28		28		28		28		28		28	EXAMS	28		28	EXAMS
29		29		29	Holidays	29		29		29		29		29	12.	29	EXAM	29	EXAMS	29		29	EXAMS
30		30		30	Holidays	30		30		30		30	8.	30		30	EXAM	30	EXAMS	30		30	EXAMS
31	5.	31		31	Holidays	31		31		31		31		31		31		31	EXAMS	31		31	EXAMS

\* Extraordinary exam session - No Lessons

## STATISTICS AND BIOINFORMATICS

Total Credits: 6

Lectures: 48

Practicals: 40

Scientific Discipline Sector: MED/01 – INF/01

### Course Instructors:

Prof. Clelia Di Serio      Email: [diserio.clelia@univr.it](mailto:diserio.clelia@univr.it) (Coordinator)

Prof. Elia Biganzoli      Email: [elia.biganzoli@unimi.it](mailto:elia.biganzoli@unimi.it)

Dr. Paola Rancoita      Email: [rancoita.paolamaria@univr.it](mailto:rancoita.paolamaria@univr.it)

Receiving Hour to be requested by email writing to the single Professor

### Course Description

The course provides an introduction to statistical concepts and quantitative methods used in the Health Sciences. Fundamental concepts in the following fields will be presented: clinical epidemiology, probability, exploratory data analysis, statistical inference. Basic knowledge and tools for data management and data analysis are also provided in the course.

### Course Objectives

By the end of the course, students will be able to:

- 1) understand and perform basic statistical data analysis by means of graphical methods and of descriptive statistics for univariate and bivariate variables;
- 2) understand the difference between causality and statistical association, compute association measures between variables, calculate least squares regression and interpret the results,
- 3) perform simple calculations based on the rules of probability (Bayes' Theorem) to interpret diagnostic tests;
- 4) recognize different study designs used in clinical epidemiology and compute measures of treatment efficacy and risk factors impact;
- 5) use statistical models (Binomial, Poisson, Exponential and Normal distribution) to calculate probabilities of events;
- 6) construct and interpret confidence intervals and one-sample hypothesis tests for population means;
- 7) construct and interpret two-sample hypothesis tests and confidence intervals for difference of means;
- 8) understand and use simple statistical methods for analyzing censored survival data;
- 9) read clinical epidemiological papers and interpret the statistical analyses;
- 10) use SPSS statistical software to perform basic statistical analyses.

### Practicals:

The practicals will be usually structured in the following way: 1) some exercises will be solved and discussed by the teaching assistant; 2) in-class problems will be assigned and asked to be solved in small groups; 3) the solution of the in-class problems will be discussed. The in-class exercises will allow an active learning and discussion of the related statistical and epidemiological concepts. At the end of each lesson, similar homework exercises will be assigned to provide an opportunity for independent practice. The corresponding complete solutions will be given subsequently for auto-correction. Depending on the topic, also the statistical analysis of some examples of published scientific papers will be discussed.

### Readings

Main material:

- Textbook: Biostatistics. Basic Concepts and Methodology for the Health Sciences (9<sup>th</sup> edition). Author: Wayne W. Daniel. Wiley
- Supplementary Online Material.

Additional material (one of the following):

- Discovering Statistics Using SPSS (Introducing Statistical Methods), 3rd edition, by Andy P. Field (2009)- Sage Publications
- SPSS Survival Manual: A step by step guide to data analysis using SPSS, 4th edition, by Julie Pallant (2010)-Allen & Unwin

- SPSS Programming and Data Management, 4th Edition, by Raynald Levesque; SPSS Inc.

### Schedule of the Lectures

Session	Topics	SPSS LAB/ Practicals
1	Introduction, graphical methods for representing data	
2	Univariate analysis: measures of location and dispersion	
		SPSS LAB 1
		Practical 1
3	Bivariate analysis: covariance and correlation	
4	Bivariate analysis: regression and R-squared	
		SPSS LAB2
		Practical 2
5	Probability, Bayes' Theorem and conditional probability	
6	Independency and contingency table (chi-square statistic)	
		SPSS LAB 3
		Practical 3
7	Introduction to discrete probability distributions, Binomial distribution	
8	Poisson distribution	
		Practical 4
		SPSS LAB summary 1
9	Introduction to continuous probability distributions, Exponential distribution	
10	Normal distribution	
11	Screening test	
		Practical 5
12	ROC curve	SPSS LAB

13	Sampling distribution for the mean and for the difference of means, Central Limit Theorem	
		Practical 6
14	Confidence intervals for the means (variance known and unknown) and for the difference of means, Student's t-distribution	
		Practical 7
15	Hypothesis testing: basic concepts and hypothesis test for the mean (with variance known)	
16	Hypothesis testing: hypothesis test for the mean (with variance known and unknown) and for the difference of means	
		Practical 8
		SPSS LAB 4
17	Introduction to Evidence Based Medicine reasoning based on quantitative statistical evidence Diagnostic tests: screening and diagnosis Test with dichotomous variables: sensibility and specificity, PPV, NPV	
18	Diagnostic test Test with continuous and ordinal variables, ROC curves Fagan nomogram and practical application in diagnostic testing Information and medical decision making in screening test: examples of early diagnosis	
19	Introduction to clinical epidemiology Evaluating risk factors Probability and disease risk Measures of prevalence, incidence and association	
20	Observational vs. experimental studies. Cross-sectional and case-control studies Cohort studies (prospective/retrospective) Inference on odds ratio and relative risks	
21	Experimental design in clinical research Clinical trial vs. observational studies Phase I, II, III, IV clinical trials	
22	Randomized Controlled Trials Ethical issues Inclusion criteria Randomization in treatment assignment Measures of treatment efficacy Interaction and confounders	
23	Basic concepts of survival analysis	
		SPSS LAB summary 2

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## MEDICAL PHYSICS

Total Credits: 5

**Lectures: 40**

**Practicals: 10**

Scientific Discipline Sector: FIS/07 – MED/36

### Teaching staff

Prof. Tommaso Tabarelli de Fatis (Coordinator)

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Prof. Giovanni Mauro Cattaneo

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Prof. Antonio Esposito

Email: [esposito.antonio@univr.it](mailto:esposito.antonio@univr.it)

Prof. Samuel Zambrano

Email: [zambrano.samuel@hsr.it](mailto:zambrano.samuel@hsr.it)

The course covers the basic principles of Physics, with emphasis on topics useful for understanding biological phenomena and biomedical instrumentation.

### Prerequisites

Basic high-school mathematics. Some basic notion of calculus will be introduced as needed during the lectures.

### Textbooks

“Physics” or “General Physics”, by Morton Sternheim and Joseph Kane, Wiley;

Notes on the specific topics covered during the lectures will be made available as additional material.

Other books with coverage of the topics presented :

“Physics Principles with Applications”, by Douglas Giancoli, Pearson/Prentice Hall;

“Fundamentals of Physics Extended”, by David Halliday, Robert Resnick, Jearl Walker, Wiley.

“Serway’s Essentials of College Physics”, by Raymond A. Serway and Chris Vuille, Brooks/Cole.

Other books oriented to Life Science, but less comprehensive

“Physics of Life Science” by Jay Newmann, Springer

“Physics for Life Science”, by Morton Sternheim and Joseph Kane, Wiley, 1978 (not anymore available, but some copies around on amazon, and some pdf versions around over the net - beware “SI version” would be needed)

### Course Syllabus

The course is organized in five parts, of four lectures each (2 h) followed by one problem/review session (2 h):

Part. I and II - Mechanics, rigid body and fluids (TTdF)

- Motion and fundamental quantities, unit of measure, scalar and vector quantities. Examples.
- The principles of dynamics. Mass and force. Example of forces. “Laws of force”.
- Energy and momentum. Conservation laws. Applications.
- Rigid bodies, elements of statics, levers. Application to the human body.
- Deformable bodies: elasticity, stress and strain and applications.
- Fluids (i.e. fully deformable bodies): pressure, density, compressibility. Static of fluids and applications.
- Ideal fluids. Flow rate. Equation of continuity. Work of a fluid. Conservation of energy and Bernoulli’s equation.
- Real fluid (blood): viscosity, hydraulic resistance, laminar and turbulent motion. The human circulatory system.

Part.III - Gases and Thermodynamics (SZ)

- Temperature and equation of state. Ideal gas and kinetic theory. Real gases, vapour, and saturated vapour.
- Diffusion and osmosis. Solutions, solubility, dissociation. Matter transport and exchange in the human body.
- Energy transport in gases (and matter). Mechanical waves. Reflection and acoustic impedance.
- Thermodynamics. The first principle (and the second principle) of thermodynamics. Metabolic rate
- Specific heat capacity, heat capacity. Latent heats. Thermal conductivity. Thermoregulation of the human body.

#### Part.IV - Electrical phenomena and optics (MC)

- Electric charge, the "law of force", electric field, electrostatic potential energy, relation between field and potential difference. Case studies (relevant to physiology). Conductor and insulators. Capacitors.
- Electric current. Drift velocity of the charge carriers. Electric resistance; resistivity. Ohm's law. Resistors in series and parallel. Electrical representation of a cell's membrane: response of RC circuits
- Elements of electrophysiology. Charge transport through the membrane. Nernst equilibrium. The Na-K pump. Action potential. Propagation of pulses in the nerves.
- Optics. Physical and geometrical optics. Lenses. The eye: cornea and lens, defects in vision. Colour vision and photoelectric effect.

#### Part V - Physics principles of medical imaging (AE)

- Introduction to medical imaging
- Physical principles of image formation: radiography and CT
- Physical principles of image formation: ultrasound
- Physical principles of image formation: magnetic resonance

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**CHEMISTRY AND BIOCHEMISTRY**  
Total Credits: 12  
**Lectures: 48**  
**Practicals: 96 (divided in groups)**  
Scientific Discipline Sector: BIO/10- BIO/11

**Course Coordinator:** Prof. Massimo Degano

Email: [degano.massimo@hsr.it](mailto:degano.massimo@hsr.it)

40 hours

Prof. Andrea Graziani

Email: [andrea.graziani@hsr.it](mailto:andrea.graziani@hsr.it)

9 hours

Prof. Mauro Freccero

Email: [mauro.freccero@unipv.it](mailto:mauro.freccero@unipv.it)

40 hours

Prof. Angelo Corti

Email: [corti.angelo@hsr.it](mailto:corti.angelo@hsr.it)

9 hours

**Tutorials:** 96 hours to be divided in groups/tutors

Dr. Barbara Corsi - Dr. Claudia Minici - Dr. Francesca Giannese – Dr. Elisa Sala

**Type of subject:** Traditional medical discipline

**Field:** General discipline for the preparation of a doctor: Structure, function and metabolism of molecules of medical interest.

**Course objectives:**

The Chemistry and Biochemistry course is one of fundamental importance, in which students are presented with the notions of the chemical and biochemical mechanisms necessary to understand the regulation of biological processes of the cell and of the organism.

This course covers classical aspects of molecular and cellular biochemistry, and molecular physiology. Metabolic interrelationships as they occur in the individual will be stressed and related to disturbances in disease states.

The knowledge and understandings provided by the course constitute the foundations for the following semesters both for the molecular analysis of physiological processes and those of pathogenetic mechanisms in disease. The initial part of the course will focus on the principles of general and organic chemistry with a description of the fundamental chemical reactions for the understanding of biological processes, the structure and function of organic molecules that constitute the building blocks of living matter, and the analysis and structure and function of principle biological polymers, with particular emphasis on the processes of catalytic enzymes. The second part will provide a description at the molecular level of the structures and processes that are essential for cellular life, in particular how energy is obtained from nutrients and is then used in specific processes. A strong focus will be maintained on the relationship between dysfunctions in metabolism and human disease.

The students will be also involved in practical activities, carrying out typical biochemical experiments using the techniques encountered during the course.

**Course attendance**

Students are required to attend more than 70% of the scheduled classes in order to sit at exams. Students who are unable to attend part of the classes (e.g., plan to leave the room before the end of the two hours) must make prior arrangements with the lecturer. Clocking in for other students is not tolerated, and random checks of attendance will be carried out. Violation of the honor code will be sanctioned.

**How to follow the course and study for the exam**

Experience from the previous years has shown a strong correlation between active attendance and the final result of the exam. It is thus strongly recommended to review the material presented during the lectures, and also to read in advance the topics to be presented.

**At the end of this course, students should be able to:**

- Solve problems in diagnosis and treatment of human disease by application of biochemical principles.
- Use primary medical and scientific literature as a resource for learning and problem-solving.
- Define, describe and contrast functions of genes and macromolecules in normal and pathologic contexts.
- Define and describe systemic metabolic biochemistry in terms of genes and molecules.
- Deduce therapeutic mechanisms from established molecular mechanisms.
- Interpret new medical discoveries in terms of fundamental principles of biochemistry
- Explain the molecular basis of diseases that affect cellular function or development.

**Textbooks**

Voet & Voet - Biochemistry, Wiley eds. (at least 2<sup>nd</sup> edition)

Timberlake – General, Organic and Biological Chemistry, Pearson eds.

**The course is a prerequisite for:**

Foundation for “Cellular and Molecular Biology” and “Genetics and Developmental Biology”.

**Evaluation of acquired knowledge**

The exam is structured as a **multiple choice written test**, with one correct answer out of four possible. The test will contain 100 questions on the Biochemistry section and 30 questions on the Chemistry section. A correct answer corresponds to 1 (one) point, a wrong answer -0.25 points, a blank answer 0 (zero) points. **A score of at least 54/100 in the Biochemistry section AND 16/30 in the Chemistry section is required to pass the exam.** In order to pass, sufficient knowledge in both Chemistry and Biochemistry must be demonstrated on a single exam date. **Hence, for instance, a positive result in Biochemistry cannot compensate for a poor result in Chemistry, and cannot be “saved” from one date to the other.** The final grade is computed considering 30/30 as 90% of the maximum score attainable.

Given the complexity of the course, **a mid-term test concerning the Chemistry part will be administered on two dates in February** (the precise days will be made public during the course). Students are **strongly encouraged to take this test**, since a “pass” mark will allow to be tested only on the Biochemistry section at the end of the year (**and all future exam dates**). The mid-term can be taken in either date (or both, in case of a “fail” mark on the first attempt).

**No. Theme**

- 1 Introduction to the course. Tips and suggestions for a proficient C&B course. Chemistry and biochemistry in human physiology
- 2 Atomic Structure. Electron Configuration and the Aufbau Principle. Atomic and Molecular Orbitals. Chemical Bonding - Covalent, Ionic and Metallic Bonds.
- 3 Intermolecular Forces - Dipole-Dipole Forces, Hydrogen Bond, London Forces. Periodic System of Elements. Trends in the Periodic Table. Nomenclature of Inorganic Compounds. Characterization of sp-, d- and f-Elements and their Compounds.
- 4 Classification of Chemical Reactions. Chemical Thermodynamics -the Laws of Thermodynamics, Enthalpy, Entropy, Free Energy. Spontaneity of Chemical Change. Chemical Equilibrium. Equilibrium Constant. Le Chatelier's Principle.
- 5 Chemical Kinetics. Reaction Rates and Factors that Influence them. Activation Energy and the Activated Complex. Catalysts and Mechanism of their Effect.
- 6 Solutions and their Properties. Solubility, Concentration of Solutions. Solutions of Electrolytes, Ionization Constant. Activity (effective concentration). Acids and Bases. The Dissociation of Water. The pH Scale. Salts, Hydrolysis of Salts, Solubility Product. Buffers, Characterization, pH, Capacity. Buffers of the Blood.
- 7 Oxidation-Reduction Processes. Hydrogen and Oxygen in these Processes. Standard Reduction Potentials. Osmosis. Osmotic Pressure. Colligative properties. Importance in Medicine.
- 8 Scope of Organic Chemistry. Formulas, Naming and Classification of Organic Compounds. Resonance, delocalization, conjugation, and aromaticity
- 9 Hydrocarbons and their Derivatives. Alkanes, Alkenes, Alkynes, Cycloalkanes.
- 10 Alcohols
- 11 Ethers, epoxides, and sulfides
- 12 Amines
- 13 Ketones and aldehydes
- 14 Carboxylic acids, esters, amides
- 15 Amino Acids and their Properties. Important Peptides.
- 16 Lactones, lactams and antibiotics
- 17 Phosphoric acids, inorganic and organic phosphates
- 18 Aromatic compounds
- 19 Alpha substitution and condensation of enols and enolate ions
- 20 Synthetic reactions in bioorganic chemistry
- 21 Monosaccharides - Classification, Configuration, Optical Activity, Anomers, Epimers. The Haworth Formulas. Reactions of Monosaccharides. Glycosidic Linkage, Reducing and non-Reducing Disaccharides. Polysaccharides and Glycosaminoglycans, Composition, Properties.
- 22 Proteins - Amino Acid Composition, Conformation of Proteins.
- 23 Types of Bonds and Interactions. Physical and Chemical Properties. Classification of Proteins.
- 24 Enzymatic catalysis
- 25 Enzymatic regulation
- 26 Protein purification and characterization
- 27 Myoglobin and Hemoglobin. Allosteric proteins.
- 28 Protein folding
- 29 Antibodies
- 30 Lipids and Steroids. Classification, Structure, Properties, Chemical Reactions.
- 31 Nucleosides and nucleotides. DNA and RNA structure and properties.
- 32 Introduction to the cell, compartments and cellular biochemistry.
- 33 Cell membranes. Lipid digestion, resorption, and transport. Lipoproteins and pathologies
- 31 Transport across membranes. Passive and active transport.
- 32 Introduction to metabolism. Synthesis and breakdown of biomolecules.
- 33 Glycolysis. Metabolism of glucose and other monosaccharides.
- 34 The Pentose Phosphate Pathway. Gluconeogenesis.
- 35 Synthesis and breakdown of glycogen. Regulation through hormonal signaling.
- 36 The pyruvate dehydrogenase complex. The citric acid cycle.
- 37 The mitochondrial electron transport chain. Oxidative phosphorylation. ATP synthesis through the mitochondrial ATPase.
- 38 Metabolism of lipids. Fatty acid oxidation in the mitochondrion and peroxisomes. Fatty acid synthesis.

- 39** Cholesterol and steroid hormones. Arachidonate metabolism. Glycolipids and storage diseases.
- 40** Amino acids. Removal of the amino group. The urea cycle. Ammonia in health and disease.
- 42** Degradation of the carbon skeleton of amino acids. Heme synthesis and degradation.
- 43** Nucleotide metabolism. Purine and pyrimidine nucleotide synthesis and regulation.
- 44** Nucleotide degradation and diseases associated with dysregulation. Uric acid, gout, and immunodeficiencies.
- 44** Integrated and organ-specialized metabolism. Extracellular and Intracellular Communication.
- 45** Molecular physiology 1. Blood clotting. The immune response
- 46** Molecular physiology 2. Muscle contraction.
- 47** Hormones and neurotransmission
- 48** Connective Tissue Proteins, Proteoglycans.

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## MEDICAL HUMANITIES

Total Credits: 13

Total Hours: 104

Scientific Discipline Sector: MED/02 – M-FIL/33 – M-FIL/03 – L-LIN/01 – L-LIN/12

### Teaching staff

Prof. Michael John

[john.michael@univr.it](mailto:john.michael@univr.it)

(Coordinator - Receiving Hour: Wednesday from 13:00 to 14:00 – Room 52R- Dabit 1)

Prof. Donatella Lippi

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Prof. Mariagrazia Strepparava

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Prof. William Cooke

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Prof. Massimo Reichlin

[reichlin.massimo@hsr.it](mailto:reichlin.massimo@hsr.it)

### Aim

The aim of the course is to help students understand that patients are people, and not just a mass of molecules, that not only have an illness, but are also suffering fear and anguish. Doctors must therefore strive to empathize with individuals and not simply distribute medication and drugs to faceless and nameless numbers.

Discussion and active student participation will be paramount to the overall success of the course.

### Final evaluation

The students will receive a final mark based upon two **compulsory** end-of-term written tests. The three-section test at the end of the first semester will be multiple-choice based, and will comprise History of Medicine (Lippi), Doctor-patient communication skills (Strepparava part 1, John part 1). The three-section multiple-choice test at the end of semester two will comprise Doctor-patient communication skills (Strepparava part 2), Bioethics (Reichlin), and Peer-to-peer communication skills (John part 2).

As will be clearly explained during lesson 1 of the Humanities Course, **the result of the final examination** will be based on the total of the above-mentioned multiple-choice written exercises, together with the marks obtained for group-based classwork exercises (i.e. power point presentation, abstract writing).

All of these exercises are **compulsory**, and the mark obtained is to be considered **final**. Only those students that fail to reach a positive overall result (18/30) will have the chance to re-sit the entire examination (multiple-choice sections **ONLY**, as group-exercise results will be maintained) on a single date during the September examination session.

Students that achieve a positive result will not be permitted to re-sit any part or all of the examination *merely to 'up the mark'*.

The dates for the mid-term tests and the September re-sit are as follows:

1. Part-one mid-term: 4<sup>th</sup> March 2014 at 09:00
2. Part-two mid-term: 8<sup>th</sup> June at 09:00
3. September re-sit: single date to be defined

### Course objectives

In today's frenetic, high-tech world, where medicine is evidence based and focuses on specialties of all possible kinds, doctors generally have little time to ponder the multifaceted problems of their patients. Indeed, there are innumerable horror stories told by sick people that stem from the uncaring attitudes and the lack of sensitivity shown by many health professionals. Yet medicine should be seen as a caring profession that requires doctors not only to

provide valid clinical assistance but, above all, to empathize with patients and their families when they are at their most vulnerable and in need of understanding.

Nowadays, medical school students are encouraged to interact with patients virtually from the beginning of their training and an increasing amount of emphasis is being placed on the teaching of social sciences, ethics and communication skills to help create a new kind of doctor. One way of doing this is by introducing the study of the *Medical Humanities* (literature, music, visual arts, psychology, sociology, philosophy, ethics, history, language, religion etc.) into the medical curriculum. These subjects require imagination, close observation and understanding, which are all fundamental characteristics of a successful and caring doctor.

How otherwise might a 20-year-old medical or nursing student learn about the complexities of the human condition? How would they be able to understand the reactions and feelings of someone with a terminal illness or a crippling disability, let alone a parent who has just lost a child? They certainly will not learn these skills from standard clinical textbooks, where the words fear and anguish do not appear in the index. Yet fear and anguish are at the very center of how a patient faces up to and lives with an illness.

**At the end of this course, students will have a greater understanding of:**

- *empathy and patient-centered communication*
- *team work and the ability to interact with colleagues and other health professionals*
- *use of language*
- *truth-telling and the delivery of bad news*
- *withdrawal of treatment*
- *euthanasia and assisted suicide*
- *treatment of violence and abuse*
- *ethical and legal problems linked to medical errors*
- *ethics committees*
- *conflict of interest and relationship with industries*
- *chronic illness*
- *old age, death and bereavement*
- *cross-cultural conflicts*
- *alternative and complementary health practices*
- *religion and spirituality*
- *ethical problems linked to stem cells, organ donation and transplantation*
- *re-pro ethics and new reproductive technologies*
- *history of medicine and medical education*
- *how to read and write a paper for publication in a peer journal*
- *how to read communicate with a peer audience at international congresses*

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## CELL AND MOLECULAR BIOLOGY

Total Credits: 11

Total Hours: 88

Scientific Discipline Sector: BIO/11 – BIO/12 – INF/01

**Course Coordinator:** Prof. Roberto Sitia (Receiving Hour: Thursday ore 14,30, Dibit1, A2, 4<sup>th</sup> Floor, room 36)

Email: [sitia.roberto@hsr.it](mailto:sitia.roberto@hsr.it)

18 hours

### Collaborators:

Prof. Marco Bianchi

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4 hours

Prof. Domenico Cianflone

Email: [cianflone.domenico@hsr.it](mailto:cianflone.domenico@hsr.it)

4 hours

Prof. Anna Rubartelli

Email: [anna.rubartelli@hsanmartino.it](mailto:anna.rubartelli@hsanmartino.it)

10 hours

Prof. Eelco Van Anken

Email: [vananken.eelco@hsr.it](mailto:vananken.eelco@hsr.it)

30 hours

Prof. Simone Cenci

Email: [cenci.simone@hsr.it](mailto:cenci.simone@hsr.it)

10 hours

Prof. Tiziana Anelli

Email: [anelli.tiziana@hsr.it](mailto:anelli.tiziana@hsr.it)

**Tutorials:** 6 groups for 15 hrs tutorials each.

Tutors: Drs. Maurizio D'Antonio, Iria Medrano-Fernandez, Andrea Orsi, Celine Schaeffer, Edgar Yoboue, Samuel Zambrano.

