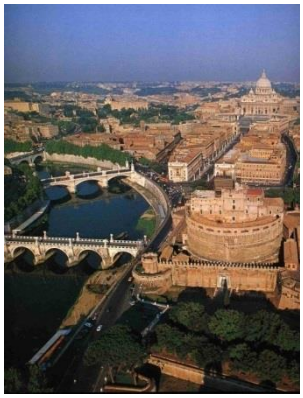
FACOLTÀ DI FARMACIA
E MEDICINA

SAPIENZA
UNIVERSITÀ DI ROMA

Dean: Prof. Eugenio Gaudio



Student Guide
Degree Course
in Medicine and Surgery *"F"*
International Medical School

Academic Year 2014-2015

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E MEDICINA

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Degree Course
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farmaciamedicina1.uniroma1.it

A cura della Presidenza
del Consiglio di Corso di Laurea Magistrale
in Medicina e Chirurgia “F”

Editing

Anja Berger

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Greetings to students and teachers

Dear Students, Dear Colleagues,

The Student Guide of the Degree Course "F" in Medicine and Surgery, academic year 2014-2015, serves as an orientation to both, students and teachers, in the complex educational organization of the single cycle degree course in Medicine and Surgery. The implementation of the Reform of the Educational System, that started already with the academic year 2009-2010, has perfected the educational process by realizing a better integration of educational contents especially inside of the integrated courses and a better coordination between ex-cathedra teaching and practical activities.

The opinions and potential suggestions by our students, regarding the course organization and the teaching quality, are essential instruments of information and as those highly appreciated. They are of high importance for the correct functioning and the future development of the degree programme. The collection of evaluation questionnaires, declared mandatory for all Italian public universities by the law 370/99, last year has been introduced in its digital form and students can proceed with the compilation in the moment of their online registration for exams. Of course, privacy is guaranteed within the whole process.

Our goal is the continuous improvement of the teaching activity in the degree programme, the offered services and its organization.

The main part of the information given by this student guide is also available on the website http://w3.uniroma1.it/ims/, where all necessary updates and additional information will be published during the course of the academic year.

One goal of the degree programme in Medicine and Surgery "F" is inalienable: to train medical doctors that are not only well educated, but also capable by their scientific preparation and professional formation of medicating and taking care of human beings both, in the state of well-being and illness.

It is task of a modern European degree programme to maintain the unity of knowledge, linking scientific competences to humanistic skills and to the capability to handle the complex, modern and expensive system of public health. The main interest remains the protection of the human being, its dignity and psycho-physical integrity.

Our wish, that we would like to renew with sincerity to all of you, is that we may proceed successfully in this difficult, but inspiring process of knowledge and life.

The Dean
Prof. Eugenio Gaudio

1. Offices Degree Course "F"

The **students office** of the single cycle course of study in Medicine and Surgery "F" (CLMMC "F") is located at Palazzina ex SCRE -Presidenza della Facoltà di Farmacia e Medicina-, ground floor, Azienda Policlinico *Umberto I.*

Responsible	**Dean Prof. Eugenio Gaudio** Department of Anatomy ☎: 06.49918055 - *Fax*: 06.44918062
E.mail :	eugenio.gaudio@uniroma1.it
Office hours:	Monday 1:00p.m.-2:00p.m., Thursday 10:30 a.m.-11:30 a.m.
Location:	Dean's office, Department of Anatomy, Via Borelli 50, 2nd floor
Secretary	**Dott.ssa Anja Berger**
Location:	Palazzina ex SCRE -Presidenza della Facoltà di Farmacia e Medicina-, ground floor, room 2, Azienda Policlinico *Umberto I*.
Office hours:	Monday and Wednesday 09:30 a.m.-11:00 a.m.
E.mail:	anja.berger@uniroma1.it
Responsabilities:	The didactic office of the CLMMC "F" is in charge of the regular function of the academic activities (teachers, time schedules, lecture rooms, programs, exam calendars, supervision of learning agreements and change forms for Erasmus scholarships), and the distribution of useful information to the students through the pin board next to the student office and through the website (http://elearning2.uniroma1.it/course/index.php?categoryid=211&inpopup=1).
Educational Manager	**Dott. Vincenzo Mancino**
Location:	Palazzina ex SCRE -Presidenza della Facoltà di Farmacia e Medicina-, ground floor, room 3, Azienda Policlinico *Umberto I*.
Office hours:	Monday and Wednesday 09:30 a.m.-11:00 a.m. ☎: 06.49970836
E.mail:	vincenzo.mancino@uniroma1.it
Coordinator I year – I semester	**Prof. Paolo Sarti** ☎: 06.49910944
E.mail:	paolo.sarti@uniroma1.it
Coordinator I year – II semester	**Prof. Francesco Malatesta** ☎: 06.4454952
E.mail:	francesco.malatesta@uniroma1.it
Coordinator II year – I semester	**Prof. Maurizio Muscaritoli** ☎: 06.49972020
E.mail:	maurizio.muscaritoli@uniroma1.it
Coordinator II year – II semester	**Prof.a Francesca Grassi** ☎: 06.49910060
E.mail:	francesca.grassi@uniroma1.it
Coordinator III year – I semester	**Prof.a Gabriella Palmieri** ☎: 06.4468448
E.mail:	gabriella.palmieri@uniroma1.it
Coordinator III year – II semester	**Prof. Enrico De Smaele** ☎: 06.49255659
E.mail:	enrico.desmaele@uniroma1.it
Coordinator IV year – II semester	**Prof. Paolo Puddu** ☎: 06.49972659
E.mail:	paoloemilio.puddu@uniroma1.it
Coordinator IV year – I semester	**Prof. Oliviero Riggio** ☎: 06.49972001
E.mail:	oliviero.riggio@uniroma1.it

2. Syllabus

Exam	Course	Year	Semester	Credits
1	**Chemistry and introduction to biochemistry**	**I**	**1°**	**9**
2	**Medical physics**	**I**	**1°**	**6**
3	**Biology and genetics** (I-II)	**I**	1°-**2°**	**13**
4	**Histology and embriology**	**I**	**2°**	**8**
5	**Basic medical scientific methods** (I-II-III)	I **II**	1°-2° **1°**	**15**
6	**Biochemistry** (I-II)	I **II**	2° **1°**	**14**
7	**Human anatomy** (I-II-III)	I **II**	1° 1°-**2°**	**19**
8	**Microbiology**	**II**	**2°**	**7**
9	**Human physiology** (I-II-III)	II **III**	1°-2° **1°**	**18**
10	**Immunology and immunopathology**	**III**	**1°**	**8**
11	**Clinical scientific methods** (IV-V-VI)	II **III**	2° 1°-**2°**	**21**
12	**Pathology and pathophysiology** (I-II)	**III**	1°-**2°**	**17**
13	**Laboratory medicine** (I-II)	**III**	1°-**2°**	**11**
14	**Applied pathology I - Diseases of the respiratory system and cardiovascular system**	**IV**	**1°**	**12**
15	**Applied pathology II - Diseases of kidney and urinary system**	**IV**	**1°**	**5**
16	**Applied medical scientific methods** (VII-VIII)	**IV**	1°-**2°**	**6**
17	**Pathological anatomy and associations with clinical anatomy** (I-II)	**IV**	1°-**2°**	**11**
18	**Applied pathology III - Diseases of the digestive system, endocrine system and metabolism**	**IV**	**2°**	**12**
19	**Diagnostic imaging**	**IV**	**2°**	**6**
20	**Applied pathology IV - Diseases of the blood, hematopoietic organs, immune system and rheumatology**	**V**	**1°**	**6**
21	**Applied pathology V - Infectious diseases and human reproduction**	**V**	**1°**	**7**
22	**Diseases of the nervous system**	**V**	**1°**	**5**
23	**Internal medicine and general surgery I - medical and surgical Oncology**	**V**	**1°**	**8**
24	**Pharmacology** (I-II) **and toxicology**	IV **V**	2° **1°**	**7**
25	**Psychiatry and cinical psychology**	**V**	**2°**	**4**
26	**Movement disorders, rheumatology**	**V**	**2°**	**3**
27	**Dermatology and plastic surgery**	**V**	**2°**	**3**
28	**Diseases of the sensory organs**	**V**	**2°**	**8**
29	**Scientific English** (I-II-III-IV-V) **- Journal Club**	I II III IV **V**	2° 2° 2° 1° **2°**	**12**
30	**Medical-scientific methods: public health** (IX-X)	V **VI**	2° **1°**	**8**
31	**Internal medicine and general surgery II**	**VI**	**1°**	**8**
32	**Paediatrics**	**VI**	**1°**	**6**
33	**Obstestrics and Gynaecology**	**VI**	**1°**	**6**
34	**Medical-scientific methods: forensic medicine, medicine and the law** (XI)	**VI**	**2°**	**5**
35	**Internal medicine and general surgery III - medical and surgical therapy and geriatrics**	**VI**	**2°**	**10**
36	**Emergency medicine and surgery**	**VI**	**2°**	**10**
	TOTAL CREDITS FOR EXAMS			***334***
	Electives (Attività Didattiche Elettive- ADE)			***8***
	CREDITS for preparation of final thesis			***18***
	TOTAL			***360***

3. Courses and course coordinators for each semester

I YEAR	Course Coordinator	Coordinator of Semester
I SEMESTER		**P. Sarti**
Human Anatomy (I)	L. Pannarale	
Biology and Genetics (I)	F. Citarella	
Chemistry and Introducation to Biochemistry	B. Vallone	
Medical Physics	R. Pani	
Basic Medical Scientific Methods (I)	M. Muscaritoli	
II SEMESTER		**F. Malatesta**
Biochemistry (I)	F. Malatesta	
Biology and Genetics (II)	F. Citarella	
Histology and Embryology	S. Adamo	
Scientific English- Journal Club (I)	J.F. Osborn	
Basic Medical Scientific Methods (II)	M.S. Cattaruzza	
II YEAR		
I SEMESTER		**M. Muscaritoli**
Human Anatomy (II)	S. Nottola	
Biochemistry (II)	D. De Biase	
Human Physiology (I)	C. Limatola	
Basic Medical Scientific Methods (III)	M. Muscaritoli	
II SEMESTER		**F. Grassi**
Human Anatomy (III)	E. Gaudio	
Human Physiology (II)	F. Grassi	
Scientific English-Journal Club (II)	J.F. Osborn	
Clinical Scientific Methods (IV)	M. Arca	
Microbiology	G. Antonelli	

III YEAR		
I SEMESTER		**G. Palmieri**
Human Physiology (III)	S. Ferraina	
Immunology and Immunopathology	A. Santoni	
Laboratory Medicine (I)	A. Angeloni	
Clinical Scientific Methods (V)	M. Arca	
Pathology and Pathophysiology (I)	M. P. Felli	
II SEMESTER		**E. De Smaele**
Scientific English-Journal Club (III)	M. Levrero	
Laboratory Medicine (II)	A. Angeloni	
Clinical Scientific Methods (VI)	M. Arca	
Pathology and Pathophysiology (II)	G. Giannini	
IV YEAR		
I SEMESTER		**P. E. Puddu**
Pathological Anatomy and Associations with Clinical Anatomy (I)	C. Giordano	
Scientific English-Journal Club (IV)	J.Osborn	
Applied Medical Scientific Methods (VII)	R. Gattuso	
Applied Pathology I – Diseases of Respiratory System and Cardiovascular System	F. Fedele	
Applied Pathology II – Diseases of Kidney and Urinary System	S. Mazzaferro	
II SEMESTER		**O. Riggio**
Pathological Anatomy and Associations with Clinical Anatomy (II)	G. D'Amati	
Diagnostic Imaging	C. Catalano	
Pharmacology I and Toxicology	S. Maccari	
Applied Medical Scientific Methods (VIII)	F. Angelico	
Applied Pathology III – Diseases of the Digestive System, Endocrine System and Metabolism	S. Ginanni Corradini	

4. Timetable lectures

I YEAR – I SEMESTER

CLASSROOM: C1 Istituto d'Igiene – Città Universitaria "Sapienza" Università di Roma

Time	Monday	Tuesday	Wednesday	Thursday	Friday
9 - 10	**HUMAN ANATOMY**	**BIOLOGY AND GENETICS**	**BASIC MEDICAL-SCIENTIFIC METHODS**	**HUMAN ANATOMY**	
10 - 11	**HUMAN ANATOMY**	**BIOLOGY AND GENETICS**	**MEDICAL PHYSICS**	**HUMAN ANATOMY**	**MEDICAL PHYSICS**
11 - 12	**BASIC MEDICAL-SCIENTIFIC METHODS**	**BASIC MEDICAL-SCIENTIFIC METHODS**	**MEDICAL PHYSICS**	**MEDICAL PHYSICS**	**MEDICAL PHYSICS**
12 - 13	**CHEMISTRY AND INTRODUCTION TO BIOCHEMISTRY**	**BASIC MEDICAL-SCIENTIFIC METHODS**	**CHEMISTRY AND INTRODUCTION TO BIOCHEMISTRY**	**CHEMISTRY AND INTRODUCTION TO BIOCHEMISTRY**	**CHEMISTRY AND INTRODUCTION TO BIOCHEMISTRY**
13 - 14	**CHEMISTRY AND INTRODUCTION TO BIOCHEMISTRY**	**BASIC MEDICAL-SCIENTIFIC METHODS**	**CHEMISTRY AND INTRODUCTION TO BIOCHEMISTRY**	**CHEMISTRY AND INTRODUCTION TO BIOCHEMISTRY**	**CHEMISTRY AND INTRODUCTION TO BIOCHEMISTRY**
14 - 15					
15 - 16				**BIOLOGY AND GENETICS (15:30-16:30)**	
16 - 17	*HUMAN ANATOMY - LAB**			**BIOLOGY AND GENETICS (16:30-17:30)**	
17- 18	*HUMAN ANATOMY - LAB**			**BIOLOGY AND GENETICS (17:30-18:30)****	

* *Classroom L, Department of Human Anatomy (Via Borelli, 50)*
** *This hour will be used only for previously defined Genetics lessons.*

I YEAR – II SEMESTER

CLASSROOM: C1 Istituto d'Igiene – Città Universitaria "Sapienza" Università di Roma

Time	Monday	Tuesday	Wednesday	Thursday	Friday
9 - 10	**BASIC MEDICAL-SCIENTIFIC METHODS II**	**BIOCHEMISTRY I**	**BIOCHEMISTRY I**	**BASIC MEDICAL-SCIENTIFIC METHODS II**	**BIOCHEMISTRY I**
10 - 11	**BASIC MEDICAL-SCIENTIFIC METHODS II**	**BIOCHEMISTRY I**	**BIOCHEMISTRY I**	**BASIC MEDICAL-SCIENTIFIC METHODS II**	**BIOCHEMISTRY I**
11 - 12	**BIOLOGY AND GENETICS II**	**HISTOLOGY AND EMBRIOLOGY**	**BIOLOGY AND GENETICS II**	**HISTOLOGY AND EMBRIOLOGY**	**HISTOLOGY AND EMBRIOLOGY**
12 - 13	**BIOLOGY AND GENETICS II**	**HISTOLOGY AND EMBRIOLOGY**	**BIOLOGY AND GENETICS II**	**HISTOLOGY AND EMBRIOLOGY**	**HISTOLOGY AND EMBRIOLOGY**
13 - 14	**BIOLOGY AND GENETICS II****	**SCIENTIFIC ENGLISH I**	**BIOLOGY AND GENETICS II****	**SCIENTIFIC ENGLISH I**	
14 – 15					
15 – 16				*HISTOLOGY AND EMBRIOLOGY – LAB**	
16- 17				*HISTOLOGY AND EMBRIOLOGY – LAB**	