Each group will be given a scientific paper to read, understand, put in context, summarize and present to the whole class.

The interactive lectures are part of the programme. Student will be asked about their content and significance in the final exam.

This part of the programme is meant to show how scientific knowledge is created and disseminated, and to stimulate a critical attitude in our students.

### Attending lectures and tutorials

We encourage students to attend to all lectures, as teachers will cover aspects that are absent or hard to find in textbooks. However, attending a lecture means much more than the mere physical presence in the class.

Students are encouraged to read the topics that will be covered in class **before** attending lectures, so that they can raise questions and focus onto the most relevant or controversial issues. Topics are often tackled in a transversal, multidisciplinary manner.

Unfair behaviour, such as for example clocking for others, will not be tolerated. Students found to do so will not be admitted to the exam.

*Attending tutorials is mandatory.* Those failing to do so will be admitted to the exam only in exceptional cases and their final grade will be  $\leq 20/30$ .

**Type of subject:** Biomedical discipline

**Field:** General discipline: Structure, function and regulation of cells and organisms, and the molecular bases of disease.

**Course objectives:**

With Chemistry & Biochemistry and Genetics & Developmental Biology, the Cell and Molecular Biology course illustrates the molecular bases of life and poses the bases for understanding the molecular bases of human disease. The Course is both systematic, and problem oriented. Lectures cover the basic principles of cell architecture and function (molecular motors, organelles, mitosis and meiosis, apoptosis etc, see below) whilst in tutorials students are asked to read and present to the whole class a scientific paper on a topic covered by the course.

Lectures and tutorials tackle problems of the past (evolution), present (imaging and 'omics' technologies) and future (new therapeutic strategies; socio-economic implications of novel biotechnologies) and are most frequently connected to pathogenic mechanisms.

The course aims also at explaining the processes of scientific proof, publication and divulgation and fostering the communication skills of our students.

**At the end of this course, students should be able to:**

- Read, understand and evaluate a scientific paper
- Prepare and deliver a scientific presentation
- Understand the basic cellular or molecular principles so as to understand the bases of human disease
- Design the principles of novel therapies to restore faulty cellular and molecular mechanisms.
- Interpret new medical discoveries in terms of fundamental principles of cell and molecular biology
- Explain the molecular bases of diseases that affect cellular function or interactions.

***Introduction to the Course of Molecular and Cell Biology***

What is life?

Where do we come from?

What are genes and how do they work?

What are cells

How cells divide

How cells die

How cells know where they are and where to go

How they interact with the environment

How cells differentiate

Molecular bases of disease

***Evolution, Darwin and the adaptable cell structure***

Prokaryotes, eukaryotes, multicellular organisms

Mitochondria and other successful symbioses

The evolution of specialized tissues

Homeostasis

***Cytoskeleton and adhesion molecules***

Adhesion molecules

Integrins

Tissue organization

***Molecular motors and cell movements***

Microtubules, microfilaments, molecular motors

Polarity

Axonal transport

Cytoskeleton

Muscular contraction

Cilia and flagella

Microvilli

***Intracellular transport***

Three main mechanisms of macromolecular transport:

To and from the nucleus

Membrane translocation

Vesicular transport

Exo, endo, pino, phagocytosis

Transcytosis

Mechanisms of cell polarity

### ***Cell compartmentalization***

Specific signals target macromolecules to different organelles.

### ***Protein folding, the second genetic code***

Anfinsen's demonstration of the central dogma

Chaperones and protein evolution

### ***Protein degradation***

Proteasomes, lysosomes and autophagy

### ***Protein quality control and homeostasis***

Stress responses in development and disease

### ***Proteostasis as a signal and pathogenetic mechanism***

Mechanisms of proteotoxicity

Molecular and cellular aging

### ***Conformational diseases***

Prions, Amyloidoses, Alzheimer & Parkinson

### ***Nuclear structure***

Nuclear "organelles". Chromosome territories. Nuclear membrane and lamins. Nuclear pores and transport

### ***Chromatin***

Nucleosomes. Histones and histone variants. Histone post-translational modifications, and enzymes that effect them.

### ***Transcription in eukaryotes***

RNA polymerases. Promoters & enhancers. General transcription factors. Specific transcription factors.

Coactivators and corepressors. How nucleosome position and histone modifications affect gene expression

### ***Gene expression decisions:***

#### ***Examples of transcriptional regulation and signal transduction***

The NF- $\kappa$ B system

Liver specification

### ***Retroviruses, the genome and RNAi***

Retroviruses

miRNA, siRNA, heterocromatin and centromeres

### ***Membrane structure***

Architecture, composition, membrane proteins

### ***Energy conversion I***

Mitochondria

### ***Energy conversion II***

Chloroplasts, genetics of mitochondria & plastids, evolution of electron transport chains.

**Cell signaling I**

Principles of cell communication

**Cell signaling II**

G protein coupled cell surface receptors.

**Cell signaling III**

Enzyme coupled cell surface receptors.

**Cell signaling IV**

Unfolded Protein Response, determining cell shape.

**Manipulating proteins & DNA I**

Cloning, cDNA libraries, tagging, PCR.

**Studying gene function & expression I**

Function prediction, genetic screens, tagged libraries, reporter genes.

**Studying gene function & expression II**

Reverse genetics, knock-out libraries, RNAi, complementation, epistasis & EMAP, microarray.

**Cell cycle 1**

Phases and logics of the cell cycle. Experimental approaches. The Cell Cycle Control System. Engineering checkpoints. Significance of G phases. Molecular players: cyclins, cyclin-dependent kinases, Cdk inhibitors.

**Visualizing cells I**

Standard microscopy techniques

**Cell cycle 2**

Regulatory strategies: cyclic degradation, post-translational modifications, de novo synthesis. Checkpoints in G1 and G2. Preventing DNA re-replication. Cdc25 and regulation of M-Cdk activity. Rb and E2F: the restriction point and the Skp2 autoinduction loop. The DNA damage checkpoints. p53 and p14/19ARF. Cancer as a cell cycle disease.

**Mitosis**

Phases and mechanics. Cohesins and condensins. Centrosome, microtubules and the mitotic spindle. Role of motor proteins. Mechanisms of high-fidelity segregation: centromere and kinetochore. Mechanics of anaphase. Functions of chromokinesins. Cytokinesis. Drugs targeting mitosis and their clinical relevance.

**Intercellular communication**

How cells interact and talk to each other

**Cytokines****Unconventional secretion**

Release of proteins outside the conventional exocytic pathway: mechanisms and pathophysiology

**Inflammation**

Damage and pathogen associated molecular patterns (DAMPs and PAMPs). The inflammasome and the origin of many chronic inflammatory disorders.

**Visualizing cells II**

Advanced microscopy techniques

**A historical perspective**

The Luria-Delbruck experiment .

### **Apoptosis - I**

Functional significance: apoptosis vs. necrosis. Methods to study and monitor apoptosis. Functions in physiology and disease. Mechanisms: extrinsic vs. intrinsic apoptosis. Caspases: redundancy, efficiency, velocity. Death receptors and the Death-Inducing Signaling Complex (DISC). Mitochondria as signal integrators and death executors. The Apoptosome. Mitochondrial Outer Membrane Permeabilization (MOMP). The Bcl2 family: sensors/transducers, brakes, and effectors. Inhibitors of Apoptosis (IAPs).

### **Apoptosis - II**

Apoptosis and the integrated stress response. Stress specificity of BH3-onlies. The other functions of Bcl2 proteins: daily jobs of night killers. Mitochondria and ER cross-talk. ER calcium homeostasis and apoptosis. Regulation by the unfolded protein response and heat shock proteins. Proteotoxic apoptosis.

### **Apoptosis- III**

Integrating Cell Cycle, Apoptosis, and Cancer. Apoptotic escapes from the cell cycle. Apoptosis from cytotoxic vs. genotoxic stress. Maladaptive thresholds: implications for cancer pathogenesis and therapy. Alternative forms of eukaryotic cell death: autophagy, paraptosis, pyroptosis. Autophagy in physiology and disease.

### **A DNA driven world**

Science and the future of human society

### **COURSEBOOKS:**

#### **Textbooks**

Alberts, Bray, et al. *Molecular biology of the cell*

Alberts, Bray, et al. *Essential cell biology* [www.garlandscience.com/textbooks/081533480X.asp](http://www.garlandscience.com/textbooks/081533480X.asp)

Lewin, Cassimeris et al. *Cells*

Lodish et al. *Molecular cell biology* [www.whfreeman.com/lodish4](http://www.whfreeman.com/lodish4)

Pollard & Earnshaw *Cell Biology* [www.us.elsevierhealth.com/.../book/.../Cell-Biology/](http://www.us.elsevierhealth.com/.../book/.../Cell-Biology/)

Gerald Karp, *Cell Biology* ED. John Wiley & Sons ISBN 978-0470505762

As the above books contain all the essential notions, differing primarily in the style of presentation, we do not recommend one in particular and leave the choice to the students' tastes and opportunities.

### **Suggested readings**

*We encourage our students to read on science, medicine and society. Below are a few tips.*

M. Perutz. *Is science necessary? and/or I wish I made you angry before.* Two lovely series of essays on science and scientists.

J. Diamond. *Germs, guns and steel.* A brief summary of the last 13000 years of humans... Why did some civilisations prevail?

J. Monod *Chance and necessity.* A Nobel Prize winner in Medicine tackles fundamental philosophical issues

J.D. Watson. *The double helix.* Watson tells the story of how the structure of DNA was solved, with the pace of a crime fiction novel.

P. Medawar. *Advice to a young scientist.* Some tips for those tempted to become a physician scientist. Thoroughly enjoyable

### **USMLE REQUIREMENTS**

#### **Biology of cells**

- adaptive cell responses and cellular homeostasis
- intracellular accumulations
- mechanisms of injury and necrosis
- apoptosis

- mechanisms of dysregulation
- cell biology of cancer, including genetics of cancer
- general principles of invasion and metastasis, including cancer staging
- cell/tissue structure, regulation, and function, including cytoskeleton, organelles, glycolipids, channels, gap junctions, extracellular matrix, and receptors

**Molecular biology**

- gene expression: DNA structure, replication, exchange, and epigenetics
- gene expression: transcription
- gene expression: translation, post-translational processing, modifications, and disposition of proteins (degradation), including protein/glycoprotein synthesis, intra/extracellular sorting, and processes/functions related to Golgi complex and rough endoplasmic reticulum
- structure and function of proteins and enzymes
- energy metabolism

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## GENETICS AND DEVELOPMENTAL BIOLOGY

Total Credits: 12

Total Hours: 96

Scientific Discipline Sector: BIO/13 – MED/03

**Course Coordinator:** Prof. Giorgio Casari

Email: [casari.giorgio@hsr.it](mailto:casari.giorgio@hsr.it) (Receiving Hour to be scheduled by email)

32 hours

### Collaborators:

Prof. Giangiacomo Consalez

Email: [consalez.giangiacomo@hsr.it](mailto:consalez.giangiacomo@hsr.it)

32 hours

Prof. Luca Rampoldi

Email: [rampoldi.luca@hsr.it](mailto:rampoldi.luca@hsr.it)

32 hours

**Tutorials:** 5 groups for 15 hrs tutorials each.

Tutors: Drs. Maltecca Francesca, Croci Laura, Cassina Laura.

### Topics covered by the course

#### Mendelian and non-Mendelian genetics

Course introduction\_ The Human Genome Project.

Mendelian Inheritance (I)\_Definition of gene, locus, allele. The first Mendel's law.

Mendelian Inheritance (II)\_The second and third Mendel's laws. Segregation and independent assortment.

Exceptions to Mendelian inheritance\_Incomplete dominance, co-dominance. Penetrance and expressivity.

Exceptions to Mendelian inheritance\_Sex-related effects. Pleiotropy. Pedigree design\_2

Chromosomes/mitosis/meiosis\_Chromosome structure (telomeres, centromere) and segregation during mitosis and meiosis. Crossing-over.

Chromosome structure. Chromatin structure and function. Histones and nucleosomes. Chromatin remodelling.

Recombination/mapping (I)\_Molecular basis of recombination.

Recombination/mapping (II)\_Recombination as a measure of genetic linkage. Mapping in bacteria and Drosophila.

Non-Mendelian inheritance (I)\_Gene conversion.De-novo mutations.Mosaicism (X-inactivation).

Non-Mendelian inheritance (II)\_Epigenetic control of gene expression. Imprinting.

Dynamic mutations (I)

Dynamic mutations (II)

Mitochondrial Inheritance

Chromosome mutations

Cytogenetics

CGH

DNA/RNA structure

Transcription/translation\_Gene structure and transcription. The genetic code, structure of tRNA and ribosome.

Translation. Mechanisms of splicing

RNA interference\_miRNA, siRNA, shRNA. Discovery and applications.

Point mutations and repair\_Spontaneous and induced mutations. Repair of mutations and recombination.

Nonsense mediated decay

Complex mutations/polymorphisms/CNVs

Mutation detection techniques

Deep sequencing

Effect of mutations (gain/loss-of-function)\_Gain-of-function and loss-of-function effect of mutations. Negative dominance.

Effect of mutations (ESE)

Genetic markers\_DNA markers (microsatellites, SNPs). Genetic maps. Haplotype maps

(the HaploMap project).  
Genetic Mapping (I)\_Linkage analysis in human pedigrees. LOD score calculation.  
Genetic Mapping (II)\_Linkage analysis in human pedigrees. Haplotype analysis.  
Probability\_Bayes' theorem, application for risk calculation in human pedigrees.  
Examples of linkage/positional cloning  
Examples of functional cloning  
Quantitative Trait Loci  
Population genetics\_1  
Population genetics\_2  
Molecular Evolution (I)  
Non-parametric linkage analysis/association studies  
Jolly

### **Embryology and developmental biology**

This part of the course will cover the essentials of normal human development and of its main aberrations, providing information on some recognizable patterns of human malformation.

### **General Embryology**

Gametogenesis: Conversion of Germ Cells into Male and female gametes  
First Week of Development: ovulation to implantation  
Second Week of Development: Bilaminar Germ Disc  
Third Week of Development: Trilaminar, Germ Disc  
Third to Eighth weeks: The Embryonic Period  
Third Month to Birth: The Fetus and Placenta

### **Systems-based Embryology**

Skeletal System  
Muscular System  
Body Cavities  
Digestive System  
Cardiovascular System  
Respiratory System  
Urogenital System  
Head and Neck  
Central Nervous System  
Ear and eye development  
Tegumentary System

### **COURSEBOOKS:**

#### **Langman's Medical Embryology / Edition11,**

Thomas W.Sadler, ED. Lippincott Williams & Wilkins ISBN: -13: 9780781790697

#### **Human Molecular Genetics <sup>3rd</sup> Edition,**

Tom Strachan, Andrew Read - ED: Garland Science - ISBN:0-8153-4184-9

### **USMLE REQUIREMENTS**

#### **Human development and genetics**

- principles of pedigree analysis
- inheritance patterns
- occurrence and recurrence risk determination
- population genetics: Hardy-Weinberg law, founder effects, mutation-selection equilibrium
- principles of gene therapy
- genetic testing and counselling
- genetic mechanisms



## **SAN RAFFAELE INTERNATIONAL MD PROGRAM**

**YEAR 2**

**Academic Year 2014/2015**

- Human Morphology
- Physiology
- Principles of Pharmacology
- Introduction to Surgery

Academic Calendar IMDP 2014-2015



SAN RAFFAELE INTERNATIONAL MD PROGRAM - 2nd YEAR

oct-2014		nov-14		dec-2014		jan-2015		feb-15		mar-15		apr-15		may-2015		jun-2015		jul-2015		aug-2015		sep-2015	
1	Beginning A.Y	1	Holidays	1	Holidays	1	Holidays	1	EXAMS	1	Beginning Sem.2	1	Easter Holiday	1	BANK HOLIDAY	1	BANK HOLIDAY	1	EXAMS	1	EXAMS	1	EXAMS
2		2	Holidays	2	Holidays	2	Holidays	2	EXAMS	2	Beginning Sem.2	2	Easter Holiday	2		2	BANK HOLIDAY	2	EXAMS	2	EXAMS	2	EXAMS
3	1.	3		3		3		3	EXAMS	3		3	Easter Holiday	3		3		3	EXAMS	3	Holidays	3	EXAMS
4		4		4		4		4	EXAMS	4		4	Easter Holiday	4		4		4	EXAMS	4	Holidays	4	EXAMS
5		5	10.	5		5		5	EXAMS	5		5	Easter	5		5	13.	5	EXAMS	5	Holidays	5	EXAMS
6		6		6	6	6	6	6	EXAMS	6	1.	6	Easter Holiday	6		6		6	EXAMS	6	Holidays	6	EXAMS
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20		20		20		20		20	EXAMS	20	3.	20		20		20	Study Leave	20	EXAMS	20	Holidays	20	EXAMS
21		21	8.	21		21		21	EXAMS	21		21		21		21		21	EXAMS	21	Holidays	21	EXAMS
22		22		22		22		22	EXAMS	22		22		22	11.	22	Study Leave	22	EXAMS	22	Holidays	22	EXAMS
23		23		23		23		23	EXAMS	23		23		23		23	Study Leave	23	EXAMS	23	Holidays	23	EXAMS
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25		25		25		25		25	EXAMS	25		25		25	BANK HOLIDAY	25	Study Leave	25	EXAMS	25	Holidays	25	EXAMS
26		26		26	CHRISTMAS	26		26	EXAMS	26		26		26		26	Study Leave	26	EXAMS	26	Holidays	26	EXAMS
27		27		27	BOXING DAY	27		27	EXAMS	27	4.	27		27		27	Study Leave	27	EXAMS	27	Holidays	27	EXAMS
28		28		28		28		28	EXAMS	28		28		28		28		28	EXAMS	28	Holidays	28	EXAMS
29		29	9.	29		29		29	EXAMS	29		29		29	12.	29	EXAM	29	EXAMS	29	Holidays	29	EXAMS
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31		31		31		31		31	EXAMS	31	*	31		31		31		31	EXAMS	31	Holidays	31	EXAMS*

\* Extraordinary exam session - No Lessons -

## HUMAN MORPHOLOGY

Total Credits: 30

Lessons: 240 h

Practicals: 44 h

SSD BIO/16, BIO/17, MED/36, MED/37, MED/33

**Course Coordinator:** Ottavio Cremona

**Email:** [ottavio.cremona@univr.it](mailto:ottavio.cremona@univr.it)

### Professors Teaching:

Giangiaco Consalez	Email: <a href="mailto:consalez.giangiacomo@hsr.it">consalez.giangiacomo@hsr.it</a>
Andrea Falini	Email: <a href="mailto:falini.andrea@hsr.it">falini.andrea@hsr.it</a>
Francesco De Cobelli	Email: <a href="mailto:decobelli.francesco@hsr.it">decobelli.francesco@hsr.it</a>
Luigi Naldini	Email: <a href="mailto:naldini.luigi@hsr.it">naldini.luigi@hsr.it</a>
Giuseppe Peretti	Email: <a href="mailto:giuseppe.peretti@hsr.it">giuseppe.peretti@hsr.it</a>
Mario Rende	Email: <a href="mailto:rende@unipg.it">rende@unipg.it</a>
Marco Vitale	Email: <a href="mailto:marco.vitale@univr.it">marco.vitale@univr.it</a>
Stefano Cappa	Email: <a href="mailto:stefano.cappa@iusspavia.it">stefano.cappa@iusspavia.it</a>
Angelo Lombardo	Email: <a href="mailto:lombardo.angelo@hsr.it">lombardo.angelo@hsr.it</a>
Celeste Scotti	Email: <a href="mailto:celeste.scotti@grupposandonato.it">celeste.scotti@grupposandonato.it</a>

Tutors:

Andrea Raimondi

Alessio Cantore

Francesco Boccalatte

### Goals

Aim of the course is to provide the morphological basis of the various functions and pathologies of the human body. Approaches to morphological education include the acquisition of foundational knowledge in microscopic observation and in dissection with the aim of correlating structure with function and pathology. Our course emphasizes clinical aspects by integrating radiologic imaging techniques, effective peer teaching and the use of electronic resources to facilitate the understanding and memorization of morphological data. The study of tissue and organ architecture by different microscopic techniques is structured to provide the structural basis for tissue and organ function; principles of tissue development and homeostasis, cellular turnover, isolation and properties of stem cells will be given as a priming for tissue pathology.

Pre-Requisites

Although there are no formal restrictions to the access to the final exam, we strongly advise students to have solid foundations in:

- Cell Biology and Cytology
- Developmental Biology

Knowledge of these disciplines was acquired during the 2<sup>nd</sup> semester of the past academic year.

### Evaluation

Final marks will be the results of in-course and end-of-course exams, including:

- An oral histology exam including observation tests at the microscope
- A multiple-choice exam on "Dynamics of Movement"
- A final written exam covering the remaining part of the program

## Program

1<sup>st</sup> semester:

### INTRODUCTORY MORPHOLOGY

1. Introduction to Tissues
2. Epithelial Tissue .
3. Connective Tissues
4. Adhesion & Matrix
5. Cell Migration
6. Anatomical Position & Terminology

### MORPHOLOGY OF ORGAN SYSTEMS

#### ➤ *Support and Movement*

- i. Skin*
- ii. Skeletal Tissues*

1. Histology of the skeletal muscle
2. Histology of Muscle, Bone & Cartilage
3. Bone remodeling
4. Dynamics of Movement  
Upper limb  
Lower limb  
Thorax  
Rachis

#### ➤ *Transportation & Defense*

- i. Blood*

1. Blood.
2. Hematopoiesis  
*ii. Cardiovascular system*
3. Heart.
4. Structure of Vessels
5. Major Vessels. General Organization.
6. Major Vessels.  
Head and neck.  
Thorax.  
Abdomen.

#### *iii. Lymphatic system*

7. Overview and structure of the system
8. Major lymphatic vessels

#### *iv. Immune system*

9. General overview of the Immune system
10. Immune organs (MV)

#### ➤ *Respiratory System*

1. Nasal Cavity & pharynx
2. Larynx, trachea & bronchi
3. Lung & Pleura

#### ➤ *Digestive System*

1. Oral Cavity.
2. Teeth
3. Esophagus & topography of the mediastinus
4. Peritoneum
5. Stomach
6. Small Intestine

7. Large intestine & rectum
8. Gut stem cells
9. Liver
10. Gallbladder & Pancreas

➤ *Urinary System*

1. Kidney
2. Urinary tract
3. Topography of the abdomen.
4. Topography of the pelvis
5. Perineum

➤ *Endocrine System*

1. Pituitary gland
2. Thyroid & Parathyroid glands
3. Adrenal glands
4. Topography of head and neck

➤ *Reproductive Systems*

*i. Male reproductive system*

1. Testis
2. Reproductive tract
3. Accessory reproductive glands & Supporting structures

*ii. Female reproductive system*

4. Ovaries & Uterine tubes (OC)
5. Uterus & placenta (OC)
6. Vagina, Vulva & Breast (OC)

[Human Morphology book list](#)

Suggested textbooks (kindle versions are strongly recommended and indicated with ASIN numbers):

**Gray's Anatomy for Students** by Richard L. Drake, A. Wayne Vogl and Adam W. M. Mitchell

**ISBN:** 9780443069529, **ASIN:** B005YZX32I

**Atlas of Human Anatomy** by Frank H. Netter **ISBN:** 9781416059516, **ASIN:** B005IXCCD2

**Neuroanatomy: An Atlas of Structures, Sections, and Systems** by D.H. Haines. **ISBN:** 9781605476537 or **ASIN:** B00838KNNK

**Neuroanatomy: Text and Atlas** by John Martin **ISBN:** 978-0071603966, **ASIN:** B0088NGYY2

**Histology: A Text and Atlas** by [Michael H. Ross](#) and Wojciech Pawlina **ISBN:** 978-0781772006, **ASIN:** B0080KAXS6

Reference textbooks:

**Gray's Anatomy: The Anatomical Basis of Clinical Practice** by Susan Standring. **ISBN:** 978-0443066849

**Clinically Oriented Anatomy** by Keith L. Moore **ISBN-13:** 978-0781775250

**Neuroanatomy through Clinical Cases** by Hal Blumenfeld **ISBN:** 978-0878930586

**Atlas of Anatomy (Thieme Anatomy)** by Anne Gilroy, Brian MacPherson, Lawrence Ross and Michael Schuenke **ISBN:** 978-1604060621

**Junqueira's Basic Histology: Text & Atlas** by A. Mescher **ISBN:** 978-0071630207

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## PHYSIOLOGY

**Total Credits: 17**

**Lessons: 136 hrs**

**Practicals: 130 hrs**

**SSD: BIO/09**

**Course Coordinator:** Antonio Malgaroli [Malgaroli.antonio@univr.it](mailto:Malgaroli.antonio@univr.it)

### Professors Teaching:

Dario Di Francesco      Email: [dario.difrancesco@unimi.it](mailto:dario.difrancesco@unimi.it)  
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Jacopo Lamanna        Email: [lamanna.jacopo@hsr.it](mailto:lamanna.jacopo@hsr.it)  
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## COURSE INTRODUCTION

The purpose of this course is to provide a complete training in biophysics and human physiology. This course is designed to promote learning by practice, with a particular emphasis on stimulating student experimental creativity and interdisciplinary approaches. We all know that *Physiology* is the investigation of cell and body functions, hence the major goal is to understand and be able to predict the acute and adaptive responses of the body to external stimuli but also to understand how the body can maintain a stable set of internal conditions while the external environment is constantly changing. Physiology can be studied at many different levels including biophysics, cell physiology, organ physiology and systems physiology. In this course you will be exposed to all of these levels, initially to the biophysical and cellular physiology level, then quickly moving up to the organ and system levels. In the mainframe of this M.D. program, clearly Physiology and Anatomy must be closely related subjects. To fully appreciate the physiology of a given system it is necessary to first know its anatomy, therefore much coordination work has gone into ensuring that each topic will be presented sequentially, first in the Anatomy and then in the Physiology Course. Indeed, in most cases true understanding of physiology can only take place if structure and function are concurrently learned. A complete and in depth understanding of physiology would be essential to appreciate in subsequent courses how the human body might be functionally altered by diseases (pathophysiology) and also to predict the response of the body to pharmacological therapies or drugs.

## SPECIFIC GOALS AND OBJECTIVES

The goals of this M.D. Course in Physiology are to train students to:

1. be able to demonstrate comprehensive understanding of biophysics and physiology as well as the integration of these with basic and applied disciplines;

2. understand the molecular and cellular mechanisms of physiological processes, in order to provide a foundation for understanding pathophysiology and therapeutics in subsequent courses;
3. integrate knowledge and concepts from cellular physiology and organ physiology to understand the integrative body functions, e.g., maintenance of blood gas levels; responses to stresses; regulation of fluid volumes and compositions; digestion; reproduction, etc.;
4. use and develop adequate knowledge of the most current developments in basic and medical sciences as related to biophysics and physiology;
5. acquire skills in research methodologies used in biophysics and physiology to be able to understand experimental research more effectively;
6. plan and run simple biophysics and physiology experiments utilizing standard equipments, including the evaluation and interpretation of experimental results; demonstrate competence in basic concepts of research methodology; effectively use the statistical methods for data analysis;
7. develop communication skills by frequent in-class discussions;
8. understand scientific papers dealing with physiological results;
9. function as a productive member of a student team engaged in learning and designing experimental strategies to understand structure-function problems;

#### DETAILED PROGRAM

##### **Biophysics and Cell Physiology**

1. Historical grounds of physiology; Units and Scales in physiology; The concept of homeostasis
2. Cellular Membranes and Transmembrane Transport of Solutes and Water
3. Thermodynamics of membrane transport
4. Mechanisms of carrier-mediated transport: facilitated diffusion, cotransport, and countertransport. Sodium pump function,  $\text{Na}^+$  -  $\text{Ca}^{2+}$  exchange currents
5. Diffusion and permeability
6. Osmosis and regulation of cell volume
7. Intracellular pH Regulation
8. Ionic Equilibria and the concept of equilibrium potential.
9. Origin of resting membrane potentials. The driving force for ionic-fluxes.
10. Gibbs-Donnan equilibrium potentials. Intracellular chloride regulation
11. Patch-clamp techniques and analysis of cell currents and ion channels
12. Ion channel families
13. Structure-function of voltage-gated ion channels
14. Electrogenesis of membrane excitability
15. Generation and conduction of action potentials
16. Cable properties and propagation of action potentials
17. Derivation of the Cable Equation and the AC length constant
18. Effects of toxins, drugs, genetic diseases of ion channels and variation in extracellular ions concentration on resting membrane potential and membrane excitability

##### **Muscle Physiology**

19. Introduction to Skeletal muscle physiology
20. Membrane excitability of skeletal muscle cells
21. Excitation-contraction coupling in skeletal muscle; regulation of  $\text{Ca}^{2+}$  release from sarcoplasmic reticulum
22. Muscle metabolism and energetics
23. Role of muscle mitochondria and regulation of ATP production
24. Response to exercise and muscle fatigue

25. Smooth Muscle Physiology
26. Smooth muscle metabolism and signalling
27. Introduction to Cardiac Muscle Physiology

### **Renal Physiology**

28. Elements of Renal Function
29. The Nephron; The ultrafiltration process
30. Solute and Water Transport Along the Nephron. Tubular Function
31. Feedback mechanisms and autoregulation of the kidney function
32. Control of Body Fluid Osmolality and Extracellular Fluid Volume
33. Potassium, Calcium, and Phosphate Homeostasis
34. Intracellular pH Regulation and role of the Kidneys in Acid-Base Balance

### **Physiology of the Respiratory System**

35. Overview of the Respiratory System
36. Mechanical Properties of the Lung and Chest Wall
37. Ventilation, Perfusion, and Their Relationship
38. Oxygen and Carbon Dioxide Transport
39. Control of Respiration
40. Nonrespiratory Functions of the Lung

### **Physiology of the Cardiovascular System**

41. Overview of the Circulation, Blood, and Hemostasis
42. Electrical Activity of the Heart
43. Natural Excitation of the Heart and the pacemaker ion channels
44. Cardiac Pump
45. Regulation of the Heartbeat
46. Hemodynamics
47. Arterial System
48. Microcirculation and Lymphatics
49. Peripheral Circulation and Its Control
50. Control of Cardiac Output. Coupling of the Heart and Blood Vessels
51. Special Circulations
52. Interplay of Central and Peripheral Factors in Control of the Circulation

### **Physiology of the Digestive System**

53. Introduction to the digestive system
54. Nutrition and energy metabolism
55. The enteric nervous system
56. Motility of the Gastrointestinal Tract
57. Gastrointestinal Secretions
58. Digestion and Absorption for lipids, carbohydrates, proteins

### **Physiology of the Nervous System**

59. Cellular and functional organization of the nervous system

60. The functional organization of cerebral cortex
61. Introduction to synapses
62. Synaptic transmission and ligand-gated ion channels
63. Synaptic transmission and release of neurotransmitter molecules
64. Synaptic transmission and transporters for neurotransmitter molecules
65. Quantal analysis of synaptic transmission
66. Synapses as targets for toxins, drugs, and genetic diseases
67. Associative and non-associative forms of synaptic plasticity
68. The organization of the sensory nervous system
69. The visual system
70. The auditory system
71. The central organization of the motor system and the motor pathways
72. The spinal reflex and locomotor activity centers in the spinal cord
73. Motor function and the role of brainstem, basal nuclei and cerebellum
74. Activation of the brain, sleep and wakefulness; EEG recordings
75. Higher Functions of the Nervous System: memory, consciousness, language, emotions.
76. The autonomic nervous system and its control

### **Physiology of the Endocrine System**

77. General Principles of Endocrine Physiology
78. Whole-Body Metabolism
79. Hormones of the Pancreatic Islets
80. Endocrine Regulation of the Metabolism of Calcium and Phosphate
81. Hypothalamus and Pituitary Gland
82. Thyroid Gland
83. Adrenal Cortex
84. Adrenal Medulla
85. Overview of Reproductive Function
86. Male Reproduction
87. Female Reproduction

### **FORMATIVE ASSESSMENT AND EXAMS**

The assessment is continuous as well as end-of-term. The continuous assessment is based on the feedback from teachers and tutors and a series of theory exams (Electricity review test, I and II midterm for 2nd year students). The performance of students during theoretical lectures and experimental sessions will be monitored throughout the course and duly recorded in log books as evidence of the ability and daily work of the student.

The Electricity review and the two midterm progress tests are organized during the first and second semester. A positive score (above 18 out of 30) is **OBLIGATORY** to access the end-of-term assessment. Students with a negative score in one (or more) test(s) will be asked to repeat this during one of the official appelli at the end of the second semester. Students with a positive score in one test cannot repeat this. The mark achieved in the progress test can only be incremented only during the end-of-term assessment (oral exam).

The intermediate progress test and end of term progress test will be organized either as multiple choice and/or multiple-multiple choice which might include numerical questions and small exercises (a pocket calculator with log and exp might be needed) or using an open-question format. The students are expected to know the proper names and spelling of channels, transporters, receptors, reactions, structures, cells, currents, etc. as presented in class or in textbooks. Regarding the exercises, not only the procedures but also the final results should be accurate (see Grading section below for details about the actual grade breakdown).

Class Presentations: during the course reading session(s) will be organized where students will have the opportunity to discuss with teachers and colleagues recent scientific papers related to the application of some modern recording technique to the study of human physiology and physiopathology. Papers will be selected by the teacher and made available in advance on the intranet web site (see Grading section below for details about grading).

The end-of-term assessment is an oral exam, it is organized in one of the official exam dates (Appelli) as listed on the intranet (on line registration is OBLIGATORY). Since students that have passed all three progress tests will already have a grade (to see how this is calculated see Grading section below), the oral exam would be optional. In other words, students that are satisfied with the grade already received can simply enroll on the intranet in one of the official Appelli and on the date of the exam have their grade registered. On the contrary, on the same date they would have the opportunity to upgrade their score by taking the end-of-term assessment which would be a viva voce exam. For this latter evaluation step, the student can: A) Be tested on the whole program; B) Present an in-depth analysis of one or more subjects listed in the course program; C) Discuss a recent scientific paper from the last two years (this MUST be a research paper, not a review, should deal with one of the physiological subjects taught in class, i.e. some novel physiological finding that sooner or later will be found in a physiology textbook. Papers can only be taken from one of the following journals: Nature, Science, Cell, PNAS, J. Physiology, J. Neuroscience, Neuron, European J. Physiology, American J. Physiology). The research paper MUST BE CHOSEN AUTONOMOUSLY by the student and must be brought by student the day of the exam. No written analysis should be prepared and the exam will be a viva voce discussion(see the Grading section below for details about the actual grading of these three different formats).

N.B. The three progress tests will be written tests. The exam will consist of either multiple choice questions (keyed questions) or open questions. These are OBLIGATORY and no final grade can be computed until the student has passed all of them. If the score in one or more progress test(s) is below 18/30 the test(s) must be repeated during one of the official appelli at the end of the second semester (in this case students MUST always register on the intranet and the day of the Appello, no test will be prepared for students that did not register officially). The admission to the end-of-term assessment (oral exam) will be granted only after all the three progress tests have been completed.

N.B. Students that have passed these tests CANNOT repeat them even when unhappy about the score received. The score can be fully upgraded during the end-of-term exam session (see detailed grading below)

N.B. Detailed programs for individual progress tests will be posted on the intranet course page well in advance.

#### GRADING

The Progress tests will be graded in the scale score 0-30. To pass any exam student must obtain a grade equal or above 18 out of 30. Scores will posted on the intranet course page (to maintain privacy, score will be listed in a file where students can identify themselves by their private student registration number). When all progress tests will be completed, a final score will be computed according to the following scheme:

ELECTRICITY REVIEW TEST:	up to	3/30	points
IST MIDTERM:	up to	15/30	points
IInd MIDTERM:	up to	14/30	points
CLASS PRESENTATIONS:	up to	1/30	points
		-----	
Total of		33/30	points (33 = 30 with laude)

Regarding score registration, students that are not satisfied by their grade (based on what just stated above) can take the oral end-of-term exam. In this case, BASED ON THE EXAM FORMAT (see Point 2, Formative assessment and format of the exams section for details), their grade can be incremented according to the following scheme:

-Exam on the whole course program:	up to 30/30 with laude
-In-depth analysis of one of the course subjects:	up to 3/30 additional points
-Discussion of a recent paper:	up to 3/30 additional points

### **SUGGESTED BOOKS AND READINGS**

- 1) Course Syllabus and other reading material provided on the intranet (course page)
- 2) E. R. Kandel, J.H. Schwartz e T.M. Jessel: Principles of neural science V ed. McGrawHill, 2012
- 3) Berne & Levy Physiology, Bruce M. Koeppen and Bruce A. Stanton, Mosby-Elsevier VI edition, 2010

### **OTHER BOOKS**

Aidley D.J. The Physiology of Excitable Cells. Cambridge Univ Press, IV ed., 1998.  
Hille, B. Ionic channels of excitable membranes. III Edition, Sinauer, Sunderland, 2001  
Johnston D., S. Miao\_Sin Wu, S. Maio\_Sin Wu. Foundations of Cellular Neurophysiology. MIT, 1995.  
Katz, B. Nerve, Muscle and Synapse, McGraw Hill, 1966  
Sheperd G.M. The synaptic organization of the brain. Oxford, V edition, 2004  
Sperelakis N. Cell Physiology Source Book: Essentials of Membrane Biophysics. III edition, Academic Press 2001

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## **DIDACTIC MATERIAL**

The textbook of reference is the Goodman e Gilman's, XII edition, published in English at the end of 2010 (mind! Of this book there are obviously 11 editions before this one, published every 5 years, approximately; Pharmacology is a discipline in fast development!).

Goodman & Gilman's

The Pharmacological Basis of Therapeutics, XII Edition

Ed. McGraw Hill, 2010

### **Meetings with students**

Meetings with the coordinator of the course on Principles of Pharmacology can be organized by appointment organized by email (zacchetti.daniele@hsr.it) or calling the 02-2643.4817

### **Evaluation procedures**

The exam is based on two steps: a test with 8-10 open questions, to be completed within 30 min and aimed to highlight students still far from an adequate knowledge of the discipline; then, an oral exam based on the critical discussion of wide and important topics, all included in then teaching program, on the basis of which the final grade will be established.

### **Program of the course**

The Course is organized in the following topics. In details we will deal with

1. Introduction to the course, definitions, drugs and their molecular and biological properties.
2. Pharmacokinetics, i.e. the journey of the drug within the organism, the time-dependence of drug effects and the process that are responsible for them:
  - Absorption and distribution of drugs: way of administration, proteins of the plasma;
  - Drug elimination: drug metabolism, excretion, kinetic aspects.
3. Pharmacodynamics, i.e. the features and the quantification of the drug effects:
  - Drug effects, dose-dependency
  - Dose-effect curves.
4. Pharmacogenetics, pharmacogenomics and mechanisms of resistance.
5. Molecular targets of drugs – the receptors and their transduction mechanisms:
  - Surface receptors;
  - Circulation of receptors;
  - Intracellular receptors.
6. Effects of drugs on cellular signaling:
  - Second messengers – spatial coordination;
  - Cross-talk among transduction pathways.
7. Pharmacology of the peripheral nervous system as a paradigm for the drug action:
  - Sympathetic system;  $\alpha$  and  $\beta$  adrenergic receptors;
  - Direct and indirect agonists, receptor antagonists;
  - Parasympathetic system and neuromuscular transmission;
  - Muscarinic e nicotinic receptors;
  - Cholinergic agonists; cholinesterase blockers;
  - Antagonists: ganglioplegics and curare.
8. Autacoids, specific endogenous factors that act locally, and their pharmacology:
  - the arachidonic acid cascade;
  - the nitric oxide;
  - histamine, serotonin, bradykinin, cytokines;
  - ATP; adenosin.
9. General pharmacology of the central nervous system:
  - neurons and glia, the synaptic signalling;
  - excitatory and inhibitory transmissions; drugs of abuse;
  - neurodegeneration.
10. Introduction to chemotherapy (bacteria, viruses, tumors):
  - introduction to antibacterial drugs;
  - introduction to antiviral drugs;
  - growth and death of cells. antitumoral drugs.
11. Principles of pharmacognosy, toxicology and biologic therapy.
12. Principles of Pharmacovigilance and Pharmacoeconomy
13. Development of new drugs: history, rules and future of pharmacology.

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## **INTRODUCTION TO SURGERY**

**Total Credits: 3**

**Lessons: 24 hrs**

**Practicals: 30 hrs**

*Scientific Discipline Sector: MED/18 – MED/19*

**Course Coordinator:** Prof. Riccardo Rosati

**Professors Teaching:**

Riccardo Rosati Email: [rosati.riccardo@hsr.it](mailto:rosati.riccardo@hsr.it) (by appointment writing to: [fumagalli.carla@hsr.it](mailto:fumagalli.carla@hsr.it))

Franz Baruffaldi Preis Email: [f@preisurgery.com](mailto:f@preisurgery.com)

**Tutors:**

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Mariacamilla Zotti Email: [zotti.mariacamilla@hsr.it](mailto:zotti.mariacamilla@hsr.it)

Giovanni Burtulo Email: [burtulo.giovanni@hsr.it](mailto:burtulo.giovanni@hsr.it)

**Course aims**

The course will give to the students the basic information on:

- 1) Operating room environment
- 2) Rules of asepsis and sterilization
- 3) Pre-habilitation and re-habilitation
- 4) Approach to the surgical patients: taking a history; reviewing the existing data and exams; programming further diagnostic exams; taking a physical exam; obtaining an informed consent
- 5) Approach to the acute patient
- 6) Anaesthesia and perioperative management; principles of enteral and parenteral nutrition.
- 7) Surgical instruments; energy devices. Patient positioning in the operating table; surgical incisions; tissue manipulation
- 8) Surgical dissection, recognition of anatomical structures and planes, principles of haemostasis
- 9) Principles of visceral suturing; manual and mechanical sutures; visceral anastomotic techniques; pathophysiology of intestinal anastomosis; anastomotic complications;
- 10) Tissue healing, cicatrization, tissue repair. Suture technique and materials
- 11) Sutures in plastic surgery
- 12) The adipose tissue: patophysiology and surgery
- 13) Tumors of the skin and subcutaneous tissue; the non oncologic breast

The course will be articulated in 12 lessons of two hours each and 30 hours of practical activity. It will also give basic knowledge of the surgical culture and skills which shall be part of the general medicine. A doctor has to deal with health problems on a daily basis, which require the knowledge of basics of surgery in order to understand diagnostic process, treatment modalities, and possible complications.

The course represents an approach to these issues, which will be followed consistently and completed in the other surgery courses that will enter in details in diagnostic situations.

Introduction to Surgery book list: Textbook of Surgery – Sabiston

## Lesson plans of Plastic Surgery

Within 8 hours made available by the university for the treatment of the topics of reconstructive plastic surgery and aesthetics will be held by Prof. FW Baruffaldi Preis four lessons of two hours each, chosen from among the four topics listed below:

- 1) The integumentary repair and healing
- 2) The suture in surgery
- 3) benign and malignant lesions of the skin and breast
- 4) The surgical treatment of adipose tissue

1) The repair tegmental provides an introduction to the many causes responsible for the deterioration of the integument.

In particular, we consider all those physical, biological, metabolic able to modify the characteristics of the skin mantle.

Follows the classification of different types of repair that lead to the creation of a repair tissue of a normal or pathological tissue.

In the discussion of the pathophysiology of tissue repair are considered those factors that can facilitate the process (protection, antiseptic agents, systemic factors) and those responsible for the chronicity of the disease and possible complicating local and general.

Are taken into consideration the peculiarities of tissue repair depending on the area concerned: face-lip-nose-eyelid

Arts

trunk

Is treated the disease burn both as regards the skin lesions that as regards the systemic involvement for major burns .

Introduces the principles underlying the use of skin substitutes.

It decrypts the action of Vacuum therapy used for cleansing of skin ulcers.

2) The suture in plastic surgery

The topic is introduced describing the evolution had in the synthesis of the margins of a wound in surgery.

Are analysed biomaterials used for skin and subcutaneous tissue, their interaction with tissue, the mechanical strength and their degradation.

It analyses the tools applied to the phase of the suture.

Nodes are explained and made examples of how to stabilize the suture manual and instrumental.

Explanations are given on the classification of the sutures according to the type of thread, type of August

Mention the use of glues and staplers.

3) benign and malignant lesions of the skin and subcutaneous tissue

It starts from the histological classification of tumours pigmented and non-pigmented skin. We analyze the therapeutic strategies related to the severity of the injury and the district concerned: direct closure or by grafting or skin flap.

Are taken into account the concepts of tissue autologous, homologous and heterologous. It describes the characteristics of the skin flaps, skin and muscle cutaneous flaps. We analyse systemic diseases linked to predisposition to develop tumours of the skin.

Marjolin ulcers.

Angioma and MAV.

4) The introduction of the concept of breast reconstruction post -mastectomy: cutaneous expansion, immediate reconstruction, delayed reconstruction with muscle-skin flaps .I always in the context of breast surgery you enter into the merits of

-gigantomastia: Technical reductive

- Gynecomastia: its aetiology and surgical correction

- Breast ptosis: the pathophysiology of aging and breast mastopexy

- Breast hypoplasia, surgical techniques to increase the biocompatibility of silicone and synthetic materials

-asymmetry mammary gland and malformations of the cone and the areola complex nipple

5) The subcutaneous tissue. Pathophysiology of subcutaneous adipose tissue. Use of the adipose tissue in plastic surgery.

Lipofilling: principles concerning the grafting of fat cells, fields of application, reparative activities related to preadipocytic cells (stem cells).

Removal of localized fat in the adipose tissue, in the correction of body volumes and in states of obesity.

The post-bariatric surgery

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## TIMETABLE

Please note that changes may always occur in the daily lesson schedule.  
Please refer to the on line timetable for the latest version.