**Auletta Esercitazioni Dipartimento SAIMAL – Sezione Istologia (Via A. Scarpa, 14)*

*** This hour will be used only for previously defined Genetics lessons.*

II YEAR – I SEMESTER

CLASSROOM: D, Ex Officine Ortopediche – Città Universitaria "Sapienza" Università di Roma

Time	Monday	Tuesday	Wednesday	Thursday	Friday
9 - 10	**BASIC MEDICAL-SCIENTIFIC METHODS III**	**BASIC MEDICAL-SCIENTIFIC METHODS III**	**BIOCHEMISTRY II**	**BASIC MEDICAL-SCIENTIFIC METHODS III**	**HUMAN ANATOMY II**
10 - 11	**BASIC MEDICAL-SCIENTIFIC METHODS III**	**BASIC MEDICAL-SCIENTIFIC METHODS III**	**BIOCHEMISTRY II**	**BASIC MEDICAL-SCIENTIFIC METHODS III**	**HUMAN ANATOMY II**
11 - 12	**BIOCHEMISTRY II**	**HUMAN ANATOMY II**		**BIOCHEMISTRY II**	**HUMAN PHYSIOLOGY I**
12 - 13	**BIOCHEMISTRY II**	**HUMAN ANATOMY II**	**HUMAN PHYSIOLOGY I**	**BIOCHEMISTRY II**	**HUMAN PHYSIOLOGY I**
13 - 14			**HUMAN PHYSIOLOGY I**		**HUMAN PHYSIOLOGY I**
14 – 15				*GENETICS SEMINAR*	
15 – 16				*GENETICS SEMINAR*	
16- 17	*HUMAN ANATOMY-LAB**			*GENETICS SEMINAR*	
17 - 18	*HUMAN ANATOMY-LAB**			*GENETICS SEMINAR*	

** Classroom L, Department of Human Anatomy (Via Borelli, 50)*

II YEAR – II SEMESTER

CLASSROOM: D, Ex Officine Ortopediche – Città Universitaria "Sapienza" Università di Roma

Time	Monday	Tuesday	Wednesday	Thursday	Friday
9 - 10		**HUMAN PHYSIOLOGY II**		**HUMAN PHYSIOLOGY II**	**HUMAN PHYSIOLOGY II**
10 - 11		**HUMAN ANATOMY III**	**CLINICAL-SCIENTIFIC METHODS IV**	**HUMAN ANATOMY III**	**HUMAN PHYSIOLOGY II**
11 - 12	**MICROBIOLOGY**	**HUMAN ANATOMY III**	**CLINICAL-SCIENTIFIC METHODS IV**	**HUMAN ANATOMY III**	**MICROBIOLOGY**
12 - 13	**MICROBIOLOGY**	**SCIENTIFIC ENGLISH II**	**CLINICAL-SCIENTIFIC METHODS IV**	**HUMAN PHYSIOLOGY II**	**MICROBIOLOGY**
13 - 14	**MICROBIOLOGY**	**SCIENTIFIC ENGLISH II**		**HUMAN PHYSIOLOGY II**	
14 - 15			**CLINICAL-SCIENTIFIC METHODS IV**		
15 - 16		*HUMAN ANATOMY- LAB*	**CLINICAL-SCIENTIFIC METHODS IV**	**MICROBIOLOGY**	
16 - 17		*HUMAN ANATOMY- LAB*	**CLINICAL-SCIENTIFIC METHODS IV**		
17 - 18			**CLINICAL-SCIENTIFIC METHODS IV**		
18 - 19			**CLINICAL-SCIENTIFIC METHODS IV**		

III YEAR – I SEMESTER

CLASSROOM: B, Ex Officine Ortopediche – Città Universitaria "Sapienza" Università di Roma

Time	Monday	Tuesday	Wednesday	Thursday	Friday
9 - 10		**PATHOLOGY AND PATHOPHYSIOLOGY I**		**IMMUNOLOGY AND IMMUNOPATHOLOGY**	
10 - 11		**PATHOLOGY AND PATHOPHYSIOLOGY I**	**CLINICAL-SCIENTIFIC METHODS V**	**IMMUNOLOGY AND IMMUNOPATHOLOGY**	
11 - 12		**IMMUNOLOGY AND IMMUNOPATHOLOGY**	**CLINICAL-SCIENTIFIC METHODS V**	**IMMUNOLOGY AND IMMUNOPATHOLOGY**	
12 - 13		**IMMUNOLOGY AND IMMUNOPATHOLOGY**	**CLINICAL-SCIENTIFIC METHODS V**	**PATHOLOGY AND PATHOPHYSIOLOGY I**	
13 - 14	**LABORATORY MEDICINE I**			**PATHOLOGY AND PATHOPHYSIOLOGY I**	**LABORATORY MEDICINE I**
14 – 15	**LABORATORY MEDICINE I**	**HUMAN PHYSIOLOGY III**			**LABORATORY MEDICINE I**
15 – 16		**HUMAN PHYSIOLOGY III**			

III YEAR – II SEMESTER

CLASSROOM: B, Ex Officine Ortopediche – Città Universitaria "Sapienza" Università di Roma

Time	Monday	Tuesday	Wednesday	Thursday	Friday
9 - 10		**PATHOLOGY AND PATHOPHYSIOLOGY II**		**PATHOLOGY AND PATHOPHYSIOLOGY II***	
10 - 11		**PATHOLOGY AND PATHOPHYSIOLOGY II**	**SCIENTIFIC ENGLISH III**	**PATHOLOGY AND PATHOPHYSIOLOGY II***	
11 - 12		**LABORATORY MEDICINE II**	**SCIENTIFIC ENGLISH III**	**PATHOLOGY AND PATHOPHYSIOLOGY II***	
12 - 13		**LABORATORY MEDICINE II**	**SCIENTIFIC ENGLISH III**	**PATHOLOGY AND PATHOPHYSIOLOGY II***	
13 - 14				**LABORATORY MEDICINE II***	
14 – 15		**CLINICAL SCIENTIFIC METHODS VI**	**CLINICAL SCIENTIFIC METHODS VI**	**LABORATORY MEDICINE II***	
15 – 16		**CLINICAL SCIENTIFIC METHODS VI**	**CLINICAL SCIENTIFIC METHODS VI**	**LABORATORY MEDICINE II***	
16 - 17		**CLINICAL SCIENTIFIC METHODS VI**	**CLINICAL SCIENTIFIC METHODS VI**		

**The schedule for the Thursday lessons at 9:30, and all the lessons start on the half hour (i.e. Pathology and Pathophysiology is from 9:30 to 12:30, and Laboratory Medicine is from 13:30 to 15:30)*

IV YEAR – I SEMESTER

CLASSROOM: E, Ex Officine Ortopediche – Città Universitaria "Sapienza" Università di Roma

Time	Monday	Tuesday	Wednesday	Thursday	Friday
9 - 10	**PRACTICAL SKILLS***	**APPLIED PATHOLOGY I**	**PATHOLOGICAL ANATOMY I**	**APPLIED PATHOLOGY I**	**PATHOLOGICAL ANATOMY I**
10 - 11	**PRACTICAL SKILLS***	**APPLIED PATHOLOGY I**	**PATHOLOGICAL ANATOMY I**	**APPLIED PATHOLOGY I**	**APPLIED PATHOLOGY I**
11 - 12	**PRACTICAL SKILLS***	**APPLIED MEDICAL SCIENTIFIC METHODS VII**	**PATHOLOGICAL ANATOMY I**	**SCIENTIFIC ENGLISH IV**	**APPLIED PATHOLOGY I**
12 - 13	**PRACTICAL SKILLS***	**APPLIED PATHOLOGY II**	**PATHOLOGICAL ANATOMY I**	**APPLIED PATHOLOGY II**	
13 - 14		**APPLIED PATHOLOGY II**		**APPLIED PATHOLOGY II**	
14 – 15				**APPLIED MEDICAL SCIENTIFIC METHODS VII**	

**From October 13th to November 28th*

IV YEAR – II SEMESTER

CLASSROOM: E, Ex Officine Ortopediche – Città Universitaria "Sapienza" Università di Roma

Time	Monday	Tuesday	Wednesday	Thursday	Friday
9 - 10	**PRACTICAL SKILLS**	**PRACTICAL SKILLS**	**PRACTICAL SKILLS**	**PRACTICAL SKILLS**	**PRACTICAL SKILLS**
10 - 11	**PRACTICAL SKILLS**	**PRACTICAL SKILLS**	**PRACTICAL SKILLS**	**PRACTICAL SKILLS**	**PRACTICAL SKILLS**
11 - 12	**PHARMACOLOGY AND TOXICOLOGY**	**PATHOLOGICAL ANATOMY II**	**PHARMACOLOGY AND TOXICOLOGY**	**PATHOLOGICAL ANATOMY II**	**DIAGNOSTIC IMAGING**
12 - 13	**PHARMACOLOGY AND TOXICOLOGY**	**PATHOLOGICAL ANATOMY II**	**DIAGNOSTIC IMAGING**	**PATHOLOGICAL ANATOMY II**	**DIAGNOSTIC IMAGING**
13 - 14					
14 – 15					
15 – 16	**APPLIED PATHOLOGY III**	**APPLIED PATHOLOGY III**	**DIAGNOSTIC IMAGING**	**APPLIED PATHOLOGY III**	**APPLIED PATHOLOGY III**
16 - 17	**APPLIED PATHOLOGY III**	**APPLIED PATHOLOGY III**	**DIAGNOSTIC IMAGING**	**APPLIED PATHOLOGY III**	**APPLIED PATHOLOGY III**

5. Exams and ongoing examinations

I YEAR

Courses	Credits (CFU)
I Year	**60**

Courses	CFU	Exam/*ongoing examination*
I SEMESTER	**31**	
Human anatomy (I)	**5**	***Ongoing examination***
Biology and genetics (I)	**5**	***Ongoing examination***
Chemistry and introduction to biochemistry	**9**	**Exam**
Medical physics	**6**	**Exam**
Basic medical scientific methods (I)	**6**	***Ongoing examination***

Courses	CFU	Exam/*ongoing examination*
II SEMESTER	**29**	
Biochemistry (I)	**6**	***Ongoing examination***
Biology and genetics (II)	**8**	**Exam**
Histology and embriology	**8**	**Exam**
Scientific English (I)	**2**	***Ongoing examination***
Basic medical scientific methods (II)	**4**	***Ongoing examination***
Electives	**1**	

II YEAR

Courses	Credits (CFU)
II Year	**60**

Courses	CFU	Exam/*ongoing examination*
I SEMESTER	**29**	
Human anatomy (II)	**7**	***Ongoing examination***
Biochemistry (II)	**8**	**Exam**
Human physiology (I)	**8**	***Ongoing examination***
Basic medical scientific methods (III)	**5**	**Exam**
Electives	**1**	

Courses	CFU	Exam/*ongoing examination*
II SEMESTER	**31**	
Human anatomy (III)	**7**	**Exam**
Human physiology (II)	**7**	***Ongoing examination***
Scientific English (II)	**4**	***Ongoing examination***
Microbiology	**7**	**Exam**
Clinical scientific methods (IV)	**5**	***Ongoing examination***
Electives	**1**	

III YEAR

Courses	Credits (CFU)
III Year	**60**

Courses	CFU	Exam/*ongoing examination*
I SEMESTER	**31**	
Human Physiology (III)	**3**	**Exam**
Immunology and Immunopathology	**8**	**Exam**
Laboratory Medicine (I)	**5**	***Ongoing examination***
Pathology and Pathophysiology (I)	**7**	***Ongoing examination***
Clinical scientific Methods (V)	**8**	***Ongoing examination***

Courses	CFU	Exam/*ongoing examination*
II SEMESTER	**29**	
Scientific English (III)	**4**	***Ongoing examination***
Laboratory Medicine (II)	**6**	**Exam**
Pathology and Pathophysiology (II)	**10**	**Exam**
Clinical scientific Methods (VI)	**8**	**Exam**
Electives	**1**	

IV YEAR

Courses	Credits (CFU)
IV Year	**60**

Courses	CFU	Exam/*ongoing examination*
I SEMESTER	**28**	
Pathological Anatomy and Ass. with Clin. Anat. (I)	**6**	***Ongoing examination***
Scientific English (IV)	**1**	***Ongoing examination***
Applied Pathology I *Diseases of Respiratory System and Cardiovascular System*	**12**	**Exam**
Applied Pathology II *Diseasesof Kidney and Urinary System*	**5**	**Exam**
Applied Medical Scientific Methods (VII)	**3**	***Ongoing examination***
Electives	**1**	Verifica nei Corsi Integrati

Courses	CFU	Exam/*ongoing examination*
II SEMESTER	**32**	
Pathological Anatomy and Ass. with Clin. Anat. (II)	**5**	**Exam**
Diagnostic Imaging	**6**	**Exam**
Pharmacology (I) **and Toxicology**	**4**	***Ongoing examination***
Applied Pathology III *Diseases of Digestive System, Endocrine System and Metabolism*	**12**	**Exam**
Applied Medical Scientific Methods (VIII)	**3**	**Exam**
Electives	**1**	Verifica nei Corsi Integrati
Credits for the preparation of the final thesis	**1**	

6. Course organisation: Teaching staff

In bold = Course coordinators
Students should contact the course coordinators in the start of the new semester

I YEAR

I SEMESTER (coordinator of semester: P. Sarti)

Teachers		Time	Classroom
Basic medical scientific methods (I)		**(ongoing examination)**	
M. Capocci – A. Farcomeni – **M. Muscaritoli**	Mon	11-12	C1 – Istituto d'Igiene
	Tue	11-14	C1 – Istituto d'Igiene
	Wed	09-10	C1 – Istituto d'Igiene
Chemistry and introduction to biochemistry		**(exam n. 1)**	
A.E. Miele – P. Sarti – **B. Vallone**	Mon	12-14	C1 – Istituto d'Igiene
	Wed	12-14	C1 – Istituto d'Igiene
	Thu	12-14	C1 – Istituto d'Igiene
	Fri	12-14	C1 – Istituto d'Igiene
Medical physics		**(exam n. 2)**	
R. Pani – A.D. Polosa	Wed	10-12	C1 – Istituto d'Igiene
Additional activities: E. Preziosi, A. Pilloni	Thu	11-12	C1 – Istituto d'Igiene
	Fri	10-12	C1 – Istituto d'Igiene
Biology and genetics (I)		**(ongoing examination)**	
F. Citarella – M. Devoto – P. Fortina	Tue	09-11	C1 – Istituto d'Igiene
	Thu	15^{30}-17^{30}	C1 – Istituto d'Igiene
Human anatomy (I)		**(ongoing examination)**	
L. Pannarale – R. Mancinelli	Mon	09-11	C1 – Istituto d'Igiene
	Thu	09-11	C1 – Istituto d'Igiene

II SEMESTER (coordinator of semester: F. Malatesta)

Basic medical scientific methods (II)		**(ongoing examination)**	
M.S. Cattaruzza – V. Fineschi – C.M. Rossi Arnaud	Mon	09-11	C1 – Istituto d'Igiene
	Thu	09-11	C1 – Istituto d'Igiene
Biology and genetics (II)		**(exam n. 3)**	
F. Citarella – M. Devoto – P. Fortina	Mon	11-14	C1 – Istituto d'Igiene
	Wed	11-14	C1 – Istituto d'Igiene
Histology and embryology		**(exam n. 4)**	
E. Vicini – **S. Adamo** – M. Bouché	Tue	11-13	C1 – Istituto d'Igiene
	Thu	11-13	C1 – Istituto d'Igiene
	Fri	11-13	C1 – Istituto d'Igiene
Biochemistry (I)		**(ongoing examination)**	
F. Malatesta - M. Perluigi – D. De Biase	Tue	09-11	C1 – Istituto d'Igiene
	Wed	09-11	C1 – Istituto d'Igiene
	Fri	09-11	C1 – Istituto d'Igiene
Scientific English – Journal Club (I)		**(ongoing examination)**	
J.F. Oborn	Tue	13-14	C1 – Istituto d'Igiene
	Thu	13-14	C1 – Istituto d'Igiene

II Year

I SEMESTER (coordinator of semester: M. Muscaritoli)

Basic medical scientific methods (III) — **(exam n. 5)**
M. Muscaritoli – A. Farcomeni – M. Capocci - P. Grammatico

Mon	09-11	Ex Officine Ortopediche
Tue	09-11	Ex Officine Ortopediche
Thu	09-11	Ex Officine Ortopediche

Biochemistry (II) — **(exam n. 6)**
D. De Biase - F. Malatesta - M. Perluigi

Mon	11-13	Ex Officine Ortopediche
Wed	09-11	Ex Officine Ortopediche
Thu	11-13	Ex Officine Ortopediche

Human anatomy (II) — **(ongoing examination)**
G. Familiari - E. Gaudio – **S. Nottola** – M. Relucenti
Additional activities: A. Renzi, G. Vivacqua

Tue	11-13	Ex Officine Ortopediche
Fri	09-11	Ex Officine Ortopediche

Human physiology (I) — **(ongoing examination)**
C. Limatola – G. Tanzilli

Wed	12-14	Ex Officine Ortopediche
Fri	11-14	Ex Officine Ortopediche

II SEMESTER (coordinator of semester: F. Grassi)

Clinical scientific methods (IV) — **(ongoing examination)**
M. Arca – L. Giacomelli
Additional activities: S. Guarino

Wed	10-13	Ex Officine Ortopediche
Wed	15-17/ 14.30-19.30	Ex Officine Ortopediche

Human anatomy (III) — **(exam n. 7)**
E. Gaudio – M. Relucenti - S. Nottola – R. Mancinelli
Additional activities: A. Renzi, G. Vivacqua

Tue	10-12	Ex Officine Ortopediche
Thu	10-12	Ex Officine Ortopediche

Human physiology (II) — **(ongoing examination)**
F. Grassi – P. Palange – A.P. Mitterhofer – M. Merli

Tue	09-10	Ex Officine Ortopediche
Thu	09-10	Ex Officine Ortopediche
	12-14	Ex Officine Ortopediche
Fri	09-11	Ex Officine Ortopediche

Microbiology — **(exam n. 8)**
G. Antonelli – A.T. Palamara – D. Modiano

Mon	11-14	Ex Officine Ortopediche
Thu	15-16	Ex Officine Ortopediche
Fri	11-13	Ex Officine Ortopediche

Scientific English – Journal Club (II) — **(ongoing examination)**
J.F. Osborn

Tue	12-14	Ex Officine Ortopediche

III YEAR

I SEMESTER (coordinator of semester: G. Palmieri)

Clinical scientific methods (V) — **(ongoing examination)**
L. Giacomelli – **M. Arca** – R. Cangemi – P. Fiori Nastro
Additional activities: S. Guarino

Wed	10-13	Ex Officine Ortopediche
Wed	15-18	Ex Officine Ortopediche

Human physiology (III) — **(exam n. 9)**
S. Ferraina
Additional activities: E. Brunamonti

Tue	14-16	Ex Officine Ortopediche

Immunology and immunopathology — **(exam n. 10)**
S. Mardente – **A. Santoni** – G. Palmieri

Tue	11-13	Ex Officine Ortopediche
Thu	09-12	Ex Officine Ortopediche

Laboratory medicine (I) — **(ongoing examination)**
P. Valenti – D. Modiano – A. Bellelli – **A. Angeloni**

Mon	13-15	Ex Officine Ortopediche
Fri	13-15	Ex Officine Ortopediche

Pathology and pathophysiology (I) — **(ongoing examination)**
A. Gulino – G. Canettieri – **M. Felli**

Tue	09-11	Ex Officine Ortopediche
Thu	12-14	Ex Officine Ortopediche

II SEMESTER (coordinator of semester: E. De Smaele)

Clinical scientific methods (VI) — **(exam n. 11)**
M. Arca – L. Giacomelli – F. Consorti
Additional activities: S. Guarino

Tue	14-17	Ex Officine Ortopediche
Wed	14-17	Ex Officine Ortopediche

Pathology and pathophysiology (II) — **(exam n. 12)**
E. De Smaele – M. Felli – G. Canettieri – **G. Giannini**

Tue	09-11	Ex Officine Ortopediche
Thu	9:30-12:30	Ex Officine Ortopediche

Laboratory medicine (II) — **(exam n. 13)**
F. Mainiero – **A. Angeloni** – A. Bellelli

Tue	11-13	Ex Officine Ortopediche
Thu	13:30-15:30	Ex Officine Ortopediche

Scientific English – Journal Club (III) — **(ongoing examination)**
M. Levrero

Wed	10-13	Ex Officine Ortopediche

IV YEAR

I SEMESTER (coordinator of semester: P. Puddu)

Applied medical scientific methods (VII) **(ongoing examination)**
F. Angelico – A. Frustaci – **R. Gattuso**

Tue	11-12	Ex Officine Ortopediche
Thu	14-15	Ex Officine Ortopediche

Applied pathology I **(exam n. 14)**
F. Fedele – C. Savoia – P. Palange – P.E. Puddu – F. Venuta

Tue	09-11	Ex Officine Ortopediche
Thu	09-11	Ex Officine Ortopediche
Fri	10-12	Ex Officine Ortopediche

Applied patholgy II **(exam n. 15)**
A. Tubaro – **S. Mazzaferro**
Additional activities: G. Franco

Tue	12-14	Ex Officine Ortopediche
Thu	12-14	Ex Officine Ortopediche

Pathological anatomy and associations with clinical anatomy (I) **(ongoing examination)**
P. Gallo – G. d'Amati – **C. Giordano**

Wed	09-13	Ex Officine Ortopediche
Fri	09-10	Ex Officine Ortopediche

Scientific English – Journal Club (IV) **(ongoing examination)**
J. Osborn

Thu	11-12	Ex Officine Ortopediche

II SEMESTER (coordinator of semester: O. Riggio)

Applied medical scientific methods (VIII) **(exam n. 16)**
F. Angelico – M. Muscaritoli – O. Riggio

To be defined		Ex Officine Ortopediche
		Ex Officine Ortopediche

Pathological anatomy and associations with clinical anatomy (II) **(exam n. 17)**
P. Gallo – **G. d'Amati** – C. Giordano

Tue	11-13	Ex Officine Ortopediche
Thu	11-13	Ex Officine Ortopediche

Applied patholgy III **(exam n. 18)**
A. Isidori – F. Lombardo – E.S. Corazziari – **S. Ginanni Corradini** – E. Lezoche

Mon	15-17	Ex Officine Ortopediche
Tue	15-17	Ex Officine Ortopediche
Thu	15-17	Ex Officine Ortopediche
Fri	15-17	Ex Officine Ortopediche

Diagnostic imaging **(exam n. 19)**
C. Catalano – M. Francone – A. Laghi

Wed	12-13	Ex Officine Ortopediche
	15-17	Ex Officine Ortopediche
Fri	11-13	Ex Officine Ortopediche

Pharmacology (I) **and toxicology** **(ongoing examination)**
F. Nicoletti – **S. Maccari**

Mon	11-13	Ex Officine Ortopediche
Wed	11-12	Ex Officine Ortopediche

7. Teaching staff: Contact information

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De Smaele Enrico *(MED/46 Scienze Tecniche di Medicina di Laboratorio)*
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Reception hours: by appointment

Ferraina Stefano *(BIO/09 Fisiologia)*
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Reception hours: Thursday 11 a.m.-1 p.m.

Fineschi Vittorio *(MED/43 Medicina Legale)*
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FRANCONE MARCO *(MED/36 Diagnostica per Immagini e Radioterapia)*
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Reception hours: by appointment

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Reception hours: by appointment

GALLO PIETRO (*MED/08 ANATOMIA PATOLOGICA)*
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GATTUSO ROBERTO (*MED/22 CHIRURGIA VASCOLARE)*
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Gaudio Eugenio *(BIO/16 Anatomia Umana)*
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Giacomelli Laura *(MED/18 Chirurgia Generale)*
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Giannini Giuseppe *(MED/04 Patologia Generale)*
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Reception hours: by appointment

Ginanni Corradini Stefano *(MED/12 Gastroenterologia)*
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Reception hour: by appointment (e-mail)

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Reception hours: Monday 8.30 a.m.-10.30 a.m.

Muscaritoli Maurizio *(MED/09 Medicina Interna)*
Department of Clinical Medicine
Location: Viale dell'Università 37
☎: 06.49972020; *E.mail*: maurizio.muscaritoli@uniroma1.it
Reception hours: Monday 11 a.m.-1 p.m.

Nicoletti Ferdinando *(BIO/14 Farmacologia)*
Department of Physiology and Pharmacology "Vittorio Erspamer"

Location: Piazzale Aldo Moro, 5
☎: 06.49912969; *E.mail*: ferdinandonicoletti@hotmail.com
Reception hours: by appointment

Nottola Stefania *(BIO/16 Anatomia Umana)*
Department of Anatomical, Histological, Forensic and Orthopedic Sciences
Location: Section of Human Anatomy, Via Alfonso Borelli 50
☎: 06.49918072- *Fax:* 06.49918081; *E.mail*: stefania.nottola@uniroma1.it
Reception hours: Tuesday and Thursday 10 a.m.-11 a.m. by appointment

Osborn John *(MED/42 Igiene generale ed applicata)*
Department of Public Health and Infectious Diseases
Location: P.le Aldo Moro 5
☎: 06.49914881 - *Fax:* 06.49914881; *E.mail*: john.osborn@uniroma1.it
Reception hours: by appointment

Palamara Anna Teresa *(MED/07 Microbiologia e microbiologia clinica)*
Department of Public Health and Infectious Diseases
Location: P.le Aldo Moro 5
☎: 06.49694311- *Fax:* 06.4468625; *E.mail*: annateresa.palamara@uniroma1.it
Reception hours: Thursday 12 p.m.-2 p.m.

Palange Paolo *(MED/09 Medicina Interna)*
Department of Public Health and Infectious Diseases
Location: Section of Internal Medicine, Viale dell'Università 37
☎: 06.4941110- *Fax:* 06.4941110; *E.mail*: paolo.palange@uniroma1.it
Reception hours: Tuesday 12 p.m.-1 p.m.

Palmieri Gabriella *(MED/04 Patologia Generale)*
Department of Experimental Medicine
Location: Policinico Umberto I, Viale Regina Elena 324, Building Patologia Generale, 1st floor
☎:06.4468448; *E.mail*: gabriella.palmieri@uniroma1.it
Reception hours: by appointment

Pani Roberto *(FIS/07 Fisica Applicata)*
Department of Molecular Medicine
Location: Building Banca Unicredit - Fisica Sanitaria -1st floor, Policlinico Umberto I
☎: 06.49918277- *Fax:* 06.49918277; *E.mail*: roberto.pani@uniroma1.it
Reception hours: Thursday 2 p.m.- 4 p.m. by appointment

Pannarale Luigi *(BIO/16 Anatomia Umana)*
Department of Anatomical, Histological, Forensic and Orthopedic Sciences
Location: Section of Human Anatomy, Via Alfonso Borelli 50
☎: 06.49918058- *Fax:* 06.49918062; *E.mail*: luigi.pannarale@uniroma1.it
Reception hours: Thursday 10 a.m.-11 a.m.

Perluigi Marzia *(BIO/10 Biochimica)*
Department of Biochemical Sciences "Alessandro Rossi Fanelli"
Location: P.le Aldo Moro 5
☎: 06.49910885- *Fax:* 06.4440062; *E.mail*: marzia.perluigi@uniroma1.it
Reception hours: Monday and Wednesday 2 p.m.-3 p.m.

Polosa Antonio Davide *(FIS/02 Fisica Teorica)*
Department of Physics
☎: 06.49694247; *E.mail*: antonio.polosa@uniroma1.it
Reception hours: Tuesday 11 a.m.-1 p.m.

Puddu Paolo Emilio *(MED/11 Malattie dell'Apparato Cardiovascolare)*
Department of Cardiovascular, Respiratory, Geriatric Nephrology and Anaesthetic Sciences
☎: 06.49972659; *E.mail*: paoloemilio.puddu@uniroma1.it
Reception hours: Monday 4 p.m.-6 p.m.

Relucenti Michela *(BIO/16 Anatomia Umana)*
Department of Anatomical, Histological, Forensic and Orthopedic Sciences
Location: Section of Human Anatomy, Via Alfonso Borelli 50
☎: 06.49918061- *Fax:* 06.49918040; *E.mail*: michela.relucenti@uniroma1.it
Reception hours: Monday 9 a.m.-10 a.m. by appointment

Riggio Oliviero *(MED/12 Gastroenterologia)*
Department of Clinical Medicine
Location: Gastroenterologia B, Viale dell'Università 37
☎: 06.49972001; *E.mail*: oliviero.riggio@uniroma1.it
Reception hours: by appointment

Rossi Arnaud Clelia Matilde *(M-PSI/01Psicologia Generale)*
Department of Psychology
Location: Dipartimento di Psicologia, 1st floor, room 16
☎: 06.49917513; *E.mail*: clelia.rossi-arnaud@uniroma1.it
Reception hours: Thursday 10 a.m.

Santoni Angela *(MED/04 Patologia Generale)*
Department of Molecular Medicine
☎: 06.44340632; *E.mail*: angela.santoni@uniroma1.it
Reception hours: by appointment

Sarti Paolo *(BIO/10 Biochimica)*
Department of Biochemical Sciences "Alessandro Rossi Fanelli"
Location: Department of Biochemical Sciences " Alessandro Rossi Fanelli"
☎: 06.49910944- *Fax:* 06.4440062; *E.mail*: paolo.sarti@uniroma1.it
Reception hours: Monday, Tuesday and Friday 3 p.m.- 4 p.m. (by e-mail appointment)

Savoia Carmine *(MED/11 Malattie dell'Apparato Cardiovascolare)*
Department of Clinical and Molecular Medicine
Location: Sant'Andrea Hospital, Cardiology Unit (Audit Clinico, 3rd floor)
*Fax:*06.33775061; *E.mail*: carmine.savoia@uniroma1.it
Reception hours: Monday 3 p.m.-5 p.m. and Tuesday 3 p.m.-5 p.m.

Tanzilli Gaetano *(MED/11 Malattie dell'apparato cardiovascolare)*
Department of Cardiovascular, Respiratory, Nephrologic and Geriatric Sciences
☎: 06.4958281; *E.mail*: gaetano.tanzilli@uniroma1.it
Reception hours : by appointment

Tubaro Andrea *(MED/24 Urologia)*
Department of Clinical and Molecular Medicine
☎: 06.33777712; *E.mail*: andrea.tubaro@uniroma1.it
Reception hours : Thursday 10a.m.-1p.m.