		International MD Program YEAR 2				
		A.Y 2013/2014				
TIME	MONDAY 29/09/2014	TUESDAY 30/09/2014	WEDNESDAY 01/10/2014	THURSDAY 02/10/2014	FRIDAY 03/10/2014	
09-11			Intro to the Course - OC		Planes&Topographic terminology - OC	
11-13			Physiology AM		Structure of Vessels - OC	
14-16			Intro to Histology - Epithelia LN1			
16-18						
TIME	MONDAY 6-Oct-14	TUESDAY 7-Oct-14	WEDNESDAY 8-Oct-14	THURSDAY 9-Oct-14	FRIDAY 10-Oct-14	
09-11	Physiology AM	Connective Tissues - LN2	Connective Tissues - LN3		Physiology AM	
11-13	Physiology AM	Bone & related tissues - GP	Bone & related tissues - GP	Angiogenesis - LN4	Physiology VZ	
14-16	Histology AL1	Bone & related tissues - GP	Bone & related tissues - GP	Respiratory System 1 - OC		
16-18	Physiology ER			Physiology ER		
TIME	MONDAY 13-Oct-14	TUESDAY 14-Oct-14	WEDNESDAY 15-Oct-14	THURSDAY 16-Oct-14	FRIDAY 17-Oct-14	
09-11	Muscle - LN5	Physiology VZ	Physiology VZ	Physiology AM SLM+ aula Group 3		
11-13	Physiology AM	Respiratory System 2 - OC	Respiratory System 3 - OC	Physiology AM		
14-16	Physiology AM	Physiology ER	Physiology AM SLM+ aula Group 1	Histology AL2	Physiology Test ER SLM	
16-18	Physiology ER	Physiology ER	Physiology AM SLM+ aula Group 2		Physiology Test ER SLM	
TIME	MONDAY 20-Oct-14	TUESDAY 21-Oct-14	WEDNESDAY 22-Oct-14	THURSDAY 23-Oct-14	FRIDAY 24-Oct-14	
09-11	Physiology AM	Alimentary System 1 - OC	Myocardium- LN6	Physiology AM	Physiology VZ	
11-13	Physiology AM	Alimentary System 2 - OC	Dynamics of Movement	Physiology AM SLM+ aula Group 3	Physiology VZ	
14-16	Physiology VZ	Physiology VZ	Dynamics of Movement	Physiology AM SLM+ aula Group 2		
16-18			Dynamics of Movement	Physiology AM SLM+ aula Group 1		

TIME	MONDAY 27-Oct-14	TUESDAY 28-Oct-14	WEDNESDAY 29-Oct-14	THURSDAY 30-Oct-14	FRIDAY 31-Oct-14
09-11	Physiology AM	Blood 1 - LN7	Alimentary System 3 - OC	Alimentary System 4 - OC	
11-13	Physiology AM	Respiratory System 2- OC	Dynamics of Movement	Alimentary System5 - OC	Histology AL3
14-16	Human Morphology MV	Physiology AM SLM+ aula Group 2	Dynamics of Movement	Physiology AM SLM+ aula Group 1	
16-18	Human Morphology MV	Physiology AM SLM+ aula Group 3	Dynamics of Movement		
TIME	MONDAY 3-Nov-14	TUESDAY 4-Nov-14	WEDNESDAY 5-Nov-14	THURSDAY 6-Nov-14	FRIDAY 7-Nov-14
09-11	Physiology AM	Blood 2 - LN8	Alimentary System/ - OC	Physiology AM SLM+ aula Group 2	
11-13	Physiology AM	Alimentary System6 - OC	Dynamics of Movement	Physiology AM SLM+ aula Group 3	
14-16	Human Morphology MV	Physiology VZ	Dynamics of Movement	Endocrine System1 - OC	
16-18	Human Morphology MV		Dynamics of Movement	Physiology AM SLM+ aula Group 1	
TIME	MONDAY 10-Nov-14	TUESDAY 11-Nov-14	WEDNESDAY 12-Nov-14	THURSDAY 13-Nov-14	FRIDAY 14-Nov-14
09-11	Physiology AM	Hematopoiesis I - LN9	Hematopoiesis II - LN10	Endocrine System2 - OC	Histology AL4
11-13	Physiology AM	Imaging of the Heart - FDC	Imaging of the Vascular System - FDC	Endocrine System3 - OC	
14-16		Physiology AM	Physiology VZ	Physiology VZ	
16-18		Physiology AM			
TIME	MONDAY 17-Nov-14	TUESDAY 18-Nov-14	WEDNESDAY 19-Nov-14	THURSDAY 20-Nov-14	FRIDAY 21-Nov-14
09-11	Cellular Immunity - LN11	Female Reproductive System1 - OC	Endocrine System - LN13	Physiology AM	Uterus/implantation - LN15
11-13	Human Morphology MV	Thymus/Spleen - LN12	Female Reproductive System2 - OC	Physiology AM	
14-16	Human Morphology MV	Physiology VZ	Physiology VZ	Ovary/menstrual Cycle LN14	
16-18				Histology AL5	

TIME	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
	24-Nov-14	25-Nov-14	26-Nov-14	27-Nov-14	28-Nov-14
09-11	xxxxx LN16	Physiology VZ	Male Reproductive System1 - OC	Physiology AM	
11-13	Human Morphology MV	Physiology VZ	Male Reproductive System2 - OC	Physiology AM	
14-16	Human Morphology MV	Practicals Microscopy INTRO -ALL in the classroom	Physiology VZ		
16-18					

TIME	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
	1-Dec-14	2-Dec-14	3-Dec-14	4-Dec-14	5-Dec-14
09-11	Physiology AM	Human Morphology MR	Human Morphology MR	Physiology VZ AM	Physiology AM VZ
11-13	Physiology AM	Human Morphology MR	Human Morphology MR	Physiology VZ AM	Physiology VZ AM
14-16	Human Morphology MV	Human Morphology MR	Human Morphology MR	Physiology VZ AM	Physiology AM VZ
16-18	Human Morphology MV		Histology AL6	Physiology VZ AM	Physiology AM VZ

TIME	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
	8-Dec-14	9-Dec-14	10-Dec-14	11-Dec-14	12-Dec-14
09-11	holiday	Topography1 OC	Topography3 OC	Gene Therapy LN17	
11-13		Topography2 OC	Imaging of the abdominopelvic cavity - 1st part-FDC	Imaging of the abdominopelvic cavity - 2ndpart-FDC	
14-16		Practicals Microscopy 1A	Practicals Microscopy 1B	Topography4 OC	Practicals Microscopy 1C
16-18		Practicals Microscopy 1A	Practicals Microscopy 1B	Histology AL7	Practicals Microscopy 1C

TIME	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
	15-Dec-14	16-Dec-14	17-Dec-14	18-Dec-14	19-Dec-14
09-11	extraordinary exam session				
11-13					
14-16					
16-18					

TIME	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
	22-Dec-14	23-Dec-14	24-Dec-14	25-Dec-14	26-Dec-14
09-11	holiday	holiday	holiday	holiday	holiday
11-13					
14-16					
TIME	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
	29-Dec-14	30-Dec-14	31-Dec-14	1-Jan-15	2-Jan-15
09-11	holiday	holiday	holiday	holiday	holiday
11-13					
14-16					
TIME	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
	5-Jan-15	6-Jan-15	7-Jan-15	8-Jan-15	9-Jan-15
09-11	holiday	holiday	Practicals Microscopy 2B	Practicals Microscopy 2A	Practicals Microscopy 3A
11-13			Practicals Microscopy 2B	Practicals Microscopy 2A	Practicals Microscopy 3A
14-16			Practicals Microscopy 2C	Practicals Microscopy 3C	Practicals Microscopy 3B
16-18			Practicals Microscopy 2C	Practicals Microscopy 3C	Practicals Microscopy 3B
TIME	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
	12-Jan-15	13-Jan-15	14-Jan-15	15-Jan-15	16-Jan-15
09-11			Practicals Microscopy 4B	Practicals Microscopy 5A	
11-13			Practicals Microscopy 4B	Practicals Microscopy 5A	
14-16		Practicals Microscopy 4A	Practicals Microscopy 4C	Practicals Microscopy 5B	Practicals Microscopy 5C
16-18		Practicals Microscopy 4A	Practicals Microscopy 4C	Practicals Microscopy 5B	Practicals Microscopy 5C
TIME	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
	19-Jan-15	20-Jan-15	21-Jan-15	22-Jan-15	23-Jan-15
09-11	Study Leave				
11-13					
14-16					
16-18					

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## **SAN RAFFAELE INTERNATIONAL MD PROGRAM**

### **YEAR 3**

Academic Year 2014/2015

- Basic Pathology and Immunology
- Microbiology and Mechanisms of Infectious Diseases
- Clinical Laboratory Medicine
- Cardiovascular Diseases
- Principles of Surgery
- Digestive System Diseases
- Respiratory, Ear, Nose and Throat Diseases
- Clinical Rotations



# Basic Pathology and Immunology

Total Credits: 13

Total hours: 104

Scientific Discipline Sector: MED/04 - MED/08 – MED/09

## Teaching staff

**Course Coordinator:** Prof. Guido Poli Email: [poli.guido@hsr.it](mailto:poli.guido@hsr.it)  
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Dr. Attilio Bondanza Email: [bondanza.attilio@hsr.it](mailto:bondanza.attilio@hsr.it)  
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Dr. Anna Mondino Email: [mondino.anna@hsr.it](mailto:mondino.anna@hsr.it)  
Dr. Maurilio Ponzoni Email: [ponzoni.maurilio@hsr.it](mailto:ponzoni.maurilio@hsr.it)

## Course Description

The BPI course will be articulated in two parts. The first part (composed of 32 frontal lessons) aims at providing the fundamental knowledge on the most relevant aspects of human pathology and immunology, including cell and tissue pathology, the mechanisms underlying acute and chronic inflammation, vessel biology, wound repair and the process of neoplastic transformation. Immunology lessons will provide state of art information on both innate and adaptive immune responses to pathogens and transformed cells as well as on key immunologically mediated pathologies, such as immunodeficiencies, allergy and autoimmunity.

In the second part of the course, the student will be directly involved in interactive modules (IM) revolving around clinical cases. Each IM will start from the medical and histopathological description of a clinical case with the goal of identifying its etiology and of reconstructing the fundamental pathogenic steps leading to overt clinical disease. This inductive process will be enriched by elements of epidemiology, genetics and pre-clinical models (when available). Since each module will span over two lessons (i.e. 4 h), the second part of the course foresees 10 IM related to the main areas of human pathology.

Overall, the course aims at providing a solid base on the fundamental principles underlying human pathology while training the students to exert their skills and acquired knowledge to probe the field of human diseases.

## Textbooks:

Robbins Basic Pathology: with STUDENT CONSULT Online Access, 9e (Robbins Pathology)

Cellular and Molecular Immunology: with STUDENT CONSULT Online Access, 7e (Abbas, Cellular and Molecular Immunology)

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# Microbiology and Mechanism of Infectious Diseases

Total Credits: 7

Total hours: 56

Scientific Discipline Sector: MED/07 - VET/06 – BIO/14

## Teaching staff

**Course Coordinator:** Prof. Nicasio Mancini  
Receiving hour: Monday from 13:00 to 14:00

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Prof. Pistello Mauro  
Prof. Nicola Clementi

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## Course Description

### Bacteriology

The purpose of this course is to give to students a thorough grounding in the comprehension of microbial structure, physiology and in the interplay between humans and microbes in different body sites and conditions. This will be achieved by studying microbial resident flora (microbiota), with particular attention to its composition, its changes during infectious diseases and to its role in the diffusion of resistance to antibiotics.

Following this perspective, students will be introduced to all of the basic structural, physiological and metabolic principles of medical bacteriology including the following points:

- Cell structure of prokaryotes
- Structure and function of endospores
- Microbial metabolism
- Microbial genetics
- Virulence and pathogenicity of bacteria
- Transmission of bacterial infection
- The immune response to bacteria
- Techniques for the diagnosis of bacterial infections
- Novel techniques for the study of resident flora (the "human microbiome project")

The detailed knowledge of the microbiota and its composition will also allow a better comprehension of the role played by specific bacterial genera and species, important in medical microbiology, that will be studied in details. Here it follows a punctual list of the bacterial genera and species that students should understand by the end of the course:

- *Staphylococcus* spp
- *Staphylococcus aureus*
- Coagulase-negative staphylococci
- *Streptococcus* spp
- *Streptococcus pyogenes*
- *Streptococcus agalactiae*
- *Streptococcus pneumoniae*
- Viridans streptococci
- *Enterococcus* spp
- *Enterococcus faecalis*
- *Enterococcus faecium*
- *Bacillus* spp
- *Bacillus anthracis*
- *Bacillus cereus*
- *Clostridium* spp
- *Clostridium difficile*
- *Clostridium perfringens*
- *Clostridium botulinum*
- *Clostridium tetani*
- *Corynebacterium* spp
- *Corynebacterium diphtheriae*

- *Corynebacterium striatum*
- *Listeria monocytogenes*
- *Actinomyces* spp
- *Nocardia* spp
- *Enterobacteriaceae*
- *Escherichia coli*
- *Klebsiella pneumoniae*
- *Proteus mirabilis*
- *Enterobacter* spp
- *Serratia marcescens*
- *Salmonella* spp

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- *Shigella* spp
- *Pseudomonas aeruginosa*
- *Stenotrophomonas maltophilia*
- *Burkholderia* spp
- *Acinetobacter* spp
- *Vibrio cholerae*
- *Campylobacter* spp
- *Helicobacter pylori*
- *Haemophilus* spp
- *Haemophilus influenzae*
- *Moraxella catarrhalis*
- *Bordetella pertussis*
- *Brucella* spp
- *Francisella tularensis*
- *Yersinia pestis*
- *Yersinia enterocolitica*
- *Pasteurella multocida*
- *Neisseria* spp
- *Neisseria meningitidis*
- *Neisseria gonorrhoeae*
- *Legionella pneumophila*
- *Bartonella* spp
- *Bacteroides* spp
- Mycobacteria
- *Mycobacterium tuberculosis*
- *Mycobacterium avium* complex
- Spirochetes
- *Mycoplasma* and *Ureaplasma*
- *Rickettsia*, *Ehrlichia*, *Anaplasma* and *Coxiella*
- *Chlamydia* and *Chlamydophila*

The microbiota-oriented perspective will also be followed in the study of the available prophylactic and therapeutic anti-bacterial approaches:

- Sterilization, Disinfection and Antisepsis
- Modes of action of the main biocides used for disinfection and antisepsis
- Mechanisms of resistance to biocides
- Antibiotics: bacterial targets of available molecules and mechanisms of resistance
- Genetic bases of antibiotic resistance
- Genetic bases of the diffusion of antibiotic resistance
- Multi-drug resistant bacteria
- Passive immunoprophylaxis
- Anti-bacterial vaccines

### **Virology**

The general purpose of this course is to give a robust introduction to basic medical virology, correlating the molecular features of each viral agents to the associated clinical syndromes. The dramatic advances in the comprehension of the different phases of the viral replicative cycle and pathogenesis will be directly correlated to the practical possibility of developing novel antiviral strategies or of improving the available diagnostic tools.

At the end of the course, the students should be familiar with the following general topics:

- Structure and chemical composition of viruses
- Phases of viral replication
- Transmission of viral infection
- Different types of viral infection
- Pathogenesis of viral diseases according to different sites of replication

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- Viral carcinogenesis
- The immune response to viruses
- Techniques for the diagnosis of viral infections
- Antiviral agent and mechanisms of viral resistance
- Passive immunoprophylaxis
- Antiviral vaccines

These general concepts should be specifically correlated to the specific features of each of the following groups of viruses:

- Parvoviruses
- Adenoviruses
- Herpesviruses
- Poxviruses
- Picornaviruses
- Papillomaviruses and polyomaviruses
- Hepatitis viruses
- Rotaviruses
- Caliciviruses
- Arthropod-borne and rodent-borne viruses
- Orthomyxoviruses
- Paramyxoviruses
- Rubella virus
- Coronaviruses
- Rabies virus
- Human retroviruses
- Lentiviruses
- Non-conventional non-viral pathogens (Prions)

## **Mycology**

At the end of the course, the students will be familiar with the following topics regarding medical mycology:

- Structure of fungal cell
- Yeasts and moulds
- Fungal genera and species present in the human microbiota
- Virulence and pathogenicity of fungi
- Immune control of fungal agents
- Causative fungal agents of superficial, cutaneous and subcutaneous mycoses
- Causative fungal agents of endemic mycoses
- Causative fungal agents of opportunistic mycoses
- Diagnostic laboratory techniques of fungal infections
- Antifungal agents: targets of available molecules and mechanisms of resistance

The students should also be familiar with the main features regarding the following fungal genera and species of medical interest:

- *Candida* spp
- *Candida albicans*
- *Candida glabrata*
- *Candida krusei*
- *Cryptococcus neoformans*
- *Aspergillus* spp
- *Aspergillus fumigatus*

- *Aspergillus terreus*

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- *Fusarium* spp

- Zygomycetes

- *Pneumocystis jiroveci*

- *Histoplasma capsulatum* and other dimorphic fungi

### **Parasitology**

By the end of the course, students should be familiar with the following protozoan and helminthic parasites of medical importance, with particular attention given to associated clinical syndromes and diagnostic laboratory techniques:

- *Giardia lamblia*

- *Cryptosporidium* spp and *Cyclospora* spp

- *Entamoeba histolytica*

- *Trichomonas vaginalis*

- *Trypanosoma* spp

- *Leishmania* spp

- Tissue amebae (i.e. *Acanthamoeba* spp)

- *Plasmodium* spp

- *Babesia microti*

- *Toxoplasma gondii*

- *Enterobius vermicularis*

- *Trichuris trichiura*

- *Ascaris lumbricoides*

- *Ancylostoma duodenale*

- *Strongyloides stercoralis*

- *Trichinella spiralis*

- *Taenia* spp

- *Diphyllobotrium latum*

- *Anisakis simplex*

- *Schistosoma* spp

- Filariae

- *Echinococcus granulosus*

### **Suggested textbooks**

1) Patrick R. Murray, Ken S. Rosenthal, Michael A. Pfaller – Medical Microbiology – 7th ed. Mosby Elsevier.

2) Jawetz, Melnick & Adelberg's Medical Microbiology – 26th ed. McGraw-Hill.

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# Clinical Laboratory Medicine

*Total Credits: 4*

*Total hours: 32*

*Scientific Discipline Sector: MED/05 - MED/07 – BIO/12*

**Course Coordinator:** Prof. Maurizio Ferrari      Email: [ferrari.maurizio@hrs.it](mailto:ferrari.maurizio@hrs.it)  
Prof. Ferruccio Ceriotti      Email: [ceriotti.ferruccio@hsr.it](mailto:ceriotti.ferruccio@hsr.it)

## **Course Description** **Clinical Biochemistry**

The purpose of the course is to give to students an overview on the most relevant aspects of clinical laboratory medicine. The course will describe the pathophysiological aspects that influence the results of clinical laboratory tests, the interpretation of tests results and will give some insights on the technologies used in clinical laboratory.

Part of the course will be dedicated to the pre-analytical phase to provide the necessary information on variables that could influence and exert a confounding effect on the analytical results.

The following topics will be covered:

- Pre-analytical phase: description of the laboratory process, sources of pre-analytical variability (patient preparation, specimen collection, processing, transportation and storage)
- Statistical methods in laboratory medicine. Internal Quality control, external quality assessment.
- Laboratory report, units of measurement, reference intervals, decision limits, reference change value
- Analytical Techniques: spectrophotometry, mass spectrometry, immunoassays
- Proteins analysis and interpretation
- Lipids and lipoproteins
- Blood gas and critical care testing,
- Water and electrolyte balance
- Calcium biology and disorders
- Carbohydrate disorders
- Uric acid and iron metabolism
- Methods for DNA amplification
- Methods to detect known mutations
- Methods to detect unknown mutations
- New advanced molecular technologies
- Clinical applications of molecular tests

## **Suggested textbooks**

- Contemporary Practice in Clinical Chemistry, 2nd edition. Edited by William Clarke. 2011. ISBN: 9871594251023
- Tietz textbook of Clinical Chemistry and molecular diagnostics, fifth edition, Burtis, Ashwood, Bruns, Elsevier Saunders, ISBN:9781416061649

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# Cardiovascular Diseases

Total Credits: 9

Total hours: 72

Scientific Discipline Sector: MED/11, MED/22, MED/23, MED/36, BIO/14

## Teaching staff

**Course Coordinator:** Prof. Paolo Camici  
Dr. Domenico Cianflone  
Prof. Flavia Valtorta

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## Teaching Assistant:

Dr. Azeem Latib  
Dr. Franco Cecchi  
Dr. Yamume Tshomba  
Dr. Francesco Maisano  
Dr. Roberto Spoladore  
Dr. Riccardo Cappato

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## Course Description

The course is organised in 7 modules:

### ***Cardiac physiology and principles of echocardiography and ECG***

This module will provide the basis of cardiac and coronary pathophysiology necessary for the understanding of cardiovascular syndromes. In addition, the module will cover the principles of echo- and electro-cardiography with practical examples.

### ***Ischaemic heart disease (IHD)***

The pathophysiology and clinical acute and chronic syndromes caused by coronary artery disease will be discussed. Furthermore, this module will provide knowledge relative to the main diagnostic techniques/criteria for establishing the diagnosis of IHD. Finally, both pharmacologic and interventional treatment strategies will be discussed.

### ***Myocardial Diseases***

In this module both primary/genetic and secondary forms of cardiomyopathy will be presented along with inflammatory disease of the heart, i.e. myocarditis and pericarditis. Diagnosis and treatment of these conditions will also be discussed.

### ***Arrhythmias***

The pathophysiology, diagnosis and treatment of rhythm and conduction disturbances will be presented including illustrative clinical cases.

### ***Valvular heart disease***

Congenital, degenerative and inflammatory diseases of the cardiac valves will be presented along with diagnostic and treatment strategies.

### **Heart Failure**

The pathophysiology and clinical features of heart failure of ischemic and non ischemic origin will be presented along with the relevant diagnostic techniques and treatment options.

### **Congenital heart disease, pulmonary embolism and disease of the large vessels**

This module will cover the above topics in conjunction with a special lecture on cardiology in the emergency department.

A questions and answers (Q&A) session will close the course.

Students are expected to demonstrate in depth knowledge of all the topics treated in the 7 modules.

Copies of lessons' slides in addition to reference papers will be made available on the University website.

The text suggested is "Harrison's-Principles of Internal Medicine" McGraw-Hill. We also advise reading the

textbook "Coronary microvascular dysfunction" Crea, Lanza, Camici eds.- published by Springer. Finally, we

strongly advise to download and consult the European Society of Cardiology ESC Clinical Practice

Guidelines available at [http://www.escardio.org/guidelines-surveys/esc-](http://www.escardio.org/guidelines-surveys/esc-guidelines/Pages/GuidelinesList.aspx)

[guidelines/Pages/GuidelinesList.aspx](http://www.escardio.org/guidelines-surveys/esc-guidelines/Pages/GuidelinesList.aspx)

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# Principles of Surgery

*Total Credits: 3*

*Total hours: 24*

*Scientific Discipline Sector: MED/18*

## **Teaching staff**

<b>Course Coordinator:</b> Prof. Riccardo Rosati	Email: <a href="mailto:rosati.riccardo@hsr.it">rosati.riccardo@hsr.it</a>
Dott. Luca Aldrighetti	Email: <a href="mailto:aldrighetti.luca@hsr.it">aldrighetti.luca@hsr.it</a>
Dott. Gianpaolo Balzano	Email: <a href="mailto:balzano.gianpaolo@hsr.it">balzano.gianpaolo@hsr.it</a>
Dott.ssa Paola De Nardi	Email: <a href="mailto:denardi.paola@hsr.it">denardi.paola@hsr.it</a>
Dott. Ugo Elmore	Email: <a href="mailto:elmore.ugo@hsr.it">elmore.ugo@hsr.it</a>
Prof. Falconi Massimo	Email: <a href="mailto:falconi.massimo@hsr.it">falconi.massimo@hsr.it</a>
Dott. Alberto Marassi	Email: <a href="mailto:marassi.alberto@hsr.it">marassi.alberto@hsr.it</a>
Dott. Carlo Socci	Email: <a href="mailto:socci.carlo@hsr.it">socci.carlo@hsr.it</a>
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Dott. Andrea Vignali	Email: <a href="mailto:vignali.andrea@hsr.it">vignali.andrea@hsr.it</a>

## **Course Description**

The aim of this course is to provide the essential theoretical knowledge to deal with the surgical patient. The student will focus on the epidemiological and physiopathological aspects of the main surgical diseases, on its diagnostic and treatment algorithms. In this course, the basic diseases concerning general surgery will be systematically introduced and discussed in a multidisciplinary setting, including medical, radiological and surgical technical features.

## **Course Program**

### **Perioperative management**

- Preoperative assessment, analysis of risk factors.
- Intraoperative factors influencing recovery.
- Postoperative care, enhanced recovery after surgery protocols.

### **Transplant Surgery**

- History and definitions
- Matching of donor and recipient, principles of immunosuppression.
- Organ preservation.
- Organ transplants (heart, liver, kidney, pancreas, intestine).
- Living donor.

### **Metabolic surgery**

- **Bariatric surgery:** indications, principles of surgical technique, metabolic results, prognosis.

### **Abdominal wall surgery**

- Abdominal wall hernias and incisional hernias.

### **Thyroid and Parathyroids**

- **Surgical anatomy of thyroid and parathyroid**
- **Thyroid nodule and multinodular goiter:** symptoms, differential diagnosis, treatment algorithm.