Valenti Piera *(MED/07 Microbiologia e Microbiologia Clinica)*
Department of Public Health and Infectious Diseases
☎:; *E.mail*: piera.valenti@uniroma1.it
Reception hours: by appointment

Vallone Beatrice *(BIO/10 Biochimica)*
Department of Biochemical Sciences "Alessandro Rossi Fanelli"
Location: Department of Biochemical Sciences " Alessandro Rossi Fanelli"
☎: 06.49910548- *Fax:* 06.4440062; *E.mail*: beatrice.vallone@uniroma1.it
Reception hours: Monday 1 p.m.-4 p.m.

Venuta Federico *(MED/21Chirurgia Toracica)*
Department of Surgery "Paride Stefanini"
☎: 06.4461971; *E.mail*: federico.venuta@uniroma1.it
Reception hours: Monday, Wednesday and Friday 8.00 a.m.-10.00 a.m.

Vicini Elena *(BIO/17 Istologia)*
Department of Anatomical, Histological, Forensic and Orthopedic Sciences
Location: Section of Histology and Medical Embryology, Via A. Scarpa 14
☎: 06.49766804- *Fax:* 06.4462854; *E.mail*: elena.vicini@uniroma1.it
Reception hours: Monday 8.30 a.m.-10.30 a.m.

8. Course Programs

1 - Integrated Course of CHEMISTRY AND INTRODUCTION TO BIOCHEMISTRY

Main teaching objectives :

Knowledge of basic chemistry and of biochemical structures: glucides, proteins, lipids. At the end of the course, the students should: i) know the chemical bases of pathophysiological processes, ii) address in molecular terms some simple biomedical aspects, iii) be aware of the importance of the chemical instruments in the cultural formation of a medical doctor.

Formal Teaching (subjects)

- The matter: atomic and molecular orbitals; chemical bonds, strong and weak interactions, states of matter.
- The behaviour of Gases: ideal gas laws, solubility of gases in liquids
- Solutions: definition & properties; concentration; vapour pressure; electrolytes; dissociation equilibrium; colligative properties; osmosis.
- Redox reactions: defining oxidation and reduction, biological relevance
- Thermodynamics: the T. Parameters enthalpy, entropy, free energy and temperature. Equilibrium and T.
- Chemical reactions: equilibrium and kinetics; the *mass action low* and the equilibrium constant.
- Water solutions: acids, bases strength and pH; buffers, the interaction of salts with water.

Bio-organic Chemistry

The biomolecules: classification, shape and conformation

Hydrocarbon compounds, linear & cyclic, saturated, insaturated, homocyclic and heterocyclic: nomenclature, classification, properties.

Functional groups, chemical properties and biomedical relevance: the carbonyl group, aldehides and ketons; the carboxylic group, the alcoholic hydroxyl- , the amino- and the sulphydril- group; ethers and esters.

Glucides or saccharides: nomenclature and classification. Structure stabilization and stereochemistry, anomeric carbons and mutarotation. Redox properties of saccharides.

Mono-, di- & polysaccharides: structural properties and stabilizing bonds.

Aminoacids: nomenclature and classification. Structure stabilization and stereochemistry. The functional groups and the α-Carbon properties. Protonation and deprotonation equilibria.

Proteins: primary, secondary, tertiary and quaternary structure; denaturation and folding.

Lipids: nomenclature and classification. Fatty acids, mono- di- tri-glycerides; basic structure of phospholipids and bio-membranes. Cholesterol

Nucleic Acids: purines and pyrimidines, the nucleosides and nucleotides composition; keto-enolic tautomerism and hydrogen bonds.

Interactive teaching (goals)

The student should learn how to solve basic problems, dealing with solutions and their properties.

Interactive teaching, practical course (20 hours)

The matter: structure/function relationships.

Molecular modelling (groups of max. 20 students)

Calculus (subjects):

- Gas
- Acqueous solutions
- Colligative properties
- Equilibrium properties
- pH
- Buffers
- Hydrolysis

Tutorial Teaching Activities (small groups)	
Clinical relevance of pH. Evaluation of the blood buffering capacity.	Acid-base titrations
Clinical relevance of osmosis. Induced hemolysis evaluation.	Osmometry and spectrophotometry

Apprenticeship (practical laboratory)

Educational tasks	observed	done	Know how
Spectrophotometric, amperometric and chromatographic measurements, of biomedical relevant substances	yes	yes	yes
Fundamental molecular biology	yes	yes	yes
Cell viability measurements by fluorescence microscopy	yes	yes	no

Seminars:

- The chemical-biochemical nomenclature: laboratory conventions.
- Nitrogen monoxide in biology and medicine.

Exam:

- written: multiple choice questions (quiz), chemical formulas, basic stoicheiometry and general chemistry exercises.
- oral.

Suggested textbooks:

- **"Introduction to General, Organic and Biochemistry"**, **Bettelheim, Brown, Campbell, Farrell.**

  Brooks & Cole Eds. (preferred)
- Chemistry for the Biosciences: The Essential concepts
- Au: T. Bradshow & J. Crowe – Oxford University Press (accepted)

Suggested Internet web sites:

- http://www.chem.qmw.ac./iupac/; http://www.webelements.com/
- http://www.chemistry.mcmaster.ca/faculty/bader/aim/

2 - Integrated Course of MEDICAL PHYSICS

Main teaching objectives:

- To acquire Physics basic knowledge consistent with scientific and technological progress in medicine.
- At the end of this course, the student should be able to know basic principles of Physics helpful to understand biomedical phenomena and some working principles of new diagnostic methodologies.
- Learning outcomes:
- at the end of the course, the student must be able to identify and apply Physics' law necessary to explain a physics phenomenon

Physics quantities and measurement units. The SI system.
Point mass kinematics. Scalars and vectors. 2D motion. Force and Newton's laws of motions. Work and energy. Conservation of energy. The center of mass of a solid body. Point mass momentum. Momentum of a particles system. Conservation of momentum. Equilibrium of solid bodies. Principles of statics applied to human body. Momentum and its use in the human body. Newton's law of gravitation. Gravitational field and potential. Mechanics of extended bodies. Rotational motion. Moment of inertia and angular momentum.
Fluids statics. Fluids Dynamics. General concepts about fluids motion. Continuity equation. Bernoulli's equation. Surface tension and Laplace. Real fluids. Laminar and turbulent motion. Hagen-Poiseuille. Physics of circulatory and respiratory system.
Wave phenomena. Mechanical waves. Example of waves. The propagation of waves. The speed of waves. Wave intensity and wave power. Superposition principle.
Temperature. Heat and the first law of thermodynamics. Heat capacity and specific heat. Heat conduction. Entropy and second law of thermodynamics. Electric charge and Coulomb's law. Electric Field. Electric field flux and Gauss' law. Isolated charged conductor. Electrostatic and gravitational forces. Electric potential energy. Equipotential surfaces. Capacitor and dielectric. Electric current. Current density. Resistance, resistivity and conductivity. Ohm's law. Circuit.
The Magnetic field, Motion of charge in a magnetic field. Biot-Savart law. Ampere's law. Faraday's law of induction. Lenz's rule. Electromotive force resulting from motion. Induced electric field.
Atomic model. X rays spectrum. The discover of the nucleus. Some nucleus' properties. Radioactive decay. Ionizing radiation.
Physical principles applied to images formation process in diagnostic techniques.

Exam: written & oral

Suggested textbooks:

- Physics: Principles with Applications, Douglas C. Giancoli, *University of California*
- Physics for Scientists and Engineers with Modern Physics by Raymond A. Serway and John W. Jewett
- Fundamentals of Physics: David Halliday, Robert Resnick, Jearl Walker *John Wiley & Sons*

Suggested Physics websites:

- http://www.mi.infn.it/~phys2000/
- http://www.explorescience.com/activities/index.cfm
- http://www.phy.ntnu.edu.tw/java/index.html
- http://ww2.unime.it/dipart/i_fismed/wbt/

3 - Intergrated Course of BIOLOGY AND GENETICS (I & II)

Main teaching objectives:

The aim of the integrated course is to give students the tools to be familiar with structure and function of the principal components of the cell; to understand the molecular basis of cellular functions; to be aware of how the alteration of cellular functions can bring about pathological states. Students will learn how the genetic information flows between DNA, RNA, and proteins and how traits are inherited from one generation to the other. Concepts of classical and molecular genetics will be taught.

Biology

Franca Citarella, Department of Cellular Biotechnology and Hematology , Sapienza University of Rome.
e-mail: Citarella@bce.uniroma1.it ; phone: 390649918243

Introduction to cellular biology: the diversity and similarity of living organisms.
Biology and the scientific method, The Origin and Evolution of Cells
Cells As Experimental Models, Tools of Cell Biology
The Chemistry of Life
The Molecular Composition of Cells
Enzymes as Biological Catalysts
The Flow of Genetic Information
Nucleic acids, Chromatin and Chromosomes, DNA Replication, DNA Repair
RNA Synthesis and Processing: Transcription in Prokaryotes,
Eukaryotic RNA Polymerases and General Transcription Factors,
Regulation of Transcription in Eukaryotes, RNA Processing and Turnover
Protein Synthesis, Processing, and Regulation: Translation of mRNA,
Protein Folding and Processing, Regulation of Protein Function, Protein Degradation
Cell Structures and Function
The Cell Surface: Structure of the Plasma Membrane, Transport of Small Molecules
Protein Sorting and Transport - The Endoplasmic Reticulum, Golgi Apparatus, Lysosomes
The mechanism of Vesicular Transport (receptor mediated endocytosis)
The Cytoskeleton and cell junctions
Nucleus: The Nuclear Envelope, Traffic between the Nucleus and Cytoplasm, the Nucleolus
Bioenergetics and Metabolism - Mitochondria, The Mechanism of Oxidative Phosphorylation
Peroxisomes
Cell regulation
Cell Signaling: Signaling Molecules and Their Receptors, Functions of Cell Surface Receptors
Pathways of Intracellular Signal Transduction, Regulation of Programmed Cell Death
The Cell Cycle: The Eukaryotic Cell Cycle, Regulators of Cell Cycle Progression, Mitosis
Cancer: The Development and Causes of Cancer, Tumor Viruses, Oncogenes,
Tumor Suppressor Genes

Textbooks:

"Cell and Molecular Biology" Gerald Karp published by Wiley & Sons, Inc

"World of the Cell" Becker, Kleinsmith, Hardin, Bertoni published by Pearson Education

NCBI bookshelf on line: "Molecular Biology of the Cell" Bruce Alberts;

"The Cell, a molecular approach" Geoffrey M Cooper

Genetics

Marcella Devoto and Paolo Fortina

I SEMESTER

1. Structure and functions of genes and human genome
    - DNA, RNA, non-coding RNA, pseudo-genes
    - Anatomy of the human genome
2. Variation in the human genome
    - Mutations, polymorphisms, SNP, VNTR, repetitive DNA, CNV, LOH
3. Mendelian inheritance and its exceptions
    - Autosomal recessive and dominant, X-linked, and mitochondrial transmission
    - Imprinting, genetic heterogeneity, reduced penetrance, variable expressivity
    - Recurrence risk for Mendelian traits in human pedigrees

II SEMESTER

4. Molecular analysis of nucleic acids
    - DNA extraction
    - Restriction enzymes, electrophoresis and hybridization
    - Southern and Northern blotting
    - PCR, RT-PCR, TaqMan, ASO, ARMS, OLA, SSCP, DHPLC, MLPA
    - Sanger sequencing
    - Microarray
5. Human chromosomes and cytogenetic analysis
    - Karyotype
    - FISH, aCGH
6. Gene mapping and linkage analysis
    - Recombination and genetic distance
    - Genetic mapping of rare Mendelian disorders
    - Lod-score and model-free analysis in human pedigrees
7. Basic principles of population genetics
    - Allelic frequency
    - Hardy-Weinberg equilibrium
    - Consanguinity
    - Linkage disequilibrium

8. Complex genetic traits and genetic epidemiology
   - Multifactorial inheritance, threshold model
   - Twin and adoption studies, recurrence risk ratios
   - Common disease/common variant hypothesis
   - Association studies
   - Lessons learned from genome-wide association studies (GWAS) on common complex traits

9. High-throughput technologies and their applications
   - Genome-wide association study (GWAS)
   - Next-generation sequencing (NGS)
   - Whole genome sequencing (WGS)
   - Whole exome sequencing (WES)
   - Whole transcriptome (WT)

10. The Human Genome Project and its developments
   - HapMap Project
   - 1000 Genomes Project
   - The Cancer Genome Atlas (TCGA)

11. Basic principles of clinical genetics
   - Chromosomal syndromes and genomic disorders
   - Dynamic mutations and mental retardation
   - Neuromuscular disorders and cardiomyopathies
   - Hemoglobinopathies, hemophilia, congenital errors of metabolism, cystic fibrosis, hearing loss
   - Clinical cancer genetics
   - Prenatal diagnosis of genetic disorders

Texbook:

- Bruce Korf and Mira Irons, Human Genetics and Genomics, Fourth Edition, Wiley-Blackwell 2013

4 - Integrated Course of HISTOLOGY AND EMBRYOLOGY

Main teaching objectives:

Through the integrated study of Cytology, Histology and Embryology, the student will learn the microscopic anatomy of cells, tissues and organs, with an emphasis on relationships between structure and function, and to describe and discuss, using a correct terminology, specific morphological organizations. The course will teach the fine mechanisms of cell differentiation, histogenesis and embryogenesis. Through the study of gametogenesis, fertilization and the early stages of embryonic development, the student will learn the mechanisms and processes of primitive embryonic layers formation, and the development of organs and apparatus.

Introduction: Histological techniques: overview of methods in cytology and histology; tissue preparation for microscopic examination; optical instruments for studying cells and tissues.

Cytology: Structural organization and function of the eukaryotic cell. Cytoplasm and nucleus. Cytoplasmic organelles. Plasma membrane. Rough and smooth endoplasmic reticulum. Golgi apparatus and vesicle trafficking. Mitochondria. Cytoskeleton and centrioles. Inclusions. Cytosol. Nucleus. Nuclear envelope. Chromatin. Nucleolus. Cell death and division.

Histology: Introduction to tissues. Cell differentiation and histogenesis of tissue. Tissue engineering.

Epithelium. Specializations of cells surface and cell polarity. Lining epithelia: generalities and histological structure of epidermis and digestive, respiratory, urogenital mucosae. Glands: histogenesis and structure of major exocrine and endocrine glands (pancreas, liver, prostate, salivary, mammary, pituitary, thyroid, parathyroid, adrenal).

Connective tissues. General structure and functions of connective tissue; extracellular matrix, fibers, ground substance and cells; Connective tissue proper.

Cartilage. Types of cartilage; chondrogenesis and cartilage growth

Bone. Osteogenesis; bone remodeling and homeostasis .

Blood: plasma, erythrocytes, leucocytes, platelets. Hemopoiesis.

Immune system and organs, including the histological structure of thymus, spleen and lymph nodes.

Muscle tissues: morphology and functional characteristics of skeletal, cardiac muscle and smooth muscle. Nervous tissue. Neurons. Nerve fibers. Synapses. Neuroglia. Peripheral nerve terminals.