- **Thyroid tumors:** epidemiology, pathology classification, symptoms, diagnosis, surgical therapy and principles of technique, treatment algorithms, prognosis.
- **Parathyroid tumors:** epidemiology, pathology classification, symptoms, diagnosis, surgical therapy and principles of technique, treatment algorithms, prognosis.

## Breast

- **Surgical anatomy of the breast and axilla**
- **Benign breast disease:** epidemiology, pathology classification, symptoms, diagnosis, surgical therapy and principles of technique, treatment algorithms, prognosis.
- **Breast cancer:** epidemiology, pathology classification, symptoms, diagnosis, surgical therapy and principles of technique, treatment algorithms, prognosis.

## Esophagus

- **Gastro-esophageal reflux disease and hiatal hernia:** symptoms, diagnosis, surgical therapy and principles of technique, treatment algorithm.
- **Esophageal diverticula:** definitions, epidemiology, classification, physiopathology, symptoms, diagnosis, treatment algorithm.
- **Achalasia:** surgical therapy and principles of technique, endoscopic therapy.
- **Esophageal cancer:** epidemiology, pathology classification, symptoms, diagnosis, surgical therapy and principles of technique, endoscopic palliation, treatment algorithms, prognosis.

## Stomach

- **Surgical anatomy of the stomach**
- **Peptic ulcer:** symptoms, diagnosis, treatment algorithms.
- **Stomach cancer:** epidemiology, pathology classification, symptoms, diagnosis, surgical therapy and principles of technique, endoscopic palliation, treatment algorithms, prognosis.

## Small intestine

- **Surgical anatomy of the small intestine**
- **Small bowel obstruction:** causes, symptoms, diagnosis, surgical therapy and principles of technique.
- **Inflammatory bowel disease (IBD)**
  - Crohn's disease: symptoms, diagnosis, complications, surgical therapy, treatment algorithm, prognosis.
  - Ulcerative colitis: symptoms, diagnosis, complications, surgical therapy, treatment algorithm, prognosis.

## Colon and Rectum

- **Surgical anatomy of the colon and rectum**
- **Diverticular disease:** symptoms, diagnosis, complications, surgical therapy, treatment algorithm.
- **Colorectal cancer:** epidemiology, pathology classification, symptoms, diagnosis, surgical therapy and principles of technique, endoscopic therapy and palliation, treatment algorithms, prognosis.

## Anus

- Hemorrhoids.
- Fistula in ano.
- Anal fissure.
- Rectal prolapse.

## Spleen

- **Surgical anatomy of the spleen**

- **Spleen trauma:** epidemiology, symptoms, diagnosis, treatment algorithm, surgical therapy and principles of technique.
- **Spleen lesions:** epidemiology, pathology classification, symptoms, diagnosis, surgical therapy and principles of technique, treatment algorithms, prognosis.

### **Adrenal glands**

- **Surgical anatomy of the adrenal glands**
- **Adrenal gland disease:** epidemiology, pathology classification, pathophysiology, symptoms, diagnosis, surgical therapy and principles of technique, medical therapy, prognosis.

### **Biliary tract**

- **Surgical anatomy of the biliary tract**
- **Cholelithiasis and choledocholithiasis:** symptoms, diagnosis, complications surgical therapy and principles of technique, endoscopic and percutaneous approaches, treatment algorithms.
- **Biliary tract tumors:** epidemiology, pathology classification, symptoms, diagnosis, surgical therapy and principles of technique, endoscopic and percutaneous palliation, treatment algorithms, prognosis.

### **Liver**

- **Surgical anatomy of the liver**
- **Benign tumors of the liver:** epidemiology, pathology classification, predisposing factors, symptoms, diagnosis, surgical therapy and principles of technique, treatment algorithms, prognosis.
- **Primary malignant liver tumors:** epidemiology, pathology classification, predisposing factors, symptoms, diagnosis, medical therapy, percutaneous approaches, surgical therapy and principles of technique, treatment algorithms, prognosis.
- **Metastatic liver disease:** clinical scenarios, diagnosis, medical therapy, surgical therapy and principles of technique, treatment algorithms, prognosis.
- **Portal Hypertension:** definitions, classification, pathophysiology, symptoms, complications, diagnosis, medical therapy, endoscopic and percutaneous treatment, surgical therapy and principles of technique, treatment algorithms, prognosis.

### **Pancreas**

- **Surgical anatomy of the pancreas**
- **Acute pancreatitis:** definitions, epidemiology, symptoms, diagnosis, severity classification, complications, surgical therapy, treatment algorithm.
- **Exocrine and endocrine tumors of the pancreas:** epidemiology, pathology classification, symptoms, diagnosis, endoscopic and percutaneous palliation, surgical therapy and principles of technique, treatment algorithms, prognosis.

### **Surgical emergencies**

- **Gastrointestinal bleeding:** epidemiology, symptoms, diagnosis, endoscopic, percutaneous and surgical therapy, treatment algorithms.
- **Acute abdomen:** causes, symptoms, diagnosis, surgical therapy and principles of technique, treatment algorithm.
- **Appendicitis:** classification, symptoms, diagnosis, surgical therapy and principles of technique, treatment algorithm.

### **Suggested textbook:**

- 1) Sabiston Textbook of Surgery, 19th edition  
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# Digestive System Diseases

Total Credits: 8

Total hours: 64

Scientific Discipline Sector: MED/12 – MED/18 – MED/29 – MED/36 – BIO/14

## Teaching staff

**Course Coordinator:** Prof. Pier Alberto Testoni

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Receiving hour: by appointment ([candela.tiziana@hsr.it](mailto:candela.tiziana@hsr.it)) on Wednesday at 13:00 to 14:00.

Prof. Giulia M.Cavestro	Gastroenterology	Email: <a href="mailto:cavestro.giuliamartina@hsr.it">cavestro.giuliamartina@hsr.it</a>
Dr Mario Guslandi	Gastroenterology	Email: <a href="mailto:guslandi.mario@hsr.it">guslandi.mario@hsr.it</a>
Dr Paolo Giorgio Arcidiacono	Gastroenterology	Email: <a href="mailto:arcidiacono.paologioorgio@hsr.it">arcidiacono.paologioorgio@hsr.it</a>
Dr Paola De Nardi	Proctology	Email: <a href="mailto:denardi.paola@hsr.it">denardi.paola@hsr.it</a>
Prof. Francesco De Cobelli	Diagnostic Imaging	Email: <a href="mailto:decobelli.francesco@hsr.it">decobelli.francesco@hsr.it</a>
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Prof. Claudio Doglioni	Human Pathology	Email: <a href="mailto:doglioni.claudio@hsr.it">doglioni.claudio@hsr.it</a>
Prof. Marco Braga	Surgery	Email: <a href="mailto:braga.marco@hsr.it">braga.marco@hsr.it</a>
Prof. Gianfranco Ferla	Surgery	Email: <a href="mailto:ferla.gianfranco@hsr.it">ferla.gianfranco@hsr.it</a>
Prof. Riccardo Rosati	Surgery	Email: <a href="mailto:rosati.riccardo@hsr.it">rosati.riccardo@hsr.it</a>
Dr Giuseppe Cardaropoli	Odontology	Email: <a href="mailto:giuseppe.cardaropoli@mac.com">giuseppe.cardaropoli@mac.com</a>
Dr Paolo Cappare	Maxillofacial surgery	Email: <a href="mailto:paolocappare@gmail.com">paolocappare@gmail.com</a>

## Teaching Assistant: (Gastroenterology Unit)

Dr Alberto Mariani

Dr Edi Viale

Dr Lorella Fanti

Dr Maria Chiara Petrone

## Course Description

The course has been designed as a multidisciplinary teaching module and aims to give to students a thorough grounding in the comprehension of diseases of the entire digestive system, including mouth, gastrointestinal tract, liver, biliary system, and pancreas.

The integrated course has the purpose to provide to students a general practitioner level knowledge in gastrointestinal, pancreas, and liver diseases.

This will be achieved by including in the course, beside gastroenterology, some notions of odontology and maxillofacial surgery, pharmacology, radiology, human pathology, surgery, and laboratory testing in an integrated fashion.

As regards surgery, the digestive system diseases course will run head-to-head with the course of general surgery, that will include a number of topics specifically addressed to gastroenterological surgical problems, complementary to the gastroenterology.

As regards the specific gastroenterology program, students will be introduced to basic physiology of the systems and organs, and physiopathology, clinical presentation, natural history, diagnostic work-up, and basic therapeutic notions of the diseases.

Within the course four clinical case presentation sessions will be included, allowing an interactive discussion between teachers and students in a practical approach to outpatients.

At the end of the course, the students should be familiar with the following topics:

**Esophagus:**

- normal motility and primary motility disorders
- gastroesophageal reflux disease (typical and atypical symptoms)
- complications of gastroesophageal reflux disease, with particular focus on Barrett's esophagus
- esophageal cancer
- surgical approach to functional disorders and cancer

**Stomach and duodenum:**

- gastric secretion, motility, gastric barrier
- functional dyspepsia
- chronic gastritis, with particular focus on Helicobacter pylori infection
- peptic ulcer disease
- precancerous condition and cancer
- oncological management and surgery

**Small bowel:**

- digestion, absorption and motility
- celiac disease and other enteropathies, including food intolerance and hypersensitivity
- motility disorders, including obstruction
- definition and classification of diarrhea

**Colon and rectum:**

- chronic inflammatory bowel diseases and their complications
- diverticular disease and its complications
- irritable bowel syndrome
- precancerous conditions and cancer
- oncological management and surgery
- diseases of anus and functional disorders of pelvic floor

**Liver and biliary tract:**

- metabolism and laboratory testing
- bile secretion, cholestasis and jaundice
- chronic cholestatic diseases
- bile stone disease and its complications
- Vater's papilla organic and functional diseases
- non alcoholic fatty liver disease
- chronic hepatitis, with particular focus on virus-related infections
- hepatic cirrhosis and hemochromatosis
- portal hypertension and its complications
- tumors of liver and biliary system

**Pancreas:**

- exocrine and endocrine secretion
- acute pancreatitis
- local and systemic complications of acute pancreatitis
- chronic pancreatitis and its complications
- cystic lesions and neuroendocrine tumors
- cancer

**Gastrointestinal bleeding****Suggested textbooks**

- 1) Harrison's Principles of Internal Medicine – 18<sup>th</sup> edition  
McGraw-Hill
- 2) Sleisenger and Fordtran's Gastrointestinal & Liver Disease – 8<sup>th</sup> edition  
Saunders
- 3) Yamada T. Textbook of Gastroenterology – 4<sup>th</sup> edition  
Lippincott Williams & Wilkins

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# Respiratory, Ear, Nose and Throat Diseases

Total Credits: 7

Lessons: 28 (2 hours every lesson)

SSD: MED/10, MED/36, MED/31, MED/21

**Course Coordinator:** Piero Zannini

Email: [piero.zannini@hsr.it](mailto:piero.zannini@hsr.it)

## TEACHERS

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## TUTORS

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## COURSE INTRODUCTION

“Respiratory, Ear, Nose and Throat Diseases” is a course that provides information on the morphology, physiology, pathophysiology, clinical aspects, diagnosis and principles of treatment of the diseases of the upper aerodigestive tract, and of the respiratory and auditive system.

During the course the morphology and physiology of the upper aerodigestive tract and of the respiratory and auditive system will be reviewed in order to introduce the students to the pathophysiology and pathogenesis of potential diseases. Clinical aspects, semeiotics and diagnostic procedures will be explored in depth and the principles of management will be presented. Students will have the opportunity to attend clinical Departments in order to gain practical experience of the diagnostic features and clinical evolution of the diseases.

## SPECIFIC GOALS AND OBJECTIVES

The goals of the M.D. Course in Respiratory, Ear, Nose and Throat Diseases are to enable the students:

- 1) to deepen their knowledge of the macroscopic and microscopic morphology of the upper and lower respiratory system and of the ear, nose and throat.
- 2) to deepen their knowledge of the physiology of the upper and lower respiratory system and of the ear, nose and throat.
- 3) to learn about the pathophysiology of the diseases of the upper and lower respiratory system and of the ear, nose and throat.
- 4) to learn the techniques of collecting patients' medical history and of carrying out a physical examination of the upper and lower respiratory system and of the ear, nose and throat.
- 5) to gain knowledge of the most frequent diseases of the upper aerodigestive tract, the lower respiratory system, the ear, nose and throat including aetiology, pathogenesis, pathophysiology and relevant medical treatment.

## DETAILED PROGRAM SECTIONS

## **Respiratory Medicine**

**Teacher: Prof. George Cremona**

Respiratory Medicine is one of the systems-based courses covering all of the systems of the body. This course covers basic physiological, pharmacological and pathophysiological aspects of diseases of the respiratory system. Faculty from the Units of Respiratory Medicine, Pharmacology, Radiology and Surgery teach in the course. By the end of the course students will be able to describe the pathology and pathophysiology of infectious inflammatory and immunologic, metabolic and systemic disorders, trauma, and neoplasms affecting the respiratory system. Students will be able to recognize the differences between the normal and disease states, select diagnostic tests, and understand the pharmacological and non-pharmacological therapies. The course uses lectures to present material, case-based tutorials to reinforce key concepts, and a simulation exercise to link basic science material to clinical medicine. Assessment will consist of written multiple choice test and oral examination at the end of the course.

## **Radiology**

**Teacher: Antonio Esposito**

1. Introduction to imaging of the upper and lower respiratory system:  
the first and second level techniques for the assessment of respiratory system will be presented remarking the principles at the basis of image formation and the main indication for each technique.
2. Imaging in the inflammatory disease of the respiratory system:  
the role of imaging in the diagnosis, clinical assessment and management of inflammatory disease will be discussed differentiating upper airways from lungs and pleura
3. Imaging of interstitial lung diseases/pulmonary fibrosis/Chronic Obstructive Pulmonary Disease:  
the role of HRCT (high resolution computed tomography) in the assessment of diffuse lung diseases will be explain showing the most common patterns of disease
4. Imaging of throat tumours:  
role of imaging techniques in the diagnosis and staging of pharynx and larynx tumors will be presented
5. Imaging of lung cancer:  
detection of lung cancer; differential diagnosis; screening programs; lung cancer staging
6. Imaging of pleural tumours:  
detection; differential diagnosis; staging
7. Imaging of pulmonary thromboembolism  
Imaging techniques involved and main signs of PE
8. Imaging of thoracic trauma  
Role of imaging in the assessment of blunt chest trauma or penetrating thoracic lesions in emergency

## **Otorhinolaryngology**

**Teacher: Prof. Mario Bussi**

**Tutor: Matteo Trimarchi**

1. Anatomy and physiology of the upper aerodigestive tract: nose and paranasal sinuses, oral cavity, pharynx, larynx, salivary glands, external and middle ear.
2. Pathophysiology of the nose and paranasal sinuses: classification, symptomatology, diagnosis and treatment of the sinonasal diseases (acute and chronic flogoses, benign and malignant neoplasms, traumas, epistaxis).
3. Pharynx pathophysiology: acute and chronic flogoses, tonsillitis, pharynx tumors (symptomatology, diagnoses, treatment).
4. Salivary glands pathophysiology: acute and chronic flogoses, syaloadenoses and tumors.
5. Pathophysiology of the larynx: acute and chronic laryngitis, benign lesions, benign and malignant neoplasms (symptomatology, diagnoses, treatment).
6. Main aspects and clinical features of neck pathologies.

7.Pathology of the external and middle ear: symptoms, diagnosis and treatment of otitis, otosclerosis, congenital malformations.

### **Thoracic Surgery**

**Teachers: Prof. Piero Zannini, Prof. Giampiero Negri, Dr Giulio Melloni, Dr Angelo Carretta, Dr Paola Ciriaco**

**Tutors: Armando Puglisi, Alessandro Bandiera**

1. Pleura. Spontaneous pneumothorax and pleural effusion

Pleural effusion: definition, incidence, classification, pathogenesis, pathophysiology, symptoms and signs, treatment. Pleural mesothelioma: epidemiology, pathology, diagnosis and management.

Pleural Empyema: definition, incidence, classification, pathogenesis, pathophysiology, symptoms and signs, treatment.

Spontaneous pneumothorax: definition, incidence, classification, pathogenesis, pathophysiology, symptoms and signs, treatment.

2. Lung cancer.

Epidemiology, risk factors, pathology, diagnosis and staging, symptoms and signs, surgical principles and management.

3. Trachea.

Endoscopic and surgical treatment of benign and malignant diseases.

Post-intubation stenosis, idiopathic stenosis, primary and metastatic tumours, trauma: symptoms and signs, diagnosis, surgical principles and management. Tracheoesophageal fistula: definition, pathogenesis, diagnosis, surgical principles and management.

4. Trauma

Trauma to the chest wall and to the lung: incidence, diagnosis, symptoms and signs, management.

### **PRACTICAL SESSIONS AND LABS**

**I. Activities in Thoracic Endoscopy Service: diagnostic and operative fiberoptic endoscopy**

**II. Activities in Thoracic Surgery Department: chest drainage (indications to, positioning and management)**

**III. Activities in ENT department: pre-operative and post-operative patient's management**

**IV. Activities in ENT practice: vestibular and audiologic evaluation, diagnostic endoscopy, oncologic follow-up,**

**V. Activities in ENT operating theatre**

### **FORMATIVE ASSESSMENT AND EXAMS**

Multiple choice questions and clinical cases discussion.

### **SUGGESTED BOOKS AND READINGS**

**Sabiston** Textbook of Surgery Saunders Company

**Pearson's** Thoracic and Esophageal Surgery Churchill Livingstone Elsevier 2008

**Grillo** Surgery of the trachea and bronchi BC Decker

**Gibbons's** Surgery of the Chest, Saunders Company

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Medical Semiotics Internal Medicine I – 3 Credits  
Internal Medicine and Surgery I - 5 credits  
SSD: MED/09, MED/18

**Course coordinator:** Prof. Lorenzo DAGNA, MD, FACP  
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*"The true mystery of the world is the visible, not the invisible." (Oscar Wilde, 1854-1900)*

*"He who studies medicine without books sails an uncharted sea, but he who studies medicine without patients does not go to sea at all." (William Osler, 1849-1919)*

## Aims

The practice of modern medicine is a balanced combination of science and art. The role of science in medicine is clear: science-based technology and deductive reasoning are the basis for the solution of most clinical problems. The scientific advances in the basic sciences, genetics, biochemistry, imaging, laboratory medicine and therapeutics provide the physician of the third millennium with unprecedented tools. In addition to sound scientific basis, however, there is a medical art which is a combination of medical knowledge, intuition, observation and critical judgment which is equally needed by the doctor to practice of medicine.

The most striking example of these nearly artistic skills that the doctor should have is medical semiotics, the ability of understanding and describing physical signs and symptoms. With careful observation, with appropriate and timely questions, with simple gestures, the expert physician can reach incredibly precise deductions about the disease of a patient. For centuries, doctors diagnosed diseases using only their senses, observing, palpating, percussing, listening. Modern technology has undoubtedly radically changed all this. However it is not at all unusual that complex and expensive tests or imaging studies are performed to get the same information that a well performed thorough physical examination and a proper and well conducted history taking could provide.

The course of General Semiotics aims to provide students with the theoretical and practical bases necessary to effectively collect a thorough history and perform a complete physical examination. At the end of the course there will be a short rotation in the medical wards of the hospital to put into practice what students have learned during the course. The results reached during these activities will be strengthened in the following semesters, thanks to more and more prolonged periods of rotation in clinical departments, and as a result of systematic study of different medical subspecialties/blocks.

## Objectives

This practical/theoretical course is designed first to provide the student with the correct medical terms and the general signs and symptoms of disease. Then we will analyze the most typical signs and symptoms of the different organs and systems.

At the end of the course the student will be able to take a thorough history and perform a physical examination and to detect the most frequent pathological findings.

### **Interactive teaching activities**

Since this course will be the first direct contact of the students with sick patients admitted to an hospital wards, the course will begin with a seminar to explain all the procedures that are needed in order to preserve their own health and patients' safety.

Then interactive lectures will be held in which, starting from the physiology and pathophysiology of each organ/system, the normal and more common abnormal findings will be analyzed and discussed, in order to provide students with all the skills needed to perform a complete physical examination. Time will be spent to discuss specific techniques commonly used to collect a complete and thorough medical history.

During classes a lot of time will be given for interaction and discussion. The last class of the theoretical part of the course will be devoted entirely to review what was discussed in class and clarify any doubts of the students.

In the practical part of the course (last 2 weeks), students will be attending the general medical wards of our hospital in wards, dealing with real patients, collecting their histories and practicing in physical examination under the supervision of the clinic's doctors. REMEMBER THAT, DUE TO PATIENT ETHNICITY, INTERACTION WITH PATIENTS WILL BE IN ITALIAN.

### **Teaching materials**

Suggestions on possible textbooks will be provided at the first lesson of the course. Slides used in classes will be uploaded in the course on-line folder after each class.

### **Final assessment/exam**

Student **MUST ATTEND** the **INTRODUCTORY SEMINAR** and **ALL THE PRACTICALS**. Attendance to lectures will be checked and recorded electronically (badge scanning) and/or with roll calls. At the end of the course there will a written test (20 short open questions). Passing the written test will be necessary in order to sit for the subsequent practical test. The practical test will be done in the clinic, at the bedside of a real patient, checking for the ability to interact with patients, to collect history and to perform a complete physical examination. The combined evaluation of these tests will result in passing/failing the course.

## Course program

### **General principles of the history taking and physical examination**

#### **History taking**

- Reason for assessment
- Past medical history
- History of present complaint
- Family history
- Physiological
- Work history
- History taking in special situations

#### **Evaluation of the general parameters and vital signs**

#### **Assessment of the behavior and mental status**

#### **Physical examination of skin, hair and nails**

- Physical examination of the head and neck (eyes, eyelids, visual acuity, ears, the auditory acuity, Weber and Rinne tests, sinuses, mouth, lips, oral mucosa, tongue, pharynx, neck, thyroid)
- Chest examination (inspection, palpation, percussion, auscultation)

#### **Physical examination of the cardiovascular system (inspection, palpation, auscultation)**

#### **Physical examination of the breast and axillae**

#### **Physical examination of the abdomen (inspection, palpation, percussion, auscultation, Giordano's, Blumberg's, Murphy's, McBurney's, Rovsing's signs)**

**Physical examination of the vascular peripheral** (pulse features, Raynaud's phenomenon, Allen test, deep vein thrombosis and Homans' and Bauer's signs, signs of venous insufficiency, Trendelenburg's and Perthes' tests)

#### **Physical examination of the lymphatic system and lymphnodes**

#### **Physical examination of the male genitalia and evaluation of hernias**

#### **Physical examination of the female genital**

#### **Physical examination of the perineum, rectum and prostate**

#### **Physical examination of the musculoskeletal system**

**Brief neurological physical examination** (mental status, cranial nerves, muscle tone and strength, coordination tests, Romberg's test, examination of sensory system, skin and deep tendon reflexes, Lasegue's, Babinski's, Kernig's, Brudzinski's signs)

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## TIMETABLE

Please note that changes may always occur in the daily lesson schedule.  
Please refer to the on line timetable for the latest version.