Embryology: Introduction. Gonads, gametogenesis and fertilization. *In vitro* fertilization. Embryonic and adult stem cells, somatic cell reprogramming into pluripotent stem cells (iPS): concepts, definition and potentiality for tissue regeneration and repair. Early stages of the embryo development. Segmentation. Morula. Blastocyst and implantation. The embryonic disk. Timing and 3D development of primitive layers: endoderm, ectoderm and mesoderm. The notochord and its role in embryo development. Further development and derivatives of ectoderm, endoderm and mesoderm. Placenta. Embryo annexes. Morphogenetic mechanisms. Interactions between primitive layers and initial organogenesis with some examples: central nervous system, circulatory, digestive, respiratory and urogenital systems. Neural crest derivates. Teratogenesis.

Exam: oral

Textbooks:

Histology (including essential Cytology)

- Gartner LP & Hiatt JL, Color Textbook of Histology, Lippincott Williams & Wilkins, 2009.
- Ross MH & Pawlina W, Histology: a Text and Atlas, Lippincott Williams & Wilkins, 2010.
- Young B & Others, Wheather's Functional Histology. Churchill Livingstone Elsevier, 2006.

Embriology

- Moore K.L. The developing Human. Clinically oriented Embryology, Saunders Elsevier, 9th ed.
- Sadler T.W. Langman's Medical Embryology, Lippincott Williams & Wilkins, 2010.
- Shoenwolf G.C. Larsen's Human Embryology, Churchill Livingston Elsevier, 2009

Additional textbooks:

- Alberts and Others, Molecular Biology of the Cell, Garland Science, 2008.
- Ross MH, Pawlina W & Barnash TA, Atlas of descriptive Histology, Sinauer Associates, 2009

- Eroschenko VP, Di Fiore's Atlas of Histology with functional correlations, Lippincott Williams & Wilkins, 2007
- Gartner LP & Hiatt JL, Color Atlas of Histology, Lippincott Williams & Wilkins, 2009.

Further informations at: http://w3.uniroma1.it/istologia/guiM&C-F.html

5 - Integrated Course of BASIC MEDICAL-SCIENTIFIC METHODS (I, II and III)

Main teaching objectives:

- have acquired method and learning appropriate towards a theoretical practical background based on scientific bases and human relationships. The student should know the main stages of the evolution of medical thought, including a multicultural perspective. The student should know the origin, evolution and current use of the main terms used in medicine and be able to explain conceptual implications. The student should be aware of the variability inherent in biological, clinical and instrumental data and the usefulness of statistical methodology for synthesis and understanding of bio-medical phenomena.
- be able to establish collaboration with different professionals in group work, respecting the various autonomies. The student should use precise and appropriate medical terminology for a better understanding and transmission of data. The student should correctly apply the method of gathering and recording information: be able to discuss about quantitative methods in medicine and the measurement of biological phenomena, be able to use statistical, probabilistic and data processing instruments in order to manage the uncertainty connected with the nature of the medical process.
- know how to establish a therapeutic alliance with the patient and be able to apply the principle of "caring for". The student should create a relationship with the patient, relatives and the personnel involved in assisting the patient and other colleagues involved in the diagnostic-therapeutic programme.

Basic Medical-Scientific Methods (II)

Main teaching objectives:

- know how to use methodology oriented towards information, communication and health education, should be able to recognize main risk factors such as the causes of social unease and the characteristics of different human groups.
- be aware of relational, educational, social and ethical aspects involved in prevention and to be future doctors professionally coherent with the health objectives of the WHO.
- understand and interpret the basic techniques of demography and epidemiology used to measure the health of a population and investigate the aetiology of diseases; compare and contrast strategies, based on the individual person and on the population, for the prevention of ill-health and premature death.

Basic Medical-Scientific Methods (III)

Main teaching objectives:

- know the development of scientific thought in relation to medical care based on reasoning and clinical method; the methodological study of genetic diseases and the new frontiers of genetics for the development of medicine; health as primary benefit of man and the community.
- know how to apply scientific method in the medical field in order to define the basis of the formulation of clinical reasoning, in the light of fundamental ethical models of reference.
- be able to evaluate the close relationship between health-person-bioethics-genetic inheritance-symptoms and objective examination in order to provide appropriate management of the patient.

6 - Integrated Course of BIOCHEMISTRY (I & II)

Main teaching objectives:

- knowing the structure and function of the main classes of biomolecules, and specifically of macromolecules and supramolecular structures, and the main biochemical methodologies used in their study;
- recognizing the structure-function relationships in biological macromolecules;
- being aware that the study of molecular structures constitutes the conceptual basis for the understanding of metabolic processes and cellular physiopathology;
- knowing the main metabolic pathways, their regulation at the molecular and cellular level, and their integration;
- recognizing the rationale that governs the intermediate metabolite fluxes;
- being conscious that perturbations in the structures of biological macromolecules, which carry out reactions and which are involved in the regulation of metabolic pathways, are the onset of pathological cellular and systemic conditions.

Biochemistry I (first year – II semester – aptitude test)

Chemical composition of the living matter. Properties of water. Biological buffer systems. .

Proteins: Amino acids. Classification, properties, dissociation, isoelectric point. Peptide bond. Natural peptides. Glutathione. Neuropeptides. Structure of proteins. Structural organization levels. Collagen, elastin. Denaturation of proteins. Hemoglobin and myoglobin. Hemoglobinopathies. Immunoglobulins. Blood composition. Biochemical basis of muscle contraction.

Introduction to proteomics. Domains and structural motifs in proteins. Principles of macromolecules recognition: protein-protein and protein-nucleic acid interactions. Thermodynamics and kinetics of protein folding. Molecular basis of degenerative diseases caused by misfolding: prions and □-amyloids.

Nucleic acids. Nucleotides. DNA double helical structures: A, B and Z; DNA supercoiling; cruciform DNA structures; RNA structure. Genetic code. Protein synthesis and its inhibition.

Principles of biochemical methods and molecular biology techniques. Macromolecules purification and characterization methods: chromatography, electrophoresis, spectrophotometry, fluorimetry, mass spectrometry. Methods for the determination of macromolecules' molecular weight. DNA purification. Nucleic acid hybridizations. Molecular cloning. PCR and its applications. Recombinant protein expression methods.

Carbohydrates. Mono-, oligo- and poly-saccharides. Storage and structural polysaccharides. Proteoglycans. Peptidoglycan. Glycoproteins: blood groups.

Lipids. Classification. Fatty acids and neutral fats. Phospholipids and sphingolipids. Arachidonic acid and its derivatives. Cholesterol and derivatives. Lipoprotein structure. Biological membranes. Membrane proteins: structure and properties. Membrane transport. The Na^+/K^+ pump. Ion channels. Peptide antibiotics.

Vitamins. Natural sources. Active forms and function. Hypo- and hypervitaminosis.

Enzymes. Thermodynamic aspects of catalysis. Enzyme kinetics. Mechanisms of catalysis and regulation. Allostery. Enzyme inhibition. Enzyme classification. Coenzymes. Proteases. Blood clotting: physiological role and involvement in pathology.

Biochemistry II (second year – I semester - exam)

Carbohydrate metabolism. Absorption and digestion. Glycolysis. Synthesis and degradation of glycogen. Gluconeogenesis. The pentose phosphate pathway. Shuttle systems. Regulation and physiological implications.

Lipid metabolism. Absorption and digestion. Bile salts. Fatty acid oxidation. Ketone bodies. Fatty acid biosynthesis, Cholesterol metabolism. Role of lipoproteins in lipid metabolism. Regulation and physiopathological implications.

Oxidation of pyruvate and acetyl-CoA. Citric acid cycle.

Protein metabolism. Absorption and digestion. Proteasome structure and function. Amino acid metabolism: transamination, deamination, decarboxylation. Adrenalin and GABA biosynthesis. Urea cycle. Regulation and physiopathological implications. Heme metabolism. Basics of purine and pyrimidine metabolism.

Electron transport and oxidative phosphorylation. Respiratory chain: complex I-IV and chemiosmotic theory. ATP synthase. Inhibitors and uncouplers. Energetic yield of carbohydrate and lipid catabolism.

Integration and control of metabolic processes.

Signal transduction. Structural basis of receptor biochemistry. Receptor families. Adrenergic, nicotinic and tyrosine-kinase receptors. Second messengers (cAMP, inositol, Ca^{2+}). Meccanism of action of steroid hormones. Local hormones (NO, eicosanoids). Meccanism of vision, taste and smell.

Interactive activities

Biochemistry (I-II): the goal is to let the student get acquainted with the basic techniques and methods used in a biochemistry lab.

Exams:

Biochemistry I : written aptitude test

Biochemistry II : oral examnination

Texts:

- Lehninger Principles of Biochemistry**,** DL Nelson & MM Cox Fifth Ed.
- Biochemsitry, D. Voet & JG Voet, Biochemistry, Fourth Ed.

7 - Integrated Course of HUMAN ANATOMY (I, II & III)

General learning aims:

- Structural organization and functions of the human body and their main anatomical and clinical applications at macroscopic, microscopic and ultrastructural level.
- Skills: to identify macroscopic anatomical samples and to recognize the structure of the organs by light microscopy.

Human Anatomy (I)

- *General Anatomy*: History of Anatomy. Anatomical terminology. General organization of the human body.
- *Skeletal and Muscular system*: Generalities on bones, joints and muscles. External skull and intracranial region. Vertebral column and Thoracic skeleton. Pectoral girdle and upper limb (arm, elbow, forearm, wrist and hand). Abdominal wall. Pelvic girdle and lower limb (hip, knee, leg, ankle and foot). Muscles of the head, neck, back, thorax, abdomen, pectoral and pelvic girdle, upper and lower limb.
- *Cardiovascular system*: Generalities of the cardiovascular system. Mediastinum. Heart and great vessels. Pericardium. Coronary circulation. Conduction system. Arteries; Capillaries, Veins.

Human Anatomy (II)

- *Lymphoid system*: Bone marrow. Thymus. Spleen. Lymph nodes.
- *Respiratory system*: Nose. Nasal cavities and paranasal sinuses. Pharynx. Larynx. Trachea and bronchi. Lungs and pleura.
- *Digestive system*: Oral cavity. Major salivary glands. Isthmus of fauces. Pharynx. Oesophagus. Stomach. Small and large intestine. Rectum. Liver, gallbladder and biliary tree. Pancreas. Peritoneum and peritoneal cavity.
- *Urogenital system*: Kidney and ureter. Bladder and urethra. Male reproductive system (testis and spermatic tracts, prostate). Female reproductive system (ovary, uterine tubes and uterus). External genitalia.

Human Anatomy (III)

- *Neuroanatomy*: Overview of the Central Nervous System. Spinal cord. Brain stem. Cerebellum. Diencephalon. Basal ganglia. Cerebral hemisphere. Ventricular system, subarachnoid spaces and meninges. Motor pathways. Pathways of the general and the specific sensibility.
- *Peripheral nervous system*: Generalities. Spinal nerves. Plexuses. Cranial nerves. Organization of the Autonomic Nervous System.
- *Visual apparatus*: Orbit and accessory visual apparatus. Eyeball. Visual Pathway.
- *Auditory apparatus*: External and middle ear. Internal ear. Pathway of sound reception.
- *Endocrine system*: Generalities. Hypothalamus and its nuclei. Pituitary gland. Pineal gland. Thyroid and parathyroid glands. Adrenal gland. Endocrine Pancreas. Interstitial glands of testis and ovary.

Suggested textbook:

- GRAY'S ANATOMY (fortieth edition) – Churchill Livingstone.

Suggested atlases:

- Atlas of Human Anatomy – FH Netter - Saunders Elsevier.

Additional textbooks:

- WHEATER'S FUNCTIONAL HISTOLOGY – Elsevier *(Human Anatomy 2)*
- GRAY'S CLINICAL NEUROANATOMY – Mancall and Brock – Elsevier *(Human Anatomy 3)*
- GRAY'S ANATOMY for student (second edition) - Churchill Livingstone

8 - Integrated Course of MICROBIOLOGY

Main teaching objectives:

The course will introduce students to basic principles of microbial pathogenesis, using some infectious agents as model. The plan for conveying the knowledge in medical microbiology is to present, first, concepts of infectious agent structure and morphology, and then relate them to principles of microbial growth, replication and/or multiplication. Together these concepts will form the basis for understanding how infectious agents are classified, how their genetic apparatus works and how they interact with and affect the host. The above molecular and cellular mechanisms are combined with the concept of microbial pathogenesis, innate and adaptive immune response, immune evasion, persistent infections and epidemiology, evolution, and control of infectious agents. The most important infectious agent families are then discussed individually. At the end of the course, some students will be invited to make a presentation of 15 minutes. The topic of the presentation will be chosen from recent articles on hot topics in medical microbiology which deserve or may stimulate an interactive discussion. Opportunity of short laboratory research/diagnostic experience will also offered to students who are particularly interested on such a subject.

General Mircobiology, Bacteriology, Mycology

Introduction to Microbiology.

Normal Microbiota, Host-Microrganism Relationships, Occasional Pathogens, Opportunistic Pathogens, Primary Pathogens.

Bacterial structure, classification, and replication.

Microbial Nutrition and Growth.

Bacterial genetics.

Mechanisms of bacterial pathogenesis. Bacterial toxins.

Microbial Diseases and Their Control.

Basic concepts in Immune response: serums and vaccines.

Antimicrobial Chemotherapy: mechanisms of action and drug resistance.

Gram positive bacteria: Staphylococci (*S.aureus, S.epidermidis*); Streptococci (*S.pyogenes, S.agalactiae, S.pneumoniae*); Spore forming bacilli (*B.anthracis, B.cereus*); Clostridium (*C.tetani, C.botulinum, C.perfringens; C.difficile*); Listeria (*L.monocytogenes*); Corynebacterium (*C.diphteriae*)

Gram negative bacteria: Neisseria (*N.gonorrhoeae, N.meningitidis*); Enterobacteria (*Escherichia, Salmonella, Shigella, Yersinia*); Vibrio (*V.cholerae*); Helicobacter (*H.pylori*); Campylobacter; Brucella; Haemophilus (*H.influenzae*); Bordetella (*B.pertussis*); Legionella (*L.pneumophila*);

Acid-alcohol resistant bacillus: Mycobacteria (*M.tuberculosis*)

Spirochetes (*T.pallidum, B.burgdorferi, L.interrogans*)

Mycoplasma, Rickettsia, Chlamydia (*C.pneumoniae, C.trachomatis*)

Fungal classification, structure, and replication.

Mechanisms of fungal pathogenesis.

Antifungal drugs.

Throughout the course, laboratories in microbiology will introduce students to some of basic techniques used in diagnostic laboratories for the identification of infectious bacteria and fungi.

Parasitology

General Parasitology: basic terminology : parasites, obligate parasite, facultative parasite, ectoparasites, endoparasites; commensal and pathogenic parasites. Host, definitive host, intermediate host, reservoir ; vector ; zoonosis, zooparasitosis, antropoparasitosis.

Intestinal and urogenital protozoa: life cycle and pathology of intestinal amebae (*Entamoeba histolytica*) and outlines of non-pathogenic amebae; intestinal flagellates (*Giardia lamblia*), intestinal coccidia (*Cryptosporidium parvum*) and urogenital flagellates (*Trichomonas vaginalis*).

Blood and tissue protozoa: African Trypanosomiasis (*Trypanosoma brucei gambiense* and *rhodesiense*), American Trypanosomiasis (*Trypanosoma cruzi*), Leishmaniasis, Malaria, Toxoplasmosis.