International MD Program A.Y. 2014/2015					
TIME	MONDAY 29/09/2014	TUESDAY 30/09/2014	WEDNESDAY 01/10/2014	THURSDAY 02/10/2014	FRIDAY 03/10/2014
09-11			Clinical Lab. Medicine 1 FC	Clinical Lab. Medicine 2 FC	
11-13			Microbiology 1 NM	B. Pathology & Immunology (GP)	B. Pathology & Immunology (GP)
14-16				Microbiology 2 NM	
16-18					
TIME	MONDAY 6-Oct-14	TUESDAY 7-Oct-14	WEDNESDAY 8-Oct-14	THURSDAY 9-Oct-14	FRIDAY 10-Oct-14
09-11			Clinical Lab. Medicine 1 MF		Clinical Lab. Medicine 3 FC
11-13		B. Pathology & Immunology(MI-1)	B. Pathology & Immunology(MI-2)		B. Pathology & Immunology (GP)
14-16		Microbiology 3 NM			Microbiology 4 NM
16-18					
TIME	MONDAY 13-Oct-14	TUESDAY 14-Oct-14	WEDNESDAY 15-Oct-14	THURSDAY 16-Oct-14	FRIDAY 17-Oct-14
09-11	Security Course	Security Course		Clinical Lab. Medicine 2 MF	Clinical Lab. Medicine 4 FC
11-13			B. Pathology & Immunology (GP)	B. Pathology & Immunology (GP)	B. Pathology & Immunology (GP)
14-16				Microbiology 5 NM	Microbiology 1 NC
16-18					
TIME	MONDAY 20-Oct-14	TUESDAY 21-Oct-14	WEDNESDAY 22-Oct-14	THURSDAY 23-Oct-14	FRIDAY 24-Oct-14
09-11		Clinical Lab. Medicine 3 MF	Clinical Lab. Medicine 5 FC	Microbiology 2 MP	
11-13	B. Pathology & Immunology AB1	B. Pathology & Immunology (GP)	B. Pathology & Immunology (MP1)	B. Pathology & Immunology (GP)	B. Pathology & Immunology (GP)
14-16	Microbiology 6 NM		Microbiology 1 MP		
16-18					
TIME	MONDAY 27-Oct-14	TUESDAY 28-Oct-14	WEDNESDAY 29-Oct-14	THURSDAY 30-Oct-14	FRIDAY 31-Oct-14
09-11	Clinical Lab. Medicine 4 MF		Clinical Lab. Medicine 5 MF	Microbiology 4 MP	
11-13	B. Pathology & Immunology (GP)	B. Pathology & Immunology(AM-1)	B. Pathology & Immunology(AM-2)	B. Pathology & Immunology(MI-3)	B. Pathology & Immunology(MI-4)
14-16	Microbiology 7 NM		Microbiology 3 MP		
16-18					
TIME	MONDAY 3-Nov-14	TUESDAY 4-Nov-14	WEDNESDAY 5-Nov-14	THURSDAY 6-Nov-14	FRIDAY 7-Nov-14
09-11			Clinical Lab. Medicine 6 FC	Microbiology 6 MP	
11-13		B. Pathology & Immunology(AM-3)	B. Pathology & Immunology(AM-4)	B. Pathology & Immunology(AB-2)	B. Pathology & Immunology (MP2)
14-16	Microbiology 8 NM	Microbiology 2NC	Microbiology 5 MP		Microbiology 3 NC
16-18					
TIME	MONDAY 10-Nov-14	TUESDAY 11-Nov-14	WEDNESDAY 12-Nov-14	THURSDAY 13-Nov-14	FRIDAY 14-Nov-14
09-11	BPI- MODULE 1A	BPI- MODULE 1B		Microbiology 8 MP	
11-13	B. Pathology & Immunology (RP)	B. Pathology & Immunology (RP)	Clinical Lab. Medicine 7 FC	B. Pathology & Immunology (RP)	B. Pathology & Immunology (RP)
14-16	Microbiology 9 NM		Microbiology 7 MP	Microbiology 4 NC	
16-18					
TIME	MONDAY 17-Nov-14	TUESDAY 18-Nov-14	WEDNESDAY 19-Nov-14	THURSDAY 20-Nov-14	FRIDAY 21-Nov-14
09-11	BPI- MODULE 2A	BPI- MODULE 2B	Clinical Lab. Medicine8FC	BPI- MODULE 3A	BPI- MODULE 3B
11-13	B. Pathology & Immunology (RP)	B. Pathology & Immunology (RP)	B. Pathology & Immunology (MP-3)	B. Pathology & Immunology (RP)	B. Pathology & Immunology (RP)
14-16	Microbiology 10 NM		Microbiology 9 MP		
16-18					

TIME	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
	24-Nov-14	25-Nov-14	26-Nov-14	27-Nov-14	28-Nov-14
09-11	BPI- MODULE 4A	BPI- MODULE 4A - 4B	Clinical Lab. Medicine 9 FC	BPI- MODULE 5A	
11-13	B. Pathology & Immunology (MP-4)		Microbiology 12 NM	BPI- MODULE 5B	
14-16	Microbiology 11 NM				
16-18					
TIME	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
	1-Dec-14	2-Dec-14	3-Dec-14	4-Dec-14	5-Dec-14
09-11		BPI- MODULE 6B	Clinical Lab. Medicine 10 MF		
11-13	BPI- MODULE 6A	BPI- MODULE 7A	BPI- MODULE 7B		
14-16	Microbiology 13 NM	Microbiology 14 NM	Microbiology 15 NM		
16-18					
TIME	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
	8-Dec-14	9-Dec-14	10-Dec-14	11-Dec-14	12-Dec-14
09-11	Holiday	BPI- MODULE 8A	Clinical Lab. Medicine 10 FC		BPI- MODULE 10A
11-13		BPI- MODULE 8B	BPI- MODULE 9A	BPI- MODULE 9B	BPI- MODULE 10B
14-16					
16-18					
TIME	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
	15-Dec-14	16-Dec-14	17-Dec-14	18-Dec-14	19-Dec-14
09-11	Study leave				
11-13					
TIME	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
	22-Dec-14	23-Dec-14	24-Dec-14	25-Dec-14	26-Dec-14
09-11	Holiday	Holiday	Holiday	Holiday	Holiday
11-13					

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## **SAN RAFFAELE INTERNATIONAL MD PROGRAM**

### **YEAR 4**

#### **Academic Year 2014/2015**

- **Endocrine and Metabolic Diseases**
- **Nephrology and Urology**
- **Oncology**
- **Haematology**
- **Musculoskeletal Diseases**
- **Neurological Sciences**
- **Psychiatry and Clinical Psychology**
- **Ophthalmology**
- **Infectious Diseases**
- **Clinical Rotations: Internal Medicine & Surgery II**

# Academic Calendar and Blocks Timetable

Allegato 1 Academic Calendar IMDP 2014-2015



SAN RAFFAELE INTERNATIONAL MD PROGRAM 4th Year

oct-2014		nov-14		dec-2014		jan-2015		feb-15		mar-15		apr-15		may-2015		jun-2015		jul-2015		aug-2015		sep-2015	
1	Hema/Onco	1	Endo + Ophit.	1	Holidays	1	Neur. Sciences	1	Neur. Sciences	1	Neur. Sciences	1	Neur. Sciences	1	BANK HOLIDAY	1	Infec. Dis+ Rot.	1	EXAMS				
2	Hema/Onco	2	Endo + Ophit.	2	Holidays	2	Neph-Uro+ Musc.	2	Neph-Uro+ Musc.	2	Neur. Sciences	2	Easter	2	Psych.	2	Infec. Dis+ Rot.	2	EXAMS				
3	Hema/Onco	3	study/leave	3	Endo + Ophit.	3	Neph-Uro+ Musc.	3	Neph-Uro+ Musc.	3	Neur. Sciences	3	Easter	3	Tailored Activities	3	Infec. Dis+ Rot.	3	EXAMS				
4		4	study/leave	4	Endo + Ophit.	4	Neph-Uro	4	Neph-Uro	4	Neur. Sciences	4	Easter	4	Tailored Activities	4	Psych.	4	EXAMS				
5		5	study/leave	5	Endo + Ophit.	5	Neph-Uro	5	Neph-Uro	5	Neur. Sciences	5	Easter	5	Tailored Activities	5	Psych.	5	EXAMS				
6	Hema Onco + Rot.	6	study/leave	6	EPHANY	6	Neph-Uro	6	Neph-Uro	6	Neur. Sciences	6	Easter	6	Tailored Activities	6	Infec. Dis+ Rot.	6	EXAMS				
7	Hema Onco + Rot.	7	study/leave	7	S-AMEROGIO	7	study/leave	7	study/leave	7	Neur. Sciences	7	Easter	7	Tailored Activities	7	Infec. Dis+ Rot.	7	EXAMS				
8	Hema Onco + Rot.	8	study/leave	8	JMIMACOLATA	8	study/leave	8	study/leave	8	Neur. Sciences	8	Neur. Sciences	8	Tailored Activities	8	Infec. Dis+ Rot.	8	EXAMS				
9	Hema Onco + Rot.	9	exams	9	Endo + Ophit.	9	study/leave	9	Neph-Uro	9	Neur. Sciences	9	Neur. Sciences	9	study/leave	9	Infec. Dis+ Rot.	9	EXAMS				
10	Hema Onco + Rot.	10	exams	10	Endo + Ophit.	10	study/leave	10	Neph-Uro	10	Neur. Sciences	10	Neur. Sciences	10	study/leave	10	Infec. Dis+ Rot.	10	EXAMS				
11		11	exams	11	Endo + Ophit.	11	exams	11	Neph-Uro	11	Neur. Sciences	11	Neur. Sciences	11	study/leave	11	Infec. Dis+ Rot.	11	EXAMS				
12		12	exams	12	Endo + Ophit.	12	exams	12	study/leave	12	Neur. Sciences	12	Neur. Sciences	12	study/leave	12	Infec. Dis+ Rot.	12	EXAMS				
13	Hema Onco + Rot.	13	exams	13	Endo + Ophit.	13	exams	13	study/leave	13	Neur. Sciences	13	Neur. Sciences	13	study/leave	13	study/leave	13	EXAMS				
14	Hema Onco + Rot.	14	exams	14	Endo + Ophit.	14	exams	14	study/leave	14	Neur. Sciences	14	Neur. Sciences	14	study/leave	14	study/leave	14	EXAMS				
15	Hema Onco + Rot.	15	exams	15	Endo + Ophit.	15	exams	15	study/leave	15	Neur. Sciences	15	Neur. Sciences	15	study/leave	15	study/leave	15	EXAMS				
16	Hema Onco + Rot.	16	exams	16	Endo + Ophit.	16	exams	16	study/leave	16	Neur. Sciences	16	Neur. Sciences	16	study/leave	16	study/leave	16	EXAMS				
17	Hema Onco + Rot.	17	exams	17	Endo + Ophit.	17	exams	17	study/leave	17	Neur. Sciences	17	Neur. Sciences	17	exam	17	study/leave	17	EXAMS				
18		18	exams	18	Endo + Ophit.	18	exams	18	study/leave	18	Neur. Sciences	18	Neur. Sciences	18	exam	18	study/leave	18	EXAMS				
19		19	exams	19	Endo + Ophit.	19	exams	19	study/leave	19	Neur. Sciences	19	Neur. Sciences	19	exam	19	study/leave	19	EXAMS				
20	Hema Onco + Rot.	20	Endo + Ophit.	20	Endo + Ophit.	20	exams	20	study/leave	20	Neur. Sciences	20	Tailored Activities	20	exam	20	EXAMS	20	EXAMS				
21	Hema Onco + Rot.	21	Endo + Ophit.	21	Holidays	21	exams	21	study/leave	21	Neur. Sciences	21	Tailored Activities	21	exam	21	EXAMS	21	EXAMS				
22	Hema Onco + Rot.	22	Endo + Ophit.	22	Holidays	22	exams	22	study/leave	22	Neur. Sciences	22	Tailored Activities	22	exam	22	EXAMS	22	EXAMS				
23	Hema Onco + Rot.	23	exams	23	Holidays	23	exams	23	study/leave	23	Neur. Sciences	23	Tailored Activities	23	exam	23	EXAMS	23	EXAMS				
24	Hema Onco + Rot.	24	Endo + Ophit.	24	Holidays	24	exams	24	study/leave	24	Neur. Sciences	24	Tailored Activities	24	exam	24	EXAMS	24	EXAMS				
25		25	Endo + Ophit.	25	CHRISTMAS	25	exams	25	study/leave	25	Neur. Sciences	25	Tailored Activities	25	exam	25	EXAMS	25	EXAMS				
26		26	Endo + Ophit.	26	CHRISTMAS	26	exams	26	study/leave	26	Neur. Sciences	26	Tailored Activities	26	exam	26	EXAMS	26	EXAMS				
27	Hema Onco + Rot.	27	Endo + Ophit.	27	BOXING DAY	27	exams	27	study/leave	27	Neur. Sciences	27	Tailored Activities	27	exam	27	EXAMS	27	EXAMS				
28	Hema Onco + Rot.	28	Endo + Ophit.	28	Holidays	28	exams	28	study/leave	28	Neur. Sciences	28	Tailored Activities	28	exam	28	EXAMS	28	EXAMS				
29	Hema Onco + Rot.	29	Endo + Ophit.	29	Holidays	29	exams	29	study/leave	29	Neur. Sciences	29	Tailored Activities	29	exam	29	EXAMS	29	EXAMS				
30	Hema Onco + Rot.	30	Holidays	30	Holidays	30	exams	30	study/leave	30	Neur. Sciences	30	Tailored Activities	30	exam	30	EXAMS	30	EXAMS				
31	Hema Onco + Rot.	31	Holidays	31	Holidays	31	exams	31	study/leave	31	Neur. Sciences	31	Tailored Activities	31	exam	31	EXAMS	31	EXAMS				

Extra exam sessions can be scheduled, according to the request of the students and to the Professors' availability, any working day of the academic year.

## Endocrine and Metabolic Diseases

Total Credits: 6

Total hours: 48

Scientific Discipline Sector: SSD Med/13, Bio/14

### Teaching staff

**Course Coordinator:** Emanuele Bosi

Dozio Nicoletta

Federico Furlan

Rossini Alessandro

Scavini Marina

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### Goals

The overall objective of this course is to provide the student with the theoretical and practical skills for selecting the appropriate diagnostic procedures and implementing recommended treatment for endocrine and metabolic diseases. The specific aims of this course are those included in the Unità Didattiche Elementari (UDE) of the Endocrine and Metabolism chapter within the Core Curriculum of the Magistral Doctorate in Medicine (Medicina e Chirurgia 18: 629-693, 2002 UDE 936-965; <http://www.gruppoeidos.it/unimed/>). Thematic content (knowing, knowing to do, knowing to be), level of knowledge (theoretical and mnemonic, general and in depth), expertise (mnemonic, interpretational, decisional) and skills (manual, practical, professional, decision making and problem solving) will be treated and pursued as indicated in this document (see also Course Description).

### Evaluation

Written exam based on multiple choice questions, with the students' choice of an additional oral exam.

### Course Description

The different topics are treated in a systematic way, i.e., by individual endocrine gland or group of endocrine tissues, using an integrated approach encompassing morphology, pathophysiology, clinical medicine, pharmacology and therapy. Specific focus is devoted to the molecular bases of hormone action and pathogenetic mechanisms, prerequisites to a in-depth understanding of the clinical aspects of endocrine and metabolic diseases and appropriate diagnostic and therapeutic procedures. The course also aims at introducing the theme of Endocrinology and Metabolic Diseases as a discipline of Internal Medicine, with emphasis on the general underlying clinical context with the multiple pathophysiological endocrine and non-endocrine interactions typical of these diseases. The course aims at providing the understanding of the general management of the most prevalent endocrine problems that impact on any discipline of medicine.

The course includes frontal lectures on: hypothalamus and pituitary (synthesis, secretion and mechanism of action of hypothalamic and pituitary hormones, panhypopituitarism, hyperprolactinemia, acromegaly, diabetes insipidus); thyroid (secretion and mechanism of action of thyroid hormones, hypo and hyperthyroidism, thyroiditis, thyroid nodules and malignancies, ultrasound diagnostics); parathyroids (calcium homeostasis, hypo and hyperparathyroidism, osteoporosis); glucose metabolism and diabetes mellitus (insulin secretion and mechanism of action, classification, epidemiology, type 1 diabetes, type 2 diabetes, acute and chronic diabetic complications, hypoglycemia); obesity and metabolic syndrome; dyslipidemia; adrenal (secretion and mechanism of action of steroid hormones and catecholamines; hypo and hypercortisolism, hypo and hyperaldosteronism, pheochromocytoma); gonads (male and female hypogonadism, hyperandrogenism, adrenogenital syndromes).

Seminars with a practical approach will be delivered on therapy adjustments, insulin administration principles, self blood glucose monitoring and principles of nutrition.

Attendance to diabetes clinics, endocrinology clinics, thyroid US scan, Day Hospital, ophthalmology clinics and research facilities are integral part of the learning module. Moreover, there is the opportunity for students to attend the inpatient wards and the laboratories of the Diabetes Research Institute. The participation to daily clinical rounds and periodic research seminars is also welcome.

### Textbook

Harrison's Principles of Internal Medicine, part on Endocrinology and Metabolism. McGraw-Hill

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## Nephrology and Urology

Total Credits: 7

Total hours: 56

Scientific Discipline Sector: Med/14, Med/24, Bio/14

### Teaching staff

**Course Coordinators:** Francesco Montorsi      Email: [montorsi.francesco@hsr.it](mailto:montorsi.francesco@hsr.it)

Paolo Manunta      Email: [manunta.paolo@hsr.it](mailto:manunta.paolo@hsr.it)

Receiving Hour to be fixed via email writing to [scotti.cinzia@hsr.it](mailto:scotti.cinzia@hsr.it)

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Maria Teresa Sciarrone Alibrandi      Email: [sciarronealibrandi.mariateresa@hsr.it](mailto:sciarronealibrandi.mariateresa@hsr.it)

Daniele Zacchetti      Email: [zacchetti.daniele@hsr.it](mailto:zacchetti.daniele@hsr.it)

### Course Description

#### UROLOGY

The course is dedicated to the urological topics of greatest epidemiological and clinical-surgery impact.

In this context, IMDP students will have the opportunity of attending the clinical and surgical activities throughout the morning timetable. Therefore, students will take part to the daily operating theatre activities looking at open, endoscopic and robotically assisted procedures for benign and oncologic urological disorders. Likewise, students will closely follow the outpatient clinical activities (i.e. ultrasounds assessments, cystoscopy, multichannel urodynamic evaluation, etc) and the inpatient unit activities during the preop- and the postoperative periods. Similarly, students will have the opportunity to closely follow the on duty/on call urologist during the daily activities.

Moreover, during the afternoon timetable on a daily basis IMDP students will attend a formal lesson dedicated to the major functional and uro-oncological themes, thus including

1. Benign Prostate Hyperplasia/Lower Urinary Tract Symptoms
2. Prostatitis and urinary tract infections
3. Prostate cancer
4. Kidney cancer
5. Bladder and upper urinary tract urothelial carcinoma
6. Penis and testis cancer
7. Male and female urinary incontinence
8. Paediatric urology
9. Male sexual dysfunction; Couple's infertility
10. Urolithiasis

#### NEPHROLOGY

##### Educational Goals and Objectives

This course is designed to provide the student with a complete understanding of the optimal management of chronic kidney diseases. The focus of this course will be to discuss the pathophysiologic and clinical advances in the major areas of Nephrology including glomerular disease, fluid and electrolyte disorders, hypertension, dialysis, and renal transplantation. Well recognized medical complications and recommendations for optimal care will be discussed.

The material will be presented in several formats including frontal lectures and case based workshops.

In particular: students must understand the epidemiology, pathophysiology and management of common renal disorders and electrolyte and acid base disturbances including: Sodium and water imbalance, Potassium imbalance, Simple and mixed acid-base disturbances, Hypertension, Renal tubular acidosis, Glomerulonephritis, Renal vasculitis, Nephritic & Nephrotic Syndrome, Calcium & phosphorus metabolism,

Pre-renal causes of renal failure, Obstructive Uropathy, Nephrolithiasis, Renal failure in a patient with liver failure, Acute tubular necrosis, Interstitial nephritis, Chronic kidney disease, Diabetic nephropathy and main principles of dialysis and extra corporal procedures.

As renal diseases are often complex pathologies with different interindividual outcomes the course will also give students the tools and the basic notions of genetic involvement in kidney morbidities.

### **Educational resources**

- Harrison's Principles of Internal Medicine (ed: Mc Graw Hill)
- Goodman & Gilman's The Pharmacological Basis of Therapeutics

### **Suggested Reading**

- Textbook of Nephrology SG Massry, RJ Glasscock 2001
- EAU Guidelines, Edition 2014 - [http://uroweb.org/fileadmin/guidelines/Guidelines\\_2014\\_5\\_June\\_2014.pdf](http://uroweb.org/fileadmin/guidelines/Guidelines_2014_5_June_2014.pdf)

### **Evaluation methods**

Multiple choice question test (60 multiple choices closed questions) at the end of the course.

Oral examination can be performed for students who have not sustained written test or have reached a bad evaluation.

Examinations data will be communicated by official secretary of school of Nephrology.

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## Oncology

Total Credits: 5

Total hours: 40

Scientific Discipline Sector: MED/06, BIO/14, MED/36

### Teaching staff

#### Course Coordinator

Andrés J. M. Ferreri

E-mail: [ferreri.andres@hsr.it](mailto:ferreri.andres@hsr.it)

Receiving Hour: Tuesday from 15:00 and 17:00, Block B, -2 Floor (to be confirmed by email).

#### Teaching Assistants

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### Course Description

The course of Oncology consists of practical and academic activities regarding all the clinical, therapeutic, molecular, biological, radiological and pharmacological aspects of cancers. Attendants will discuss notions of the epidemiology of cancer as well as molecular mechanisms involved in the biological processes that led to cancer development, growth control and dissemination. The course covers classical concepts related to suspicion, diagnosis and staging of the most relevant solid tumours and lymphomas. An important part of course regards molecular knowledge of conventional and innovative therapeutic targets as well as the related pharmacological and radiological therapies used in current practice and experimental trials. A detailed discussion of anticancer drugs, their pharmacodynamic and pharmacokinetics as well as other knowledge with relevant therapeutic implications is included. This section includes also supportive care, therapeutic side effects and diagnosis and management of the most common complications as well as late effects in cancer survivors. An important part of the course regards cancer investigation, with a detailed analysis of the different phases of clinical research.

### Objectives

The aim of this course is to provide the essential theoretical and practical knowledge to deal with the diagnostic and therapeutic management of cancer patients. The student will focus on the epidemiological and physiopathological aspects of the main solid tumours and lymphomas and, at the end of the course, will be able to develop a systematic and multidisciplinary approach to the studied malignancies, including modern laboratory, radiological and therapeutic tools currently used in oncology. Students will analyze methods and strategies of basic and clinical cancer research as well as understand the cancer as public health problem and global phenomenon. In practice, at the end of the course, the student will be able to take a thorough history and perform a physical examination, to understand lab and radiological exams, to indicate and construe staging procedures, hypothesize therapeutic alternatives, and interpret trial results.

### Final assessment/exam

Attendance to lectures will be checked and recorded electronically. At the end of the course there will be an oral test focused on the course contents and clinical cases discussion.

### SUGGESTED BOOKS AND READINGS

- 1) DeVita, Hellman, and Rosenberg's Cancer: Principles and Practice of Oncology – Lippincott, Williams and Wilson – 9<sup>th</sup> edition - ISBN-13: 978-1451105452
- 2) Longo D., Fauci A., kasper D.: Harrison's Principles of Internal Medicine - McGraw-Hill – 18<sup>th</sup> Edition - ISBN 9780071748896
- 3) Abeloff M, Armitage J, Niederhuber J, Kastan M, McKenna W: Abeloff's Clinical Oncology - Churchill Livingstone – 4<sup>th</sup> edition - ISBN: 9780443066948

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## Haematology

Total Credits:4

Total hours: 32

Scientific Discipline Sector: Med/15

### Teaching staff

**Course Coordinator:** Claudio Bordignon

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### Teaching Assistants

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Luca Vago

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### Goals:

The goal of this course is to initiate the student to the fundamental principles of hematology and to provide the student with the theoretical and practical skills for selecting the appropriate diagnostic procedures and implementing recommended treatment for hematological diseases. To this aim we will couple academic lessons to case report discussion.

Special emphasis will be provided to the pathogenesis of haematological diseases and to the growing role of molecular biology in the clinical management of patients with haematological diseases. Based on the pivotal role of hematopathology in hematology, we include practical lessons "at the microscope", to be held in small groups. An important part of course will be held in collaboration with the course of Oncology, with the purpose, for the student, of getting acquainted with the basis of preclinical and clinical investigation in hemato-oncology.

### Evaluation/Final assessment/exam

Attendance to lectures will be checked and recorded electronically. At the end of the course there will be an oral test focused on the course contents and clinical cases discussion.

### Course Description:

Lessons held in collaboration with the Course of Oncology are in bold.

- **Stem cell biology and Hematopoiesis**
- **Clonal dynamics and Leukemic stem cells**
- **Epidemiology, carcinogenesis, molecular bases of cancer,, tumor microenvironment, metastasis**
- **Principles of cytotoxic and targeted therapy. Alkylating agents.**
- **Staging, Clinical trials, quality of life, performance status, prognostic scores**
- **Diagnostic technologies in Hematology & Oncology: blood counts, flow cytometry & tumor biopsies**
- **Antimetabolites and analogs. Vinca alkaloids and taxans.**

- Anemia definition, classification, Approach to Anemia in the adult and child
- Hemostasis, Thrombosis, Hemophilia
- Hemorrhagic syndromes. Hereditary and acquired disorders of platelets and coagulation.
- **Topoisomerases inhibitors. Kinase inhibitors. Proteasome inhibitors**
- Disorders of iron metabolism: Iron deficiency and Iron Overload. Megaloblastic anemias
- **Imaging in oncology**
- Hemoglobinopathies
- Basis of Transfusion Medicine
- **Lymphoproliferative disorders, Non Hodgkin Lymphoma, Hodgkin Lymphoma, Chronic lymphocytic leukemia**
- **Multiple Myeloma, Amyloidosis**
- Myelodysplasia
- Supportive care
- Acute Leukemias
- Myeloproliferative syndromes
- **Hematopoietic stem cell transplantation, cancer immunotherapy, gene therapy**
- At the microscope (small groups)

**Textbooks:**

Essential Haematology  
 A.V, Hoffbrand / P.A.H. Mosso Wiley-Blackwell  
 6<sup>th</sup> Edition 2011.

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## Musculoskeletal Diseases

Total Credits: 2

Total hours: 16

Scientific Discipline Sector: Med/33, Med/34

### Teaching staff

Course Coordinator:

Celeste Scotti

Email: [celeste.scotti@grupposandonato.it](mailto:celeste.scotti@grupposandonato.it)

**Goals:** The goal of this course is to provide the students with an overview on the fundamental principles and practices of Orthopaedic and Trauma Surgery. The course will be focused on the most relevant musculoskeletal disorders with hints on the newest advances on Adult Reconstruction Surgery, Arthroscopy, Sport Trauma and Regenerative Medicine. At the end of the course, the students will be able to deal with the spectrum of orthopaedic and trauma conditions and will be confident with the modern Orthopaedic and Trauma practice.

**Prerequisites:** None

**Evaluation:** The exam will consist of an oral examination. Exam will be focused on topics covered during the classes and clinical cases discussion.

### Course Description

This course is conceived to instruct the students in the pathophysiology, clinical examination, investigation and modern management of the most common musculoskeletal conditions. Typical clinical scenarios will be illustrated and discussed. The lectures will cover the following topics:

- INTRODUCTION: Brief History of Orthopaedics; Clinical Evaluation
- TRAUMA: generalities on trauma, most common trauma and related treatments. Emergencies and Complications.
- METABOLIC DISORDERS & OSTEOPOROTIC FRACTURES
- OSTEOARTHRITIS: Primary and secondary OA; related disorders; principles of Total Joint Replacement.
- PEDIATRIC ORTHOPAEDICS: Developmental Dysplasia of the Hip, Club foot, Scoliosis, and other common pediatric conditions.
- FOOT&ANKLE: Hallux valgus, flat foot, diabetic foot and other common foot&ankle conditions.
- SPORT TRAUMA: Shoulder & Elbow; Hip impingement, Articular Cartilage, Knee & Ankle.
- NEURO ORTHOPAEDICS: Adult Spine & Peripheral Nerve
- TUMORS: Benign and Malignant Tumors of Bone and Soft Tissues, Metastatic Bone Disease.
- INFECTIONS: Chronic and Haematogenous Osteomyelitis, Arthritis, Post-Traumatic and Post-Operative Infections
- REGENERATIVE MEDICINE: Cartilage, Bone and Tendon regeneration, Joint Homeostasis, Orthobiologic treatments.

### Textbooks:

*Louis Solomon, David J. Warwick, Selvadurai Nayagam. Apley's Concise System of Orthopaedics and Fractures, Fourth Edition. Hodder Arnold Publication.*

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## Neurological Sciences

Total Credits: 14

Total hours: 112

Scientific Discipline Sector: Med/08, Med/26, Med/27, Med/32, Med/37, Bio/14

### Teaching staff

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### Staff Assistants:

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### Collaborators

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**Goals:** The aim of this course is to help students acquire an understanding of the fundamental principles of clinical neurology. Students should be able to obtain a careful history of the disease, through a neurological examination and to understand the main neurological signs and symptoms. Students should be able to obtain a careful history of the disease, through a neurological examination and to understand the main neurological signs and symptoms. Students should demonstrate their ability to organize and integrate clinical data in order to produce a correct diagnosis, to learn about the diagnostic tests and understand their values and limitations. They should acquire a knowledge of nervous system development, functions and pathogenesis of neurological diseases, focusing on acute illness with an increased risk of death such as cerebral haemorrhage, intracranial hypertension, stroke, acute paralysis that requires urgent diagnosis and treatment. At the end of the course students should be able to provide an accurate diagnostic evaluation and treatment.

**Prerequisites:** None

**Evaluation:** The Commission is usually composed of three teachers of the course. The exam will consist of a multiple-choice test with 50 questions and an oral examination. The result of the multiple-choice test will condition access to the oral test and the final mark.

**Course Description:** This course will allow students to learn about the main neurological diseases related to the central and peripheral nervous systems. In the initial phase of the course some key aspects of the neuroanatomy and neurophysiology will be refreshed in order to provide students the necessary knowledge to understand the pathophysiology and clinical manifestations of neurological diseases. A modern view of all the major disorders affecting the central and peripheral nervous system will be addressed. Particular emphasis will be dedicated to the role of neuroimaging, advanced laboratory tests and neurophysiological techniques to the diagnostic processes. Lessons will start focusing on teaching the anatomy and physiology of the nervous system through imaging and neurophysiological techniques, which is of fundamental

relevance to produce a specific diagnosis. Other lessons will consider neuromuscular diseases, epilepsy, cerebrovascular diseases, movement disorders, multiple sclerosis, and brain tumours: students will learn how to provide diagnostic evaluation and treatment. Some seminars with other specialists (neurosurgeons, neuroradiologists, oncologists, pathologists and pharmacologists) will be organized to investigate the pathogenesis of the diseases. Frontal lessons will be complemented by a large body of practicalities. Students will spend some hours in neuroradiology and clinical neurophysiology labs, becoming confident with the more common investigations. Large time will be dedicated in neurological department to see patients with acute and chronic neurological diseases, to learn how to perform neurological examination and to become confident with the more common neurological signs.

**Textbooks:**

Greenberg DA, Aminoff MJ, Simon RP  
Clinical Neurology - McGraw-Hill

Allan H. Ropper, Martin A. Samuels  
Adams & Victor's Principles of Neurology, 9e - McGraw-Hill

L Pinessi, S Gentile, I Rainero: Neurology book– Edi-Ermes

CG Goetz: Textbook of Clinical Neurology, Saunders, III edition

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## Psychiatry and Clinical Psychology

Total Credits: 7

Total hours: 56

Scientific Discipline Sector: Med/25, Med/39, Bio/14, M-Psi/05, M-Psi/08

### Teaching staff

**Course Coordinator:** Cristina Colombo      Email: [colombo.cristina@hsr.it](mailto:colombo.cristina@hsr.it)

Receiving Hour: (to be confirmed via email to be sent to Prof. Colombo.) Tuesday at 4.p.m, in San Raffaele Turro, Block G.

Flavia Valtorta

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Cavallaro Roberto

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**Goals:** This course will provide an introduction to the clinical features and scientific understanding of the major mental health disorders that characterize medical practice

**Prerequisites:** none

**Evaluation:** Evaluation: Classroom performance, written final exams ( multiple choice test).

**Course Description** . Lectures and group discussions will focus on the psychiatric interview, the mental status examination, and major psychiatric disorders including Mood Disorders, Schizophrenia, Anxiety Disorders, Trauma and Personality Disorders. Students will learn to assess the clinical aspects of a range of psychiatric disorders, with the aid of didactic presentations of case material in lectures, review of patient write-ups, and live or videotaped patient interviews with members of the faculty and senior residents as preceptors.

Clinical clerkship goals can be summarized as making psychiatry real, through practical care-centered teaching and clinical exposure to fundamental issues in psychiatry.

**Textbooks:** Textbook of psychiatry. Kaplan and Saddock IX edition

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## Ophthalmology

Total Credits: 3

Total hours: 24

Scientific Discipline Sector: Med/30

### Teaching staff

#### Course Coordinator:

Francesco Bandello Email: [bandello.francesco@hsr.it](mailto:bandello.francesco@hsr.it)  
Receiving Hours on Wednesday 9.30-10:30 to be confirmed by email

#### Teaching Assistant

Piero Barboni Email: [barboni.piero@hsr.it](mailto:barboni.piero@hsr.it)  
Maurizio Battaglia Parodi Email: [battagliaparodi.maurizio@hsr.it](mailto:battagliaparodi.maurizio@hsr.it)  
Paolo Bettin Email: [bettin.paolo@hsr.it](mailto:bettin.paolo@hsr.it)  
Ugo Introini Email: [introini.ugo@hsr.it](mailto:introini.ugo@hsr.it)  
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Elisabetta Miserocchi Email: [miserocchi.elisabetta@hsr.it](mailto:miserocchi.elisabetta@hsr.it)  
Luisa Pierro Email: [pierro.luisa@hsr.it](mailto:pierro.luisa@hsr.it)  
Giuseppe Querques Email: [giuseppe.querques@hotmail.it](mailto:giuseppe.querques@hotmail.it)

#### Course Description:

The purpose of the course is to give to students an overview on the most relevant diseases in Ophthalmology

The student should achieve a comprehensive understanding of the basic concepts of ocular normal and pathological anatomy

Following this perspective the course will describe the pathophysiological and clinical aspects of the main ocular diseases in order to provide a comprehensive knowledge regarding the pathophysiology, semiotics, clinics and treatment of all the ocular diseases

Students will learn to recognize the signs and symptoms of ocular pathologies to report directly to the specialist ophthalmologist

Furthermore, this module will provide knowledge relative to the main diagnostic techniques/criteria for establishing the diagnosis of ocular diseases

Finally, both pharmacologic and interventional treatment strategies will be discussed.

#### Suggested textbooks:

Clinical Ophthalmology  
Kanski J.J., Bowling B.  
7th edition – Saunders  
2011 ISBN 9780702040931

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## Infectious Diseases

*Total Credits: 6*

*Total hours: 48*

*Scientific Discipline Sector: Med/17*

**Course Coordinator:** Paola Cinque Email: [cinque.paola@hsr.it](mailto:cinque.paola@hsr.it)

Receiving Hour (by appointment): Tuesday 15.00-16.00, Department of Infectious Diseases, San Raffaele Turro (Building B, -1 Floor, Room 17), Via Stamira d'Ancona 20, Milano

**Teaching staff:** Giuseppe Tambussi Email: [tambussi.giuseppe@hsr.it](mailto:tambussi.giuseppe@hsr.it)

### Goals:

- a. To provide information on epidemiological, pathogenetic and clinical aspects of the most relevant infectious diseases
- b. To provide tools for optimal management of infectious diseases, including prevention, diagnosis and treatment

### Prerequisites:

University level knowledge in microbiology, pathology and immunology

### Evaluation:

Oral examination

### Course Description:

The course will be articulated to include both frontal lessons (approximately 75% of total hours) and interactive discussions of clinical cases (approx 25%).

Frontal lessons aim to provide fundamental knowledge on the most relevant infectious diseases, including epidemiology, pathogenesis, clinical aspects, diagnosis and treatments. In most of the cases - wherever feasible - the diseases will be presented in the context of clinical syndromes.

Interactive discussions of clinical cases aim to start and guide students from clinical symptoms - through diagnostic pathways - towards achievement of diagnosis and establishment of treatment plans.

List of content:

Principles of epidemiology of infectious diseases

Prevention of infectious diseases

Emerging and re-emerging infectious diseases

Respiratory infections

Central nervous system infections

Gastrointestinal infections and viral hepatitis

Skin and soft tissues infections

Sexually transmitted infections

Endocarditis and septic shock

Tuberculosis and other mycobacterial diseases

HIV infection

Infections in the immunocompromised host other than HIV

Health-care associated infections and antibiotic resistance

Tropical infections

**Text books:**

D. Kasper, A. Fauci, Hauser S, Longo D, J Loscalzo, J. Jameson. Harrison's Principles of Internal Medicine, 18th Edition. McGraw Hill.

G.L. Mandell, J.E. Bennett, R. Dolin . Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, 7th edition, Churchill Livingstone (for consult only)

The lessons (slides kits and additional material) will be made available online.

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## **Clinical Rotations: Internal Medicine & Surgery II APRO**

*Total Credits: 4*

*Total hours: 100 (practicals)*

*Scientific Discipline Sector: Med/09, Med/18*

**Activity Coordinator:** Prof. Lorenzo Dagna  
Prof. Gianfranco Ferla

Email: lorenzo.dagna@unisr.it  
Email: ferla.gianfranco@hsr.it

**Goals:** The primary focus of these clinical rotations is to increase the capacity of students to act as a caring, increasing independent but always supervised physician on an interdisciplinary inpatient internal medicine and surgical team.

These clinical rotations have been designed for further developing the students' fundamental skills of physical exam and history taking that they have approached last year. Time will be given to improve the ability to listening to and communicating with patients, to increase their practical knowledge of medicine through the daily work with residents and faculty as well as self-directed study and research.

**Prerequisites:** none

**Evaluation:** pass/fail, based on attendance and on tutor's evaluation

**Course Description:** students will be working under a tutor's supervision in a general internal medicine and surgical ward and will be involved in all the daily activities of the department.

### **Textbooks (reference):**

- Harrison's Principles of Internal Medicine, 18th Edition (Eds. Dan Longo, Anthony Fauci, Dennis Kasper and Stephen Haus), McGrawHill 2012
- Sabiston Textbook Of Surgery – The Biological Basis Of Modern Surgical Practice, 19th Edition (Eds. Courtney M. Townsend, Jr., R. Daniel Beauchamp, B. Mark Evers, Kenneth L. Mattox); Saunders 2013

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## **SAN RAFFAELE INTERNATIONAL MD PROGRAM**

### **YEAR 5**

#### **Academic Year 2014/2015**

- **Clinical Immunology, Rheumatology and Dermatology**
- **Systematic Pathology**
- **Obstetrics and Gynecology**
- **Pediatrics**
- **Clinical Rotations: Ob/Gyn & Pediatrics**
- **Internal Medicine**
- **Clinical Surgery**
- **Imaging**
- **Clinical Rotations: Community Medicine**

# Academic Calendar and Blocks Timetable



SAM RAFFAELE INTERNATIONAL MD PROGRAM 5th Year

oct-2014		nov-14		dec-2014		jan-2015		feb-15		mar-15		apr-15		may-2015		jun-2015		jul-2015		aug-2015		sep-2015	
1	Imm.+ Path	1	Imm.+ Path	1	Pediatrics+ Ward	1	Holidays	1	Ob-Gyn+Ward	1	Tailored Act.	1	Easter	1	BANK HOLIDAY	1	EXAMS	1	EXAMS	1	EXAMS	1	EXAMS
2	Imm.+ Path	2	study leave	2	Pediatrics+ Ward	2	Holidays	2	Ob-Gyn+Ward	2	Tailored Act.	2	Easter	2		2	EXAMS	2	EXAMS	2	Holidays	2	EXAMS
3	Imm.+ Path	3	study leave	3	Pediatrics+ Ward	3	Holidays	3	Ob-Gyn+Ward	3	Tailored Act.	3	Easter	3		3	EXAMS	3	EXAMS	3	Holidays	3	EXAMS
4	Imm.+ Path	4	study leave	4	Pediatrics+ Ward	4	Holidays	4	Ob-Gyn+Ward	4	Tailored Act.	4	Easter	4		4	EXAMS	4	EXAMS	4	Holidays	4	EXAMS
5	Imm.+ Path	5	study leave	5	Pediatrics+ Ward	5	EPIPHANY	5	Ob-Gyn+Ward	5	Tailored Act.	5	Easter	5		5	EXAMS	5	EXAMS	5	Holidays	5	EXAMS
6	Imm.+ Path	6	study leave	6	Pediatrics+ Ward	6	EPIPHANY	6	Ob-Gyn+Ward	6	Tailored Act.	6	Easter	6		6	EXAMS	6	EXAMS	6	Holidays	6	EXAMS
7	Imm.+ Path	7	study leave	7	S. AMBROGIO	7	study leave	7	Ob-Gyn+Ward	7	Tailored Act.	7	Easter	7		7	EXAMS	7	EXAMS	7	Holidays	7	EXAMS
8	Imm.+ Path	8	study leave	8	IMMACOLATA	8	study leave	8	Ob-Gyn+Ward	8	Tailored Act.	8	Easter	8		8	EXAMS	8	EXAMS	8	Holidays	8	EXAMS
9	Imm.+ Path	9	exams	9	Pediatrics+ Ward	9	study leave	9	study leave	9	Tailored Act.	9		9		9	EXAMS	9	EXAMS	9	Holidays	9	EXAMS
10	Imm.+ Path	10	exams	10	Pediatrics+ Ward	10	study leave	10	study leave	10	Tailored Act.	10		10		10	EXAMS	10	EXAMS	10	Holidays	10	EXAMS
11	Imm.+ Path	11	exams	11	Pediatrics+ Ward	11	exam	11	study leave	11	Tailored Act.	11		11		11	EXAMS	11	EXAMS	11	Holidays	11	EXAMS
12	Imm.+ Path	12	exams	12	Pediatrics+ Ward	12	exam	12	study leave	12	Tailored Act.	12		12		12	EXAMS	12	EXAMS	12	Holidays	12	EXAMS
13	Imm.+ Path	13	exams	13		13	exam	13	study leave	13	Tailored Act.	13		13		13	EXAMS	13	EXAMS	13	Holidays	13	EXAMS
14	Imm.+ Path	14	exams	14		14	exam	14	study leave	14	Tailored Act.	14		14		14	EXAMS	14	EXAMS	14	Holidays	14	EXAMS
15	Imm.+ Path	15	exams	15	Pediatrics+ Ward	15	exam	15	exam	15	Simul. STEP 1	15		15		15	EXAMS	15	EXAMS	15	ASSUMPTION	15	EXAMS
16	Imm.+ Path	16	exams	16	Pediatrics+ Ward	16	exam	16	exam	16	Simul. STEP 1	16		16		16	EXAMS	16	EXAMS	16	ASSUMPTION	16	EXAMS
17	Imm.+ Path	17	exams	17	Pediatrics+ Ward	17	exam	17	exam	17	Imaging, Internal Medicine, Clinical Surgery	17		17		17	EXAMS	17	EXAMS	17	Holidays	17	EXAMS
18	Imm.+ Path	18	exams	18	Pediatrics+ Ward	18	exam	18	exam	18	Imaging, Internal Medicine, Clinical Surgery	18		18		18	EXAMS	18	EXAMS	18	Holidays	18	EXAMS
19	Imm.+ Path	19	exams	19	Pediatrics+ Ward	19	exam	19	exam	19	Imaging, Internal Medicine, Clinical Surgery	19		19		19	EXAMS	19	EXAMS	19	Holidays	19	EXAMS
20	Imm.+ Path	20	exams	20	Pediatrics+ Ward	20	exam	20	exam	20	Imaging, Internal Medicine, Clinical Surgery	20		20		20	EXAMS	20	EXAMS	20	Holidays	20	EXAMS
21	Imm.+ Path	21	exams	21	Holidays	21	exam	21	exam	21	Imaging, Internal Medicine, Clinical Surgery	21		21		21	EXAMS	21	EXAMS	21	Holidays	21	EXAMS
22	Imm.+ Path	22	exams	22	Holidays	22	exam	22	exam	22	Imaging, Internal Medicine, Clinical Surgery	22		22		22	EXAMS	22	EXAMS	22	Holidays	22	EXAMS
23	Imm.+ Path	23	Pediatrics+ Ward	23	Holidays	23	exam	23	Tailored Act.	23		23		23		23	EXAMS	23	EXAMS	23	Holidays	23	EXAMS
24	Imm.+ Path	24	Pediatrics+ Ward	24	Holidays	24	exam	24	Tailored Act.	24		24		24		24	EXAMS	24	EXAMS	24	Holidays	24	EXAMS
25	Imm.+ Path	25	Pediatrics+ Ward	25	CHRISTMAS	25	exam	25	Tailored Act.	25		25		25		25	EXAMS	25	EXAMS	25	Holidays	25	EXAMS
26	Imm.+ Path	26	Pediatrics+ Ward	26	BOXING DAY	26	exam	26	Tailored Act.	26		26		26		26	EXAMS	26	EXAMS	26	Holidays	26	EXAMS
27	Imm.+ Path	27	Pediatrics+ Ward	27		27	exam	27	Tailored Act.	27		27		27		27	EXAMS	27	EXAMS	27	Holidays	27	EXAMS
28	Imm.+ Path	28	Pediatrics+ Ward	28		28	exam	28	Tailored Act.	28		28		28		28	EXAMS	28	EXAMS	28	Holidays	28	EXAMS
29	Imm.+ Path	29	Pediatrics+ Ward	29	Holidays	29	exam	29	Tailored Act.	29		29		29		29	EXAMS	29	EXAMS	29	Holidays	29	EXAMS
30	Imm.+ Path	30	Pediatrics+ Ward	30	Holidays	30	exam	30	Tailored Act.	30		30		30		30	EXAMS	30	EXAMS	30	Holidays	30	EXAMS
31	Imm.+ Path	31	Pediatrics+ Ward	31	Holidays	31	exam	31	Tailored Act.	31		31		31		31	EXAMS	31	EXAMS	31	Holidays	31	EXAMS

Extra exam sessions can be scheduled, according to the request of the students and to the Professors' availability, any working day of the academic year.

# Clinical Immunology, Rheumatology and Dermatology

Total Credits: 5

Total hours: 40

Scientific Discipline Sector: SSD MED/09 MED/35

## Teaching staff

**Course Coordinator:** Patrizia Rovere Querini  
Lorenzo Dagna  
Angelo A. Manfredi

Email: [rovere.patrizia@hsr.it](mailto:rovere.patrizia@hsr.it)  
Email: [dagna.lorenzo@hsr.it](mailto:dagna.lorenzo@hsr.it)  
Email: [manfredi.anglo@hsr.it](mailto:manfredi.anglo@hsr.it)

## Collaborators

Attilio Bondanza  
Valentina Canti  
Enrico Tombetti  
Giuseppe A. Ramirez  
Mona Rita Yacoub

Email: [bondanza.attilio@hsr.it](mailto:bondanza.attilio@hsr.it)  
Email: [canti.valentina@hsr.it](mailto:canti.valentina@hsr.it)  
Email: [tombetti.enrico@hsr.it](mailto:tombetti.enrico@hsr.it)  
Email: [ramirez.giuseppealvise@hsr.it](mailto:ramirez.giuseppealvise@hsr.it)  
Email: [yacoub.monarita@hsr.it](mailto:yacoub.monarita@hsr.it)

## Goals

The mission of this course is to instruct medical students for diseases of the immune system and the skin, providing them with the necessary tools to deal with the patients, both clinically and by laboratory procedures, and to identify appropriate management strategies and treatment options. The student, in particular, should acquire medical knowledge in immunology and autoimmune diseases, and in the clinical care of the basis of the most common diseases of the skin and of the immune system and the core knowledge required to adequately collect the history of the patients, to identify relevant clinical features by medical examination, and to the appropriate use of laboratory tests. The student will develop the ability to cope with the exponential growth of scientific information in the field by identifying the link between clinical events and major molecular events that drive the pathogenesis of diseases of the immune system and skin. We particularly focus on the recent development in our understanding of dermatological, rheumatic and allergic diseases that has fundamentally changed in recent years after the introduction into clinical practice of new therapeutic strategies specifically targeting selected molecules.