Helminths: classification and general concepts; morphology, life cycles, and pathogenic mechanisms of: liver, intestinal and lung Trematodes (*Fasciola, Opistorchis, Fasciolopsis, Paragonimus*); blood trematodes (*Schistosoma*); Cestodes (*Taenia, Hymenolepis, Echinococcus)*; intestinal and tissue Nematodes (*Enterobius, Ascaris, Trichuris, Ancylostoma, Necator, Strongyloides Trichinella, Daracunculus, Wuchereria, Loa, Onchocerca*).

Arthropods: basic concepts on arthropods of medical importance; temporary and permanent ectoparasites (*Sarcoptes, Argas, Ixodes, Pediculus, Pulex*, hematophagous diptera).

Virology

General Virology: principles of viral structure, virus replication strategies, effect of viral replication on host cells and cell transformation, immune response to viral infections, pathogenesis of viral infections, principles of diagnostic virology, epidemiology, antiviral agents an control of viral infections.

Specific virus families: Picornaviridae, Caliciviridae, Astroviridae, Togaviridae, Flaviridae, Rabdoviridae, Paramyxoviridae, Orthoviridae, Arenaviridae, Reoviridae, Retroviridae, Polyomaviridae, Papillomaviridae, Adenoviridae, Parvoviridae, Herpesviridae, Hepadnaviridae.

Textbooks:

- Medical Microbiology - Jawetz Melnick&Adelbergs/ Mac Graw Hill– 2012
- Medical Microbiology - Murray, Rosenthal, Pfaller /Elsevier Saunders– 2012

9 - Integrated Course of HUMAN PHYSIOLOGY (I, II & III)

Main teaching objectives:

At the end of the course, students must know the function of the organs in the human body; the dynamical integration of the various organs into systems; the general mechanisms of functional control under normal conditions; the normal values of the main functional parameters in healthy humans; the medical application of biophysical and biotechnological principles. They must also know some of the techniques used to measure physiological parameters.

Human Physiology (I)

What is physiology. Homeostasis. Body fluids.

Cell as unit: electrical parameters of cell membrane and circuitry; resting membrane potential; action potential. Voltage-dependent ion channels. Biophysical methods to study electrical membrane events. Neurotransmitters. Electrical synapses: structure and functions. Chemical synapses: structure and functions. Transmitter release spontaneous and evoked. Synaptic potential, spatial and temporal summation. Membrane receptors. Families of ionotropic receptors: structural analogies and functional characteristics. Families of metabotropic receptors: structural analogies and functional differences. Second messengers and signal transduction mechanisms. Synaptic activity and cognitive processes.

Muscle physiology: neuromuscolar junction. Muscles: structure and function of the different muscle types. – Skeletal, smooth and cardiac muscle contraction.

Blood physiology: Functions. – Blood components: plasma, erythrocytes, leukocytes, platelets. Mechanisms of hemostasis.

Autonomic nervous system. General organization and cardiocirculatory centers.

Heart and circulation: Laws of fluid mechanics applied to circulation. Arterial pressure and peripheral resistances. The heart: myocardial physiology, cardiac cycle. Cardiac output, venous return. Myocardial excitation and impulse conduction; control mechanisms. Electrocardiography. – Microcirculation and lymphatic system. Exchanges between tissues and blood. Control of blood flow and arterial pressure. Methods to measure arterial pressure.

Exam: oral.

Textbooks:

- Guyton & Hall: Medical physiology, Elsevier Imprint: Saunders
- Berne e Levy: Medical Physiology, Imprint: Mosby
- Silverthorn: Human Physiology, Publisher: Benjamin Cummings

Human Physiology (II)

The kidney and the body fluids. Body fluid compartments; water and salt equilibrium. Urine formation: glomerular filtration, tubular transport of the electrolytes, tubular water reabsorption and the regulation of fluid osmolarity. Mincturition. Renal mechanisms for the control of blood and extracellular fluid volume. Regulation of the concentration of the principal electrolytes (sodium, potassium, calcium, magnesium, phosphate).

Respiration: structure of the lungs. Pulmonary pressure and ventilation; Pulmonary volumes. Mechanical properties of the lungs. Pulmonary circulation. Gas exchange. Respiratory gas transport. Control of breathing.

Acid-base balance: Body buffer systems for extracellular pH: plasma proteins, bicarbonate, phosphate. Renal regulation of the acid-base balance. Respiratory regulation of the acid-base balance. Disturbances of the acid-base balance.

Gastrointestinal physiology: motility, nervous control and blood circulation in the gastrointestinal tract. Food progression and mixing in the digestive tract. Gastrointestinal secretion: salivary, gastric, pancreatic, biliary, intestinal secretions. Food digestion. Absorption of water, nutrients and electrolytes in the small intestine. Absorption in the large intestine. Main metabolic functions of the liver.

Endocrinology: hormone structure and action. Measurement of hormone levels. Pituitary hormones and hypothalamic control mechanisms. Thyroid hormones. Adrenocortical steroid hormones. Endocrine pancreas: insulin and diabetes. Parathyroid hormone and calcitonin: calcium and phosphate metabolism. Male and female sex steroid hormones. Reproduction and pregnancy.

Textbooks:

- BM Koeppen, BA Stanton: Berne & Levy Physiology. Mosby Elsevier 2010. ISBN: 978-0-323-07362-2
- JH Hall: Guyton and Hall Medical Physiology. Saunders Elsevier. ISBN: 978-1-4160-44574-8
- DU Silverthorn: Human Physiology. 6th edition. Benjamin Cummings. ISBN: 978-0321750006

Human Physiology (III)

Sensory receptors: neural circuits for processing information.

Somatic Sensations: I. General organization: senses of touch and position.

Somatic Sensations: II. Pain, headache and temperature.

The Eye: I. Vision optics. The Eye II. Function of the eye and retinal nerve. The eye III. Central neurophysiology of vision.

The sense of hearing. The chemical senses: taste and smell.

Motor functions of the spinal cord: spinal reflexes. Control of motor function in the cortex and the brainstem. The cerebellum, basal ganglia and overall control of the movement.

The cerebral cortex: intellectual functions of the brain, learning and memory. Mechanisms of behavior and motivation of the brain: the limbic system and hypothalamus. Brain activity states: sleep, brain waves, epilepsy, psychosis.

Exam: oral

Textbooks:

- JH Hall: Guyton and Hall Medical Physiology. Saunders Elsevier. ISBN: 978-1-4160-44574-8

- BM Koeppen, BA Stanton: Berne & Levy Physiology. Mosby Elsevier 2010. ISBN: 978-0-323-07362-2
- DU Silverthorn: Human Physiology. 6th edition. Benjamin Cummings. ISBN: 978-0321750006

10 - Integrated Course of IMMUNOLOGY AND IMMUNOPATHOLOGY

Main teaching objectives:

To understand the molecular and cellular basis of the immune response. To understand the fundamental mechanisms responsible for protection and for tissue damage, and to comprehend their specific role in the resistance against pathogens, the immune surveillance against tumors, and immune-mediated diseases.

Formal teaching subjects:

General aspects of the immune system: cellular and molecular participants to innate and adaptive immune responses.
Cytokines and their receptors.
Innate immunity: cellular and molecular components, cell differentiation, activation, and effector functions.
The molecular basis of antigenicity, antigen receptors and the generation of diversity.
The Major Histocompatibility Complex and antigen presentation.
Maturation, activation and effector functions of B and T lymphocytes.
Biology of T cell subsets: helper (Th), cytotoxic (CTL), and regulatory (T reg).
Antibodies: molecular structure, effector functions, Fc receptors, the antigen/antibody reaction.
The complement cascade: activation pathways and regulation.
NK cells.
Hematopoiesis, lymphoid organs, leukocyte migration and trafficking.
Mucosal immunology.
Development and regulation of immune responses.
Immune responses against different classes of pathogens: viruses, bacteria, fungi and parasites, and mechanisms of pathogen evasion.
Principles of vaccination.
Immune responses against tumors and principles of immunotherapy.
Type I hypersensitivity reactions (allergies).
Type II hypersensitivity reactions and elements of immunohematology.
Type III and type IV (delayed-type) hypersensitivity reactions.
Mechanisms of central and peripheral tolerance; autoimmune diseases.
Transplantation immunology.
Primary and acquired immunodeficiencies.
The most common immunological techniques.

Interactive teaching: guided discussion of clinical cases (with the participation of clinical teachers), as a mean to illustrate the major subjects of immunopathology.

Exam: oral

Textbooks:

- Cellular and Molecular Immunology, 7th Edition (2011, Elsevier)
  Abul K. Abbas, Andrew H. Lichtman, & Shiv Pillai
- Kuby Immunology, Seventh Edition (2012, W.H. Freeman and Company)
  J. Owen, J. Punt, S. Stransford
- IMMUNOLOGY, 8th Edition (2012, Elsevier)
  David Male, Jonathan Brostoff, David Roth, Ivan Roitt
- Janeway's Immunobiology, 8th Edition (2011, Garland Science, Taylor Francis Group)
  Kenneth M. Murphy

11 - Integrated Course of CLINICAL SCIENTIFIC METHODS (IV, V & VI)

Main teaching objectives:

Methods of patient's interviewing and health history taking

Adapting Interviewing Techniques to Specific Situations

Basics of clinical reasoning

Blood pressure measurement

Basic of surgical procedures

Physical Examination: General Survey and Vital Signs

TECHNIQUES OF EXAMINATION

Beginning the Examination: Setting the Stage; Approaching the Patient; Scope of the Examination: How Complete Should It Be?; Choosing the Examination Sequence; Examining Position and Handedness

THE GENERAL SURVEY

Apparent State of Health; Level of Consciousness, Signs of Distress; Skin Color and Obvious Lesions, Facial Expression; Odors of the Body and Breath Posture, Gait and Motor Activity; Examination of head and nek; Examination of skin (Color, Moisture; Temperature), Eyes and Ear

The Thorax and Lungs examination

TECHNIQUES OF EXAMINATION

Initial Survey of Respiration and the Thorax

Examination of the Posterior Chest (Inspection,Palpation, Percussion, Auscultation); Examination of the Anterior Chest (Inspection, Palpation, Percussion, Auscultation)

Special Techniques (Clinical Assessment of Pulmonary Function, Forced Expiratory Time
Identification of a Fractured Rib).

The Cardiovascular examination

TECHNIQUES OF EXAMINATION (Jugular Venous Pressure and Pulsations, Jugular Venous Pressure (JVP), Jugular Venous Pulsations, The Carotid Pulse, Thrills and Bruits, The Brachial Artery)

SEQUENCE OF THE CARDIAC EXAMINATION
Inspection and Palpation, Percussion , Auscultation (Listening for Heart Sounds; Attributes of Heart Murmurs)

Special Techniques (Aids to Identify Systolic Murmurs, Pulsus Alternans, Paradoxical Pulse)

PRACTICAL ACTIVITY:
Practices of history taking and patient's interviewing
Practices on physical examination general
Practice on physical examination cardiovascular system, lung and torax

Each group for practical activities will constituted by 5-6 students; the calendar and the locations of practical activities will be explained during course presentation.

Exam: written (multiple choice)

Textbooks:

- Bates' Guide to Physical Examination and History-Taking - Lippincott Williams & Wilkins - Lynn Bickley MD (Author), or
- Goldman's Cecil medicine 24th edition

12 - Integrated Course of PATHOLOGY AND PHYSIOPATHOLOGY (I+II)

Main teaching objectives:

- Knowledge of the etiology and the pathogenetic mechanisms of human diseases, basic pathophysiological mechanisms of major organs and systems.
- Interpretation of basic pathophysiological and pathogenetic mechanisms of human disease.
- Ability to analyze the fundamental pathophysiological mechanisms of human diseases and interpret their results.
- Knowledge of the pathogenetic basis of disease and pathophysiological processes as the essential substrate for subsequent clinical approach to human diseases.

Pathology and Pathophysiology (I)

- Etiology: Main concepts of health, pathologic process and disease; etiology, pathogenesis, evolution, resolution (exitus). General environmental pathology. Pathology by physical and chemical agents. Biological agents of disease: bacterial exotoxins and endotoxins. Non-hereditary congenital disease. Teratogenesis.
- Genetic disorders: Gene mutation and disease. Genetic inheritance patterns. The major chromosomal and gene disorders. Genetics of multifactorial diseases. Kariotype analysis and methods for genetic diseases. Models of human genetic disorders.
- Molecular Pathology: Molecular pathology of proteins. Hemoglobinopathies. Pathology by enzyme deficiencies. Molecular pathology of the plasma membrane: receptors, channels, transduction mechanisms. Molecular pathology of the components of the connective tissue. Molecular pathology of mitochondria.
- Inflammation: The basics of inflammation, acute and chronic inflammation. Innate immunity and inflammation. Inflammation as a transcriptional program. Inflammatory cells. Chemical mediators of inflammation of cellular and plasma origins. Acute inflammation: the vascular phenomena of inflammation, the mechanisms of formation of exudate, the various types of exudative inflammation. Chronic inflammation: mechanisms of granuloma formation. Foreign-body granulomas. The main immunological granulomas. Systemic manifestations of inflammation: acute phase proteins, erythrocyte sedimentation rate, and leukocytosis. Pathophysiology of thermoregulation and fever. Tissue repair and granulation tissue. Pathological aspects of wound healing: keloids, scars.
- Pathology of cell structures: the cell's response to injury: cellular stress, cellular adaptations (hypertrophy, hyperplasia, atrophy, metaplasia), intracellular storage diseases (steatosis, lysosomal diseases). Molecular mechanisms of cellular damage. Cell death: necrosis and apoptosis. Renewal, regeneration and tissue repair. Growth factors. Aging.
- Abnormalities of the extracellular matrix: Beta-fibrillosis. Localized and systemic fibrosis. The diseases of collagen and other basement membrane components.

Pathology and Pathophysiology (II)

- Oncology: Cell/Tissue phenotypic changes: metaplasia, dysplasia, anaplasia and precancerous lesions.
- Definition of cancer. Morphological and biochemical features of the neoplastic cell. Histogenetic classification of tumors. Clinical criteria for the classification of tumors: grading and staging. Pathophysiology of replication and of cell differentiation and growth factors. Physical, chemical, viral and hormonal cancerogenesis. Stages of the neoplastic process: initiation, promotion and progression (invasion, metastasis, angiogenesis). Oncogenes and their activation mechanisms. Tumor suppressor genes. Genomic instability. Hereditary tumors. Immunity, inflammation and cancer. Biological basis of target antineoplastic therapy.
- General Pathophysiology: Pathophysiology of metabolism (amino acids, purine and pyrimidine bases, lipids and lipid disorders).
- Pathophysiology of the Endocrine System: classes of hormones and receptors, secretion and transport.
- Pathophysiology of the thyroid gland: epithelial cells and parafollicular C cells, thyroid hormones, transporters iodine and TPO. Pathogenesis of hypothyroidism and hyperthyroidism, papillary thyroid cancer, follicular, medullary and anaplastic (MTC).

- Pathophysiology of diabetes mellitus: endocrine pancreas, definitions and etiological classification: type 1 diabetes, type 2 diabetes, other types of diabetes and gestational diabetes: Pathophysiology of complications of the diabetic patient. The gut hormones: the incretin hormones GLP-1 and GIP. Atherogenesis and atherosclerosis.
- General pathophysiology of blood, blood-forming organs and haemostasis.
- General pathophysiology of major systems: renal, respiratory, hepatic, cardiocirculatory systems; fluid and electrolyte replacement; acid-base balance.

Exam: oral

Suggested texbooks:

1. Pathologic Basis of Disease. Robbins & Cotran. Eight Edition. Editor: W B Saunders Co, 2009
2. Understanding pathophysiology. S. Huether, K. McCance. Elsevier, 2012
3. Cells, Tissues and Disease. Principles of general pathology. G. Majno, I. Joris. Oxford University Press, 2004.
4. Rubin's Pathology. Clinicopathologic foundation of medicine. Rubin & Straier. Lippincott Raven; 6 Har/Psc, ed. , 2011.

13 - Integrated Course of LABORATORY MEDICINE (I+II)

Main teaching objectives:

- understand the application of the most relevant techniques in Biochemistry, Molecular Biology, Microbiology, Parasitology, Clinical Pathology, Immunology and Immunohematology;
- be able to decide which clinical laboratory analyses are appropriate for the patient under study.
- be aware of the usefulness and limits of the clinical information provided by the clinical laboratory analyses.

Formal Teaching (Topics)

The request of clinical analyses - Urgent and routine analyses - The concepts of prevention, early medical diagnosis and follow up - Methods to obtain biological samples and their application. Collection and validity of biological samples - Quality control in the clinical laboratory, between laboratory and on a global scale - Sensitivity and specificity of clinical methods. Significance and diagnostic relevance of the analysis results - Methods for clinical microbiology and parasitology. Timeline and interpretation of the results - Clinical microbiology of infectious diseases of organs and apparatuses - Blood parasites; intestinal parasites. - Biochemical characterization of dysmetabolic conditions - Laboratory medicine for the evaluation of the cardiovascular, renal, endocrine apparatuses; assays to monitor liver pathophysiology; Transfusion Medicine - Laboratory Medicine of Immune Disorders. Histocompatibility Testing and Transplantation.

Interactive teaching (goals)

- Selection of the analysis to be carried out, in relation to the patient's disease.
- Evaluation of the quantitative and qualitative alterations of the most relevant analytes.

Apprenticeship (practical laboratory)

- How to effect a standard laboratory analysis of the urine (physical, chemical and microbiological).
- How to prepare a blood smear; how to read a hemocytometric (non-pathological) test

Exam: oral

Textbook:

- Michael Laposata: Laboratory Medicine: The Diagnosis of Disease in the Clinical Laboratory (LANGE Basic Science)

14 - Integrated Course of APPLIED PATHOLOGY I

Main teaching objectives:
Students must have an adequate knowledge of the most important cardiovascular and respiratory diseases, in terms of basic research, nosography, etiopathogenesis, pathophysiology, anatomopathology and clinic.

Cardiovascular Diseases
Fundamental: signs and symptoms of cardiovascular diseases; cardiovascular risk factors; metabolic syndrome; atherosclerosis and arteriosclerosis; ischemic heart disease: angina, cardiac syndrome X, acute myocardial infarction and major complications; aortic diseases; major hyperkinetic and hypokinetic arrhythmias; valvular disease: mitral stenosis and regurgitation, aortic stenosis and regurgitation, tricuspid and pulmonary stenosis and regurgitation; primitive and secondary cardiomyopathies; myocarditis; endocarditis; pericarditis; acute and chronic heart failure; systemic and pulmonary hypertension; arterial hypotension, pre-syncope, syncope, shock; acute pulmonary edema; acute and chronic pulmonary heart disease; major cardiac tumors; congenital heart disease: atrial and ventricular septal defect, ductus Botalli patency, overview on the remaining congenital heart diseases; major cardiac emergencies; cardiac sudden death. Basis of ECG. Overview on the main cardiovascular therapies.
Professionalizing: history, clinical examination and auscultation of the cardiac patient; basis of instrumental diagnostic tools: basic ECG, mono-dimensional and two-dimensional echocardiography, main laboratory markers, chest X-ray. Overview on the main diagnostic techniques: CT, MRI, scintigraphy, ergometry, pharmacological stress echocardiography, cardiac catheterization and coronary angiography.

Vascular Surgery

Fundamental: arterial aneurysms and dissections; chronic occlusive arterial disease of the extremities; acute limb ischemia; cerebrovascular insufficiency; renal vascular hypertension; visceral ischemic syndromes; thoracic outlet syndrome; varices; chronic venous insufficiency: thrombophlebitis and venous thrombosis; vascular malformations; lymphedema. Overview on the main diagnostic techniques: carotid ultrasound imaging and lower limbs venous ultrasonography.

Cardiac surgery

Fundamental: indications to cardiac surgery in congenital heart disease, acquired valvular heart disease, ischemic heart disease, pericardial diseases, thoracic aortic disease. Heart and heart-lung transplantation; artificial heart.

Respiratory Diseases

Fundamental: mention on functional anatomy, pathophysiology and semeiotics of respiratory system (cyanosis; dyspnea; atelectasis; hemoptysis and hemoptoe). Acute infections: bronchopneumonia; COPD; bronchial asthma; pulmonary fibrosis; sarcoidosis; pneumoconiosis and other occupational lung diseases; pulmonary vascular disease: embolism; lung cancer; pleural effusions; acute (including respiratory distress syndrome) and chronic respiratory failure; tuberculosis; pulmonary mycosis.

Professionalizing: clinical examination of the respiratory system; basis of instrumental diagnostic tools: spirometry; blood gas analysis; main laboratory tests; chest X-ray; CT; MRI; ventilation/ perfusion scintigraphy; allergy testing; diagnosis of respiratory infections; overview of the main respiratory therapy: drugs, oxygen therapy and physiokinesitherapy.

Thoracic Surgery

Fundamental: surgical anatomy of the chest; pneumothorax; benign and malignant pleural effusions; pulmonary abscess and gangrene; benign and malignant diseases of the airway; tumors of the lung, pleura and mediastinum; chest trauma; hydatid disease; surgical treatment of chronic respiratory failure.

15 - Integrated Course of APPLIED PATHOLOGY II

Main teaching objectives:

Nephrology: Collect renal history, Require specific tests to evaluate and distinguish among clinical manifestations of Renal Disease, Evaluate urinary sediment, Understand the diagnostic value of radiologic techniques in nephrology, Diagnose Acute Renal Failure, Classify and understand the prognostic values of different stages of Chronic Renal Failure, Identify major electrolyte and acid-base derangements, Understand the clinical value of renal biopsy, Identify the hallmarks of the main primary glomerulonephritides, Identify the hallmarks of the main secondary glomerulonephritides, Understand the clinical specificities of those renal clinical conditions allowed by renal replacement therapies (dialysis and transplantation), Evaluate an hypertensive patients from a nephrologic point of view, Evaluate a patient presenting with nephrolithiasis,

Urology: Medical history tacking in Urology, Physical examination in Urology including DRE, Testicular examination, Insertion of urethral catheter, Carry out and interpret urine analysis, Interpretation of: Plain radiograph of kidney, ureter

and bladder, IVU films, Urinary flow rate, CT of abdomen and pelvis, Ultrasonography of the kidney, ureters and bladder, Urodynamics, Semen analysis

Nephrology

Anatomy of the kidney, Clinical Manifestations of renal diseases**:** Nephritic Syndrome, Nephrotic syndrome, Isolated Urinary Abnormalities, Acute Renal Failure, Sub-acute (or rapidly progressive) Renal Failure, Chronic Renal Failure, Arterial Hypertension, Hydro-electrolytic derangements.

Diagnostic tools in renal diseases: Methods to evaluate renal function. Laboratory tests (urinary sediment, biochemistries, microbiology, molecular biology), Radiology and ultrasonography. Renal biopsy.

Acute renal failure: Definition, etiology, pathogenesis, clinical picture, diagnosis and differential diagnosis (Pre-renal, Renal and Post-renal)

Chronic renal failure and uremic syndrome: Definition and classification (Stages I-5/D/T)). Etiology and Pathophysiology of chronic renal failure. Clinical picture. Diagnosis of chronic renal failure (tests and criteria).

- *Metabolic derangements*: Hypo- and hyper- natremia, metabolic acidosis and alcalosis, hypo- and hyper- kalemia. Mineral (calcium, phosphate, parathyroid hormone, vitamin D) and **B**one (renal osteodystrophy) **D**isorders (definition of CKD-MBD).

- *Organ involvements:* Cardiovascular, Pulmonary, Hematologic, Neuromuscular, Endocrine, Gastrointestinal, Dermatologic and Immune involvements.

Glomerulonephritides:

Pathologic mechanisms of glomerular injury. Immunologic and non-immunologic glomerular lesions

Primary glomerulonephritide**s**: Minimal lesion glomerulonephritis; Post-infectious Nephritis; IgA nephropathy; Focal and segmental glomerulosclerosis; Membranous nephropathy; Membranoproliferative glomerulonephritis; Extracapillary proliferative glomerulonephritis.

Secondary glomerulonephritides: Diabetic nephropathy; Systemic Erithematous Lupus nephritis; vasculitis; cryoglobulinemia; myeloma kidney and amyloidosis.

Tubulointerstitial Nephritis,

Nephrolithiasis,

Urinary tract infections

Hereditary Renal Diseases glomerular and tubular (Policystic kidney, Alport's disease, etc)

Renal vascular diseases and nephrovascular hypertension

Clinical Conditions Peculiar to Renal Patients:

The case of Hemodialysis: principles of hemodialysis, therapeutic indications for- and clinical picture of the patients on- maintenance hemodialysis.

The case of Peritoneal dialysis: principles of peritoneal dialysis, therapeutic indications for- and clinical picture of the patients on- maintenance peritoneal dialysis

The case of Renal Transplantation: selection criteria of the receiver; organ donation and donor selection; typization; immunosuppression; clinical picture of renal transplant patient.

Urology

Anatomy of the genitourinary tract, Diagnosis and management of urinary tract infection and sexually transmitted diseases including cystitis, epididymitis, prostatitis and urethritis, Diagnosis and management of haematuria, Testicular

torsion, PSA screening, BPH, Diagnosis/staging/management of prostate cancer, Diagnosis/staging/management of bladder cancer, Diagnosis/staging/management of testicular cancer, Diagnosis/staging/management of renal cancer Diagnosis/staging/management of nested transitional cell carcinomas, Diagnosis/staging/management of urinary tract trauma, Paraphymosis, Vesico-urethral reflux, Bladder extrophy, Hypospadias, Undescended testis, Spermatocele Hydrocele, Male factor infertility, Varicocele, Diagnosis and management of urinary incontinence, Diagnosis and management of impotence, Diagnosis and management of renal calculiDiagnosis and management of ureteric calculi Diagnosis and management of bladder calculi

Textbooks:

Smith and Tanago's General Urology, Jack. W. McAninch, Tom. F. Lue, Editors; Eighteenth Edition, McGraw Hill
Harrison's Principles of Internal Medicine

Exam modalities: Oral

16 - Integrated Course of APPLIED MEDICAL SCIENTIFIC METHODS (VII+VIII)

Applied Medical Scientific Methods (VII)

Main teaching objectives:

The rationale approach to pathology: from the clinical examination to laboratory and diagnostic tests.

Etiopathogenesis of the cardiovascular, pulmonary and renal pathologies

Clinical assessment in order to finalize the instrumental diagnostic tests.

The international guidelines to be followed for the choice between medical or invasive treatment

The need of the post-treatment control

Primary and secondary cardiovascular prevention

Objectives of the APP

The students will be able to apply theoretical knowledge to clinical practice in the diagnosis and treatment

Applied Medical Scientific Methods (VIII)

Main teaching objectives:

The rationale approach to pathology: from the clinical examination to laboratory and diagnostic tests.

Pathophysiology of main gastroenterological, metabolic and nutritional diseases

Clinical assessment and approach to biochemical and instrumental diagnostic tests

Nutrition in health and diseases

From basic science, epidemiology and RTCs to international guidelines

How to write a scientific paper

Objectives of the APP

Through the interactive discussion or clinical cases representative of the disease included in the applied pathology III - diseases of the digestive system endocrine system and metabolism, the students will be able to apply theoretical knowledge to clinical practice in the diagnosis, management and treatment.

Textbooks:

Goldman's Cecil medicine 24th edition

Harrison Principles of Internal Medicine 18 edition

Exam modalities:

Written (solution of clinical case)

17 - Integrated Course of PATHOLOGICAL ANATOMY and Associations with Clinical Anatomy (I+II)

Main teaching objectives:

For each of the diseases listed below, the students will:

a) Learn the macroscopic and microscopic features.
b) Understand the physiopathology underlying the clinical and morphologic features of each disease, and the role of pathology in the diagnostic flow-chart.
c) Be able to interpret a pathology report.

Heart and vessels

Atherosclerosis,Aneurysms and dissections, Vasculidities, Myocardial hypertrophy and adverse cardiac remodeling Ischemic heart disease

Valvular heart disease: Dystrophic, Myxomatous, Inflammatory

Cardiomyopathies: Inflammatory, Dilated, Hypertrophic, Arrhythmogenic, Restrictive

Pericardial disease: Pericardial effusion and hemopericardium, pericarditis

Lung, pleura and mediastinum

Pulmonary edema, Acute respiratory distress syndrome, Embolism, hemorrage and infarction, Emphisema, chronic obstructive pulmonary disease, Pneumothorax, Pulmonary hypertension, Diffuse interstitial disease, Pulmonary infections

Lung tumors: Benign, Malignant, Tissue determination of prognostic and predictive factors, Pleural effusions, Pleural tumors, Thymomas

Kidney and urinary tract

Congenital anomalies and cystic disease

Glomerular disease: Acute glomerulonephritis, Rapidly progressive glomerulonephritis, Membranous glomerulopathy, Minimal change disease, Focal segmental glomerulosclerosis, Membranoproliferative glomerulonephritis, IgA nephropathy, Chronic glomerulonephritis

Tubular and interstitial disease: Acute tubular necrosis, Tubulointerstitial nephritis

Vascular disease: Atherosclerosis, Benign nephrosclerosis, Malignant hypertension, Renal artery stenosis, Thrombotic microangiopathies

Obstructive uropathy:, Urolithiasis, Other

Tumors of the kidney: Benign, Malignant, Tissue determination of prognostic and predictive factors
Lower urinary tract: Inflammations, Benign and malignant tumors of ureter and bladder

Male genital system
Testicular tumors
Prostate disease: Benign prostatic hyperplasia, Prostatic tumors

Female genital system
Disease of the uterus: Uterine cervix inflammation, Cervical intraepithelial and invasive squamous neoplasia, Chronic endometritis, Endometriosis and adenomyosis, Endometrial polyps, Endometrial hyperplasia, Malignant tumors of the endometrium, Benign and malignant tumors of the endometrium
Disease of the ovaio: Benign and malignant ovarian tumors

Breast
Inflammation
Benign epithelial lesions: Fibrocystic changes, Proliferative breast disease without atypia, Proliferative breast disease with atypia
Benign and malignant tumors

Tissue determination of prognostic and predictive factors in breast carcinoma

18 - Integrated Course of APPLIED PATHOLOGY III

Main teaching objectives:
At the end of the teaching program the student will be able to
Integrate the etiological and pathophysiological mechanisms of the diseases of the digestive tract with the clinical presentation.
Analyse symptoms, signs, and investigations in orderly diagnostic algorithms.
Comprehend the differences, similarities, and interplay between functional and organic gastrointestinal diseases.
Comprehend the reciprocal interaction between environment, psychological status, and gastrointestinal function and diseases.
Deal with patients' suffering for chronic gastrointestinal diseases.
At the end of the teaching program the student will be able to
Integrate the etiological and pathophysiological mechanisms of pancreatic diseases with their clinical presentation
Integrate the etiological and pathophysiological mechanisms of biliary tract diseases with their clinical presentation
Analyse symptoms, signs, investigations and natural history in acute and chronic hepatitis with mentions on interventions
Describe the etiology and pathophysiological mechanisms of liver cirrhosis and its complications, with indications on diagnostic algorithms, prevention and therapies

Describe the diagnostic algorithms of liver masses with indications on the staging/treatment strategies for patients with hepatocellular carcinoma and cholangiocarcinoma

Topics of Formal Teaching

Altered Deglutition and esophageal diseases:

Dysphagia, Gastroesophageal Reflux Disease, Motor Alterations, Achalasia

diagnostic and therapeutic aspects of Endocrine Diseases.