## Evaluation

Attendance to lectures will be checked and recorded electronically. At the end of the course there will be an oral test focused on the course contents and clinical cases discussion.

## Course Description

- Introduction to the Immune System and to the present course
- Primary Immune Deficiency Diseases,
- Allergies, Anaphylaxis, and Systemic Mastocytosis
- Autoimmunity and Autoimmune Diseases:
  - Systemic Lupus Erythematosus & Antiphospholipid Antibody Syndrome
  - Sjogren's Syndrome
  - Inflammatory myopathies
  - Systemic Sclerosis (Scleroderma) and overlap Syndromes
  - Rheumatoid Arthritis, Palindromic Rheumatism & adult onset Still's Disease
  - Acute Rheumatic Fever
  - The Spondyloarthritides
  - The Vasculitis Syndromes
  - Behcet's Syndrome
  - Erytherma Nodosum & Sarcoidosis
  - Relapsing Polychondritis & Fascitis w or w/o eosinophilia
  - Familial Mediterranean Fever and Other Hereditary Recurrent Fevers
- Disorders of the joints
  - Osteoarthritis & osteoporosis
  - Gout and Other Crystal-Associated Arthropathies
  - Septic Arthritis & Arthritis Associated With Systemic Disease

- Skin Disorders (16 hours)
  - Eczema, Psoriasis, Cutaneous Infections, Acne
  - Skin Manifestations of Internal Disease
  - Immunologically Mediated Skin Diseases
  - Cutaneous Drug Reactions
  - Photosensitivity and Other Reactions to Light

**Textbook**

Longo D., Fauci A., kasper D.: Harrison's Principles of Internal Medicine - McGraw-Hill – 18<sup>th</sup> Edition - ISBN 9780071748896

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## Systematic Pathology

*Total Credits:*

*Total hours:*

*Scientific Discipline Sector: SSD 08*

### Teaching staff

**Course Coordinator:** Claudio Doglioni  
Receiving Hour: by appointment

Email: [doglioni.claudio@hsr.it](mailto:doglioni.claudio@hsr.it)

Maurilio Ponzoni  
Federica Pedica  
Francesca Sanvito

Email: [ponzoni.maurilio@hsr.it](mailto:ponzoni.maurilio@hsr.it)

Email: [pedica.federica@hsr.it](mailto:pedica.federica@hsr.it)

Email: [sanvito.francesca@hsr.it](mailto:sanvito.francesca@hsr.it)

### Goals

To give students a systematic pathology framework of the most frequent and relevant human diseases: understanding and classifying diseases for a rationale clinical practice. Pathology is a bridging discipline involving both basic science and clinical practice. Students will learn the morphologic alterations of diseased tissues and organs at the gross and microscopic level, as well as how these alterations correlate with the clinical manifestations of the disease and which are the most informative procedures for establishing a pathologic diagnosis.

### Evaluation

Multiple choice questions at the end of the course

### Course Description

Lectures will cover the most frequent and relevant topics of human pathology: students will be asked to expose with a brief introduction, the most important and frequent symptoms that characterize diseases of the specific organs. Students will also visit, at the beginning of the course, the pathology lab, in order to familiarize with the procedures and techniques utilized for pathology diagnosis.

### Textbook

Robbins & Cotran Pathologic basis of Disease, 9th Edition  
By Vinay Kumar, Abul K. Abbas, and Jon Aster  
Elsevier/Saunders

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## Obstetrics and Gynecology

*Total Credits:*  
*Total hours: 48*  
*Scientific Discipline Sector: MED 40*

### Teaching staff

**Course Coordinator:** Massimo Candiani      Email: candiani.massimo@hsr.it  
Origoni Massimo      Email: origoni.massimo@hsr.it  
Salvatore Stefano      Email: salvatore.stefano@hsr.it

**Goals:** This course aims to provide knowledge of the fundamental principles of obstetrics and gynaecology to medical students, including anatomy and physiology of the genital tract. This course aims also to offer notions on classification, epidemiology, patho-physiology, diagnostic work-up and management of different obstetrical and gynaecological conditions. Students should therefore acquire skills in taking history and assessing patients, in choosing the most appropriate diagnostic work-up and treatment.

**Evaluation :** Multiple choice question test at the end of the course. Oral examination will be performed for students who have reached a bad evaluation.

**Course Description:** The course will include the attendance of the IMDP students to the daily activity of the Dept of Obstetrics and Gynaecology, including ward-rounds, labour ward, outpatient clinics and operating theatre. Moreover the following formal lessons will be organized:

- Topographic and functional anatomy of female pelvis and reproductive system
- Spontaneous and recurrent miscarriage
- Reproductive system endocrinology: hypothalamus-hypophysis-ovary-uterus axis.
- Physiology of pregnancy
- Reproductive medicine
- Obstetrics ultrasound
- Ectopic pregnancy
- Third trimester bleeding
- Diabetes and hypertension in pregnancy
- The vaginal delivery
- The operative and caesarean delivery
- The post-partum and breast feeding
- Chronic pelvic pain and endometriosis
- Uterine fibroids and ovarian cysts
- Screening and diagnosis of female genital tract preneoplastic lesions
- Vulvar, vaginal and cervix cancer
- Sexual transmitted diseases
- Urogynaecology
- Endometrial and ovarian cancer
- Gestational trophoblastic disease
- Abdominal surgery in gynaecology: laparotomy and laparoscopy
- Contraceptive methods
- Vaginal surgery in gynaecology
- Presentation and discussion of obstetrics and gynaecology clinical cases

## **Textbook**

1. Lange: Current Diagnosis & Treatment Obstetrics & Gynecology, Alan DeCherney, Lauren Nathan, T. Murphy Goodwin, Neri Laufer, 11th Edition
2. Danforth's Obstetrics and Gynecology, Ronald S. Gibbs, Lippincott Williams & Wilkins, 2008
3. Williams Obstetrics, Cunningham, Leveno, Bloom, Sponge, Dashe, 24th Edition, ISBN: 0071798935  
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## Pediatrics

Total Credits: 4

Total hours: 32

Scientific Discipline Sector: SSD MED/38

### Teaching staff

**Course Coordinator:** Alessandro Aiuti Email: a.aiuti@hsr.it Receiving Hour: Friday, 3 PM

### Teaching assistant

Alessandra Biffi Email: alessandra.biffi@hsr.it

### Collaborators

Maria Grazia Natali Sora	Email: <a href="mailto:mariagrazia.natali@hsr.it">mariagrazia.natali@hsr.it</a>
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Rosanna Rovelli	Email: <a href="mailto:Rosanna.rovelli@hsr.it">Rosanna.rovelli@hsr.it</a>
Antonella Poloniato	Email: <a href="mailto:antonella.poloniato@hsr.it">antonella.poloniato@hsr.it</a>
Gabriella Pozzobon	Email: <a href="mailto:gabriella.pozzobon@hsr.it">gabriella.pozzobon@hsr.it</a>
Maria Grazia Patricelli	Email: <a href="mailto:patricelli.mariagrazia@hsr.it">patricelli.mariagrazia@hsr.it</a>
Chiara Lanzani	Email: <a href="mailto:chiara.lanzani@hsr.it">chiara.lanzani@hsr.it</a>
Maria Pia Cicalese	Email: <a href="mailto:cicalese.mariapia@hsr.it">cicalese.mariapia@hsr.it</a>
Francesca Ferrua	Email: <a href="mailto:Francesca.ferrua@hsr.it">Francesca.ferrua@hsr.it</a>
Maddalena Migliavacca	Email: <a href="mailto:maddalena.migliavacca@hsr.it">maddalena.migliavacca@hsr.it</a>

### Goals

The overall objective of this course is to provide the essential theoretical and practical knowledge to deal with the healthy and sick child of different ages (from neonates to adolescents) from the preventive, diagnostic and rehabilitation point of view. The student should be able to plan the essential medical interventions with regards to the main health problems in terms of frequency and risk inherent to the pediatric pathologies of different ages and identify the conditions that need the intervention of the professional specialist pediatrician.

**Evaluation :** Classroom attendance. Oral Examination focused on the course content, including clinical cases discussion.

### Course Description

The students will learn the methodology for a correct approach to the clinical problems of pediatric age, including the evaluation of medical records, semeiotics, instrumental and laboratory tests. Through an integrated approach based on lessons, seminars and practical exercises the course will illustrate the epidemiological, etiopathogenic, and clinical aspects of the diseases of the pediatric age providing useful information on their prevention, diagnosis, and treatment.

Topics of particular interest will be dealt in depth with the active participation of students in order to stimulate the maximum interest. Students will attend in small groups the Pediatrics, Neonatology, and Pediatric Immunohematology Units, the Pediatric day hospital and clinics (immunology, hematology, endocrinology, neonatology, neurology). These activities will be complemented by interactive lessons with clinical cases and seminars.

Topics:

### Introduction

Epidemiology of pediatric diseases. Normal growth and development. The communication in paediatrics. The immigrant child. Ethical aspects. Medicines for children.

*Tutorial activities: Pediatric physical examination. Blood pressure in children of different ages. Clinical trials in paediatrics.*

## **The newborn**

The healthy newborn: perinatal adaptation. Major diseases of the term newborn: birth asphyxia, physiological jaundice, neonatal sepsis and infection from mother to child transmission, most common metabolic disorders (hypoglycemia, hypocalcemia), most common neurological frameworks (intracranial hemorrhage, hydrocephalus, seizures), preterm infant and dysmature newborn: characteristics, perinatal adaptation, major diseases (hyaline membrane disease, bronchodysplasia, retinopathy of prematurity, necrotizing enterocolitis, ...)

*Tutorial Activities: The healthy newborn: evaluation to neonatal area, hints of childcare, nutrition. Physiological and pathological fetal growth. Neonatal screening. Principles of neonatal resuscitation*

## **Genetics**

Approach to the main Genetic and Chromosomal Disorders; patterns of Inheritance, clinical signs and natural history. *Tutorial Activities: Observation of some characteristic syndromes / dysmorphic (Down, Turner, Klinefelter, DEL22, Prader-Willi).*

## **Gastroenterology**

Vomiting: differential diagnostics; acute diarrhea, chronic or recurrent. Constipation: differential diagnostics. Malabsorption syndrome: celiac disease in pediatric. Food intolerances

*Tutorial Activities: Principles of nutrition: breastfeeding and its benefits; recommended integrations (vitamin D, fluoride, iron); deficiency of vitamin D; weaning (how, when, and why). Importance of nutrition in the prevention of chronic degenerative diseases of the adult (obesity, hypercholesterolemia, hypertension). Recurrent abdominal pain: definition and differential diagnosis, diagnostic process. Learning to detect the nutritional status of a child and the main signs of dehydration*

## **Child Neuropsychiatry**

Simple and complex febrile seizures. More frequent forms of epilepsy. Cerebral palsy, main neuromuscular diseases in the pediatric age

*Tutorial Activities: Pediatric neurological examination. Neuropsychological development of the healthy child. Febrile seizures.*

## **Haematology**

Main changes of haematological values in relation to the age. Leukemia (incidence, clinical suspicion, diagnostic procedure, therapy). Anemia: pediatric aspects. Thrombocytopenia and neutropenia. Pediatric aspects of bone marrow transplant.

*Tutorial activities: Interpretation of blood count. Transfusion of blood components.*

## **Oncology**

Incidence, symptoms, signs of suspicion of the most common pediatric solid tumors: lymphoma, neuroblastoma, Wilms' tumor. The main brain tumors in children: incidence, signs and symptoms.

**Endocrinology and metabolic disorders.** Hyposomia: diagnostic approach and therapy. Diabetes mellitus type I: clinical onset, laboratory parameters and therapeutic approach and complications from a distance. Thyroid: congenital hypothyroidism. Essential obesity and differential diagnosis with secondary forms. Physiological puberty, early, late. Congenital Adrenal Hyperplasia. Lysosomal storage diseases and other (neuro)metabolic disorders: diagnostic approach, differential diagnosis and therapy.

*Tutorial activities: learning to detect the most important auxological parameters and to evaluate the development of pubertal stage; observation of some characteristic disease variants.*

### **Allergy and Immunology**

Main allergic diseases of the child (rhino-conjunctivitis, atopic dermatitis, bronchial asthma, food allergies): principles of therapy.

Juvenile Rheumatoid Arthritis. Schoenlein-Henoch purpura. Rheumatic Disease

Primary and secondary immune deficiencies in children

*Tutorial activities: Immunological tests and their interpretation.*

### **Diseases of the respiratory system**

Pediatric aspects of upper and lower respiratory tract infections (etiology, epidemiology, clinic, diagnosis, therapy: bronchiolitis, otitis, epiglottitis, pneumonia). Cystic fibrosis. Tuberculosis.

### **Cardiology**

The heart murmur (differential diagnostics)  
The main congenital heart disease (tetralogy of Fallot, VSD, ASD, persistent ductus).

### **Nephrology**

Urinary tract infections. Glomerulonephritis. Nephritic and nephrotic syndrome

*Tutorial activities: Examination of urine: methods of collection in the first childhoods and evaluation of results.  
Hematuria: differential diagnosis*

### **Infectious Diseases**

Main exanthematous diseases (measles, rubella, chicken pox, scarlet fever). Main infectious diseases (infectious mononucleosis, CMV, mumps and whooping cough). Vaccinations (calendar and directions).

### **Orthopedics**

Screening of congenital dislocation of the hip.

### **Emergencies**

Detect the presence of conditions that require immediate medical intervention. Meningoencephalitis (etiology, clinical features, CSF test interpretation, complications, mortality and sequelae of meningitis, principles of therapy). Surgical emergencies: Acute abdomen, Acute Scrotum, Hypertrophic pyloric stenosis.  
*Tutorial activities: ABC of pediatric resuscitation. Basics of head trauma*

### **Textbook**

Reference: Nelson Essentials of Pediatrics, Marcante and Kliegman, 7th edition, Saunders, ISBN 9781455759804

For students who are interested in internship in pediatrics, "The Harriet Lane Handbook" is a comprehensive practical handbook for diagnosis and treatment.

Authors: Johns Hopkins Hospital, Kristin Arcara and Megan Tschudy. Mosby ISBN 978-0-323-07942-6

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## **Clinical Rotations: Ob/Gyn & Pediatrics**

*Total Credits: 7*

*Total hours: 175*

*Scientific Discipline Sector: SSD Med/38, Med/40, Med/45*

### **Activity Coordinators:**

Alessandro Aiuti

Massimo Candiani

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**Goals** The main objective of these clinical rotations is to increase the capacity of students to act as caring, increasing independent, but supervised physician on pediatric and ob/gyn patients. Students will improve their listening and communication skills with patients (and families), and increase their practical knowledge on prevention, diagnosis, and treatment of disease of the mother and the child.

**Evaluation** : pass fail, based on attendance and tutor's evaluation

**Course Description:** students will be attending ward, day hospitals, clinics and emergency department and will be involved in all the daily activities with residents and faculties of the obstetrics and gynecology department and pediatrics department,.

**Textbook** : see Pediatrics and Ob/Gyn courses

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# Clinical Surgery

Total Credits:5

Total hours:40

Scientific Discipline Sector: SSD MED/18, MED/20

## Teaching staff

**Course Coordinator:** Massimo Falconi

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## Goals

The goal of this course is to provide the student with the theoretical and clinical skills for the correct decision-making process and optimal management of common surgical disorders. Signs and symptoms reported by patients will be placed into the context of more general surgical problems that will be discussed according to an evidence-based medicine approach. During the course the student will learn how to apply the essential concepts of disease pathophysiology to the diagnosis and treatment of clinical problems. The course will treat the most common surgical diseases of the adult patients with a focus on vascular surgery. Common surgical disorders of the infancy and childhood are discussed as well.

## Evaluation

Classroom attendance. Oral Examination focused on the course content, including clinical cases discussion.

## Course Description

### General Surgery

#### Abdominal pain

- Clinical presentation, physical examination and diagnostic work up
- Understand the broad differential diagnosis of abdominal pain including the evaluation, differential diagnosis and treatment

#### Gastrointestinal bleeding

- Give the differential diagnosis for upper and lower GI tract bleeding
- Rank management priorities with an acutely bleeding patient
- Differentiate and describe the basic management of an upper and lower GI bleed

#### Jaundice

- Create a differential diagnosis for the onset of jaundice associated with abdominal pain
- Create a differential diagnosis for the onset of painless jaundice
- Determine the appropriate laboratory and radiologic work-up for evaluating patients with jaundice
- Summarize the management strategies associated with treating patients with jaundice

#### Hernias

- Appreciate the different types of hernias and how they can cause clinically-relevant problems
- Name the difference between reducible, incarcerated and strangulated hernias
- Describe the clinical presentation and diagnostic work-up for incarcerated and strangulated hernias
- Surgical indications for the management of hernias

#### Breast

- Summarize the important personal history and physical exam features in a patient with breast lump
- Be able to generate a diagnostic work-up and differential diagnosis for women with breast lump and/or calcifications identified on screening mammography
- List the different breast imaging modalities available and indications for each

- Discuss the surgical options for management of both invasive and non-invasive breast cancer

#### Bowel obstruction

- Clinical presentation, physical examination and diagnostic work up
- Understand the broad differential diagnosis of small- and large-bowel obstruction
- Describe the management and initial treatment for a patient with bowel obstruction
- List the indications for operation on a patient with bowel obstruction and describe the complications of delaying the operation

#### Transplantation

- Definitions and classifications of solid organ and tissue transplantation
- Solid organ transplantations in clinical practice
- Future perspectives in transplantation

#### Esophagus

- Jatal hernia and esophageal reflux disease: clinical presentation, diagnostic work-up and treatment
- Achalasia: clinical presentation, diagnostic work-up and treatment
- Esophageal cancer: classification, clinical presentation, diagnosis and treatment
- Indications for neoadjuvant treatment in esophageal carcinoma
- Palliation of advanced esophageal carcinoma

#### Stomach

- Gastric cancer: clinical presentation, diagnostic work-up and treatment
- Surgical complications of peptic disease: classification, clinical presentation, diagnosis and treatment

#### Pancreas

- Pancreatic tumors: clinical presentation, diagnostic work-up and treatment
- Indications for neoadjuvant treatment in pancreatic carcinoma
- Determine the appropriate laboratory and radiologic work-up for evaluating patients with incidentally-discovered pancreatic solid or cystic lesions
- Acute pancreatitis: clinical presentation, diagnostic work-up and treatment
- Chronic pancreatitis: clinical presentation, diagnostic work-up and treatment

#### Liver and biliary tree

- Liver tumors: clinical presentation, diagnostic work-up and treatment
- Understand the broad differential diagnosis of hepatic focal lesion
- Determine the appropriate laboratory and radiologic work-up for evaluating a hepatic focal lesion in patients with and without chronic hepatitis
- Indication for surgical resection of primary and metastatic liver tumors
- Clinical presentation, diagnostic work-up and treatment of patients with biliary tree tumors

#### Thyroid and parathyroid

- Thyroid and parathyroid tumors: clinical presentation, diagnostic work-up and treatment
- Understand the broad differential diagnosis of thyroid nodule
- Determine the appropriate laboratory and radiologic work-up for evaluating a patient with thyroid nodule

#### Adrenal gland

- Adrenal gland tumors: clinical presentation, diagnostic work-up and treatment
- Understand the broad differential diagnosis of adrenal gland incidentalomas (functioning versus non-functioning tumors)
- Determine the appropriate laboratory and radiologic work-up for evaluating a patient with incidentally discovered adrenal gland lesion

#### Small bowel, colon and rectum

- Clinical presentation, diagnostic work-up, differential diagnosis of inflammatory bowel diseases
- Surgical indications for patients with inflammatory bowel diseases
- Clinical presentation, diagnostic work-up, and management of patients with colo-rectal cancer
- Indications for neoadjuvant treatment in rectal carcinoma

- Indications for limited resection in rectal carcinoma
- Management and palliation of locally-advanced or metastatic colorectal cancer

### **Vascular Surgery**

- Clinical presentation, diagnostic work-up and management of patients with thoracic, abdominal and thoracoabdominal aortic aneurysms
- Indications for surgical versus endovascular treatment in aortic aneurysm
- Aortoiliac and femoropopliteal arterial occlusive disease: clinical presentation, diagnostic work-up and management
- Cerebrovascular occlusive disease: clinical presentation, diagnostic work-up and management

### **Pediatric Surgery**

- Clinical presentation, diagnostic work-up and treatment of the most common congenital abnormalities in neonatal surgery (from prenatal diagnosis to surgical treatment):
  - Congenital diaphragmatic hernia
  - Esophageal atresia
  - Duodenal obstruction
  - Hypertrophic pyloric stenosis
  - Small bowel atresia
  - Anorectal malformations
  - Abdominal wall defects
  - Sacro-coccygeal teratoma
- Clinical presentation, diagnostic work-up and treatment of:
  - Thoracic malformations
  - Necrotizing enterocolitis
  - Idiopathic intestinal perforations
  - Meconium ileus
  - Midgut volvulus
  - Gastro-esophageal reflux disease
  - Hirschsprung's disease
  - Intussusception
  - Appendicitis in early childhood
- The role of bronchoscopy in pediatric patients
- Clinical presentation, diagnostic work-up and treatment of:
  - Pneumothorax
  - Pleural effusions

### **Textbooks**

“Sabiston Textbook of Surgery”, 19<sup>th</sup> Edition, Elsevier

“Greenfield's Surgery: Scientific Principles & Practice”, 5<sup>th</sup> Edition, Lippincott

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# Imaging

Total Credits:3

Total hours:

Scientific Discipline Sector: SSD MED/36, MED/37

## Teaching staff

**Course Coordinator:** Francesco De Cobelli  
Andrea Falini

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## Collaborators

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Email: [politi.letterio@hsr.it](mailto:politi.letterio@hsr.it)

## Goals

The mission of this course is to instruct medical students to imaging. Most of diagnosis are based on imaging findings and this course will provide to the students the necessary tools to deal with the imaging procedures, and to identify appropriate management of the imaging information and options with different imaging techniques. The student, in particular, should acquire knowledge of different imaging techniques learning how to choose the best techniques for each clinical need. In the previous 4 academic years the Student had already experienced the knowledge of imaging in Physics and in Human Morphology and in different applications fields such as in neck, respiratory and lung diseases, in oncology and in digestive and abdominal diseases. Therefore, the aim of this course is to cover the remaining fields such as orthopedics, cardiovascular and urological, and the applications of imaging in emergency. Part of the lessons will be dedicated to Neuroradiology in order to discuss main topics such as brain tumors, degenerative and inflammatory diseases, and traumas that have not treated during the Neuroscience Course.

All the imaging techniques will be presented: XRay, Ultrasound, Computed Tomography, Digital Angiography, Magnetic Resonance and Nuclear Medicine as well such as Nuclear Scintigraphy and PET. We will also focus on the recent development of Interventional Radiology.

Students will be familiar with the main normal findings and alterations of diseased organs and apparatus with the different imaging modalities, as well as how the alterations and sings correlate with the clinical manifestations of the disease and which are the most informative procedures for establishing the correct diagnosis.

## Evaluation

Multiple choice questions at the end of the course

## Course Description

- Introduction to Imaging and to the present course
- Diagnostic Imaging in Ortopedics
- Cardiovascular Imaging
- Uroradiology
- Interventional Radiology
- Emergency Radiology
- Nuclear Medicine

## Neuro

- Inflammatory diseases
- Degenerative diseases
- Neuro-oncology
- Traumas

## Clinical Rotations: Community Medicine

*Total Credits:3*

*Total hours:75*

*Scientific Discipline Sector: SSD MED/09*

**Course Coordinator:** Antonio Secchi

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Clinical skills:

To attend the out-patient clinic of the General Practitioner (GP) and follow diagnostic and therapeutic activities of the doctors in patients attending their offices.

To familiarize with prescriptions, certifications etc, used by the GP

To assist activities in the socio-sanitary district

To familiarize with the database and electronic clinical files used by the GP

To familiarize with pharmaceutical research and bibliography research through the most common data base and web sites for biomedical activities

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