Knowledge (Gastroenterology)

Gastroduodenal Diseases

Helicobacter pylori infection, Acute and Chronic gastritis and gastropathies, Peptic ulcer, Gastric tumors

Intestinal Diseases

Maldigestion and malabsorptionm, Celiac Disease, Inflammatory Bowel Diseases, Diverticular Disease, Rectocolonic tumors

Functional Gastrointestinal Diseases

Dyspepsia, Irritable Bowel Syndrome, Constipation, Diarrhea

Anorectal Diseases

Fecal Incontinence

Acute and chronic pancreatitis. Pancreatic cancer

Acute and chronic hepatitis

Liver cirrhosis and its complications

Non malignant biliary tract diseases

Hepatocellular carcinoma and other liver masses

Liver transplantation in the adult recipient

Emergencies in gastroenterology: digestive bleeding and intestinal occlusion

Knowledge (Endocrinology)

Introduction to the endocrine system

Clinical aspects of anterior and posterior pituitary gland

The thyroid: Hypothyroidism, Hyperthyroidism, Nontoxic goiter, Thyroiditis, Thyroid cancer

Calcium and bone metabolism: Hyperparathyroidism Hypoparathyroidism, Osteoporosis

The adrenal glands: Adrenal insufficiency, Cushing's syndrome, Congenital adrenal hyperplasia, The incidentally discovered adrenal mass, The adrenal medulla

Endocrinology of hypertension: Renin-angiotensinII-related hypertension, Mineralcorticoid-related hypertension, Pheocromocytom.

Hirsutism

Metabolic disorders: Diabetes mellitus, Hypoglicemia, Obesity and metabolic syndrome

Special topics in endocrinology: Hormones and athletic performance, Trans-genderism, Late onset hypogonadism.

9. Electives *(ADE)*

I YEAR - I SEMESTER

BIOLOGY AND GENETICS (I)

Teacher	Type of Elective	Subject	Credits	Hours
C. Battistelli	Seminar	From genetics to epigenetics: the world beyond Mendel's laws	0,2	2

BASIC MEDICAL SCIENTIFIC METHODS (I)

Teacher	Type of Elective	Subject	Credits	Hours
M. Capocci	Seminar	History of Medicine (Visit to the Museum)	0,2	2

I YEAR - II SEMESTER

BIOCHEMISTRY (I)

Teacher	Type of Elective	Subject	Credits	Hours
M. Perluigi F. Malatesta	Seminar	Quantitative determination of protein content in milk	0,2	2
D. De Biase M. Perluigi	Seminar	Building molecular models at hand	0,2	2

HISTOLOGY AND EMBRYOLOGY

Teacher	Type of Elective	Subject	Credits	Hours
S. Adamo	Seminar	Tissue Engineering	0,5	5

BASIC MEDICAL SCIENTIFIC METHODS (II)

Teacher	Type of Elective	Subject	Credits	Hours
M. Cattaruzza	Monographic Course	Tobacco	0,5	5

II YEAR - I SEMESTER

HUMAN ANATOMY (II)

Teacher	Type of Elective	Subject	Credits	Hours
S. Nottola	Seminar	Ultrastructural Anatomy of Gametes in Assisted Reproduction: From Oocyte to Blastocyst	0,2	2

HUMAN PHYSIOLOGY (I)

Teacher	Type of Elective	Subject	Credits	Hours
C. Limatola	Internship	Laboratory	1,0	30
S. Sensi	Seminar	Fighting Alzheimer's diseas, A tale of mice and humans	0,25	

II YEAR - II SEMESTER

HUMAN ANATOMY (III)

Teacher	Type of Elective	Subject	Credits	Hours
E.Gaudio C.Catalano	Seminar	In vivo imaging of the Human Central Nervous System	0,2	2
E.Gaudio E. Lezoche	Seminar	Living Anatomy: Retroperitoneum	0,2	2
E.Gaudio R.Delfini	Seminar	Living Anatomy: Access to the cranial cavity	0,2	2

HUMAN PHYSIOLOGY (II)

Teacher	Type of Elective	Subject	Credits	Hours
F. Grassi	Seminar	Nicotine receptor and smoke addiction	0,1	1

MICROBIOLOGY

Teacher	Type of Elective	Subject	Credits	Hours
G. Antonelli	Seminar	Chronic hepatitis viruses: virological monitoring of the infection and of its treatment	0,1	1
G. Antonelli	Seminar	Human immunodeficiency virus: an update on etiopathogenesis	0,1	1
D. Modiano	Seminar	Genetics of susceptibility to Plasmodium falciparum malaria	0,1	1
A. Palamara	Seminar	Human Microbiota in health and disease	0,1	1

III YEAR - I SEMESTER

HUMAN PHYSIOLOGY (III)

Teacher	Type of Elective	Subject	Credits	Hours
S. Ferraina	Seminar	Neurophysiology approaches to cognitive functions	0,2	2
S. Ferraina	Internship	Laboratory		

IMMUNOLOGY AND IMMUNOPATHOLOGY

Teacher	Type of Elective	Subject	Credits	Hours
	Seminar	Tumor immunotherapy	0,2	2
	Seminar	Immunotherapy of hematological malignancies	0,2	2
	Seminar	Osteoimmunology and immune-mediated diseases of the bone	0,2	2
	Internship	Laboratory		

PATHOLOGY AND PATHOPHYSIOLOGY (I)

Teacher	Type of Elective	Subject	Credits	Hours
M. Felli A. Campese	Seminar	Animal models of human disease	0,2	2

III YEAR - II SEMESTER

PATHOLOGY AND PATHOPHYSIOLOGY (II)

Teacher	Type of Elective	Subject	Credits	Hours
A. Po L. Di Marcotullio	Seminar	Emerging research areas in cancer: microRNAs and the ubiquitin system	0,5	5
G. Giannini	Seminar	New approaches in cancer therapy: target therapies	0,2	2
G. Canettieri P. Trimboli	Seminar	Diagnosis and treatment of thyroid tumors: molecular approaches	0,2	2
G. Giannini	Internship	Molecular Oncology I		
G. Canettieri	Internship	Molecular Oncology II		

IV YEAR – II SEMESTER

APPLIED PATHOLOGY III

Teacher	Type of Elective	Subject	Credits	Hours
E.Lezoche	Seminar	Multimodal and multidisciplinary treatment of rectal cancer	0,2	2
E.Lezoche	Seminar	Minimally invasive surgery of adrenals	0,2	2
E.Corrazziari	Seminar	Neurogastroenterology	0,2	2
E.Corrazziari	Seminar	Psyche, Environment, Food, Microbiome and Gastrointestinal Diseases	0,2	2
F.Lombardo	Seminar	Disorders of pubertal development	0,2	2

I, II, III and IV YEAR

ENGLISH CONFERENCES OF THE ACADEMIA MEDICA DI ROMA

Teacher	Type of Elective	Subject	Credits	Hours
S. Filetti	Seminar	Various	0,2	Duration of specific Conference

10. Registration to the following years

Exclusively those students who by the end of the exam session of September or, ultimately, by the 23rd of December have finished all the exams scheduled by the table below, will be able to pass on to the following year:

To be enrolled to…	***it is mandatory to have passed…***
II year	**2 exams of the first year**
III year	All the exams of the first year
IV year	**All the exams of the first and second year and 1 exam of the third year**
V year	All the exams of the first, second and third year
VI year	**All the exams of the first, second, third and fourth year and 2 exams of the fifth year ***

*** also the exam of Scientific English is counted here**

Those students who, despite their certified and regular attendance of the courses scheduled for a specific year of the programme, are behind on a number of exams superior to what is stipulated by the table above, will be registered in the same year with the qualification *ripetente* (repeating) and be exempt from the attendance, unless the responsible committee will adopt different directives.

Given the fact that the observation of the propaedeutics will be checked in the moment in which a certification of the passed exams will be issued or the request for the final exam will be presented, it is the student's own responsibility and interest to observe the above mentioned standards.

Propaedeutics

To sit the exam of	***it is mandatory to have passed***
Biochemistry	Chemistry and Introduction to Biochemistry
Human Anatomy	Histology and Embryology
Human Physiology	Biology and Genetics
Pathology and Pathophysiology	Human Physiology
Applied Pathology (I, II + III), Pathological Anatomy	Pathology and Pathophysiology

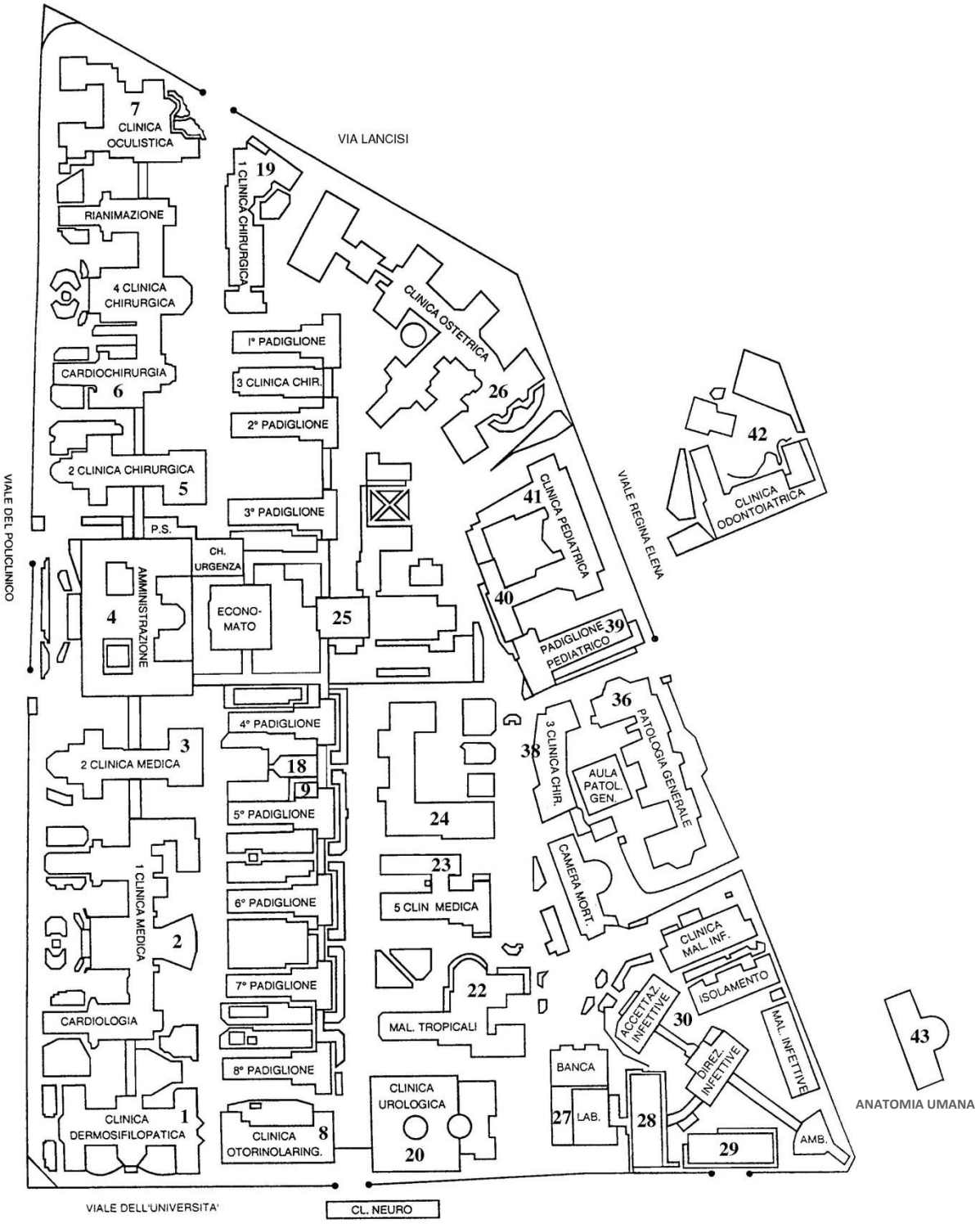
Potential additional propaedeutics can be defined and suggested by the responsible committee of the educational structure.

In order to avoid the obsolescence of the acquired credits it is forbidden to repeat more than 8 years inside of the same degree programme. The interruption of the attendance for more than six years requires the enrollment in a year determined by the decision of the responsible committee of the educational structure.

11. Legend and map of Policlinico *Umberto I*

1	Clinica Dermosifilopatica
2	I Clinica Medica
3	II Clinica Medica
4	Pal. Amministrazione e Pronto Soccorso
5	II Clinica Chirurgica
6	I Clinica Chirurgica Rep. B - IV Cl. Chirurgica
7	Clinica Oculistica
8	Clinica Otorinolaringoiatrica
9 - 18	(escluso 14) Padiglioni ed ex padiglioni
14	Cucina centrale
19	I Clinica Chirurgica
20 - 21	Clinica Urologica
22	Clinica Malattie Tropicali
23	V Clinica Medica e Biologia Generale
24	Clinica Radiologica
25	Palazzine ex SCRE: Presidenza di Facoltà, Segreterie CLMMC “A”, “D”, “F”, CL Professioni Sanitarie, Day Hospital Oncologico
26	Clinica Ostetrica e Ginecologica
27	Banca e Fisica Sanitaria
28	VI Clinica Medica
29	III Clinica Medica
30 - 35	Clinica Malattie Infettive
36	Patologia Generale ed Anatomia Patologica
37	Laboratorio Centrale di Analisi
38	III Clinica Chirurgica
39 - 41	Clinica Pediatrica
42	Clinica Odontoiatrica
43	Anatomia Umana

Map of Policlinico *Umberto I*



12. Legend and map of Città Universitaria *La Sapienza*

1	Aulette prefabbricate Chimica Biologica
2	Aulette prefabbricate Ex Psicologia
3	Cappella Universitaria
4	Clinica Ortopedica
5	Chimica Nuova
6	Clinica Malattie Nervose e Mentali
7	Edifici Segreterie Generali
8	Farmacia
9	Facoltà di Giurisprudenza
10	Facoltà di Lettere e Filosofia
11	Fisica Nuova
12	Istituto di Botanica
13	Istituto di Chimica
14	Istituto di Fisica
15	Istituto di Geologia
16	Istituto di Igiene e Microbiologia
17	Istituto di Fisiologia e Psicologia
18	Istituto di Fisiologia Umana e Istituto di Scienze dell'Alimentazione Dipartimento di Biochimica "A. Rossi Fanelli"
19	Istituto di Microbiologia
20	Istituto di Matematica G. Castelnuovo
21	Medicina legale
22	Dopolavoro e Teatro
23	Palazzine
24	Rettorato
25	Storia della Medicina
26	Centrale Elettrica
27	Facoltà di Scienze Politiche e Statistica
28	ex Tipografia Tuminelli
29	Uffici
30	Uffici
31	Uffici

Map of Città Universitaria *La Sapienza*