UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Biomedicina, Neuroscienze e Diagnostica avanzata
ACADEMIC YEAR	2021/2022
MASTER'S DEGREE (MSC)	MEDICINE AND SURGERY
INTEGRATED COURSE	PHARMACOLOGY - INTEGRATED COURSE
CODE	03143
MODULES	Yes
NUMBER OF MODULES	2
SCIENTIFIC SECTOR(S)	BIO/14
HEAD PROFESSOR(S)	CANNIZZARO CARLA — Professore Ordinario — Univ. di PALERMO MELI MARIA — Ricercatore — Univ. di PALERMO PLESCIA FULVIO — Professore Associato — Univ. di PALERMO
OTHER PROFESSOR(S)	CANNIZZARO CARLA — Professore Ordinario — Univ. di PALERMO MELI MARIA — Ricercatore — Univ. di PALERMO CALASCIBETTA ANNA — Ricercatore — Univ. di PALERMO PLESCIA FULVIO — Professore Associato — Univ. di PALERMO
CREDITS	8
PROPAEDEUTICAL SUBJECTS	13246 - SYSTEMATIC PATHOLOGY I - INTEGRATED COURSE 13248 - SYSTEMATIC PATHOLOGY II - INTEGRATED COURSE 13257 - SYSTEMATIC PATHOLOGY IV - INTEGRATED COURSE 13253 - SYSTEMATIC PATHOLOGY III - INTEGRATED COURSE
MUTUALIZATION	
YEAR	4
TERM (SEMESTER)	2° semester
ATTENDANCE	Mandatory
EVALUATION	Out of 30
TEACHER OFFICE HOURS	**CALASCIBETTA ANNA** Monday 09:00 14:00 edificio 9 policlinico Paolo Giaccone sez Farmacologia **CANNIZZARO CARLA** Thursday 11:00 13:00 Farmacologia, Edificio 11d - AOUP Paolo Giaccone, Via del Vespro 129 Palermo Friday 10:00 12:00 Farmacologia, Edificio 11d - AOUP Paolo Giaccone, Via del Vespro 129 Palermo **MELI MARIA** Wednesday 11:00 13:00 Istituto di Farmacologia **PLESCIA FULVIO** Monday 9:30 11:30 Policlinico Universitario, Padiglione 11d - Farmacologia

DOCENTE: Prof. FULVIO PLESCIA- *Sede HYPATIA*

PREREQUISITES	Students will have acquired the basics of Human Physiology, Microbiology, General Pathology, Pathophysiology and Medical Methodology, Systematic Pathology.
LEARNING OUTCOMES	Knowledge and understanding - Acquisition of the most appropriate means to reach a competent comprehension of the issues and knowledge of the effects of pharmacological properties of the molecules employed in therapy -Acquisition of a proper language, suitable to the description of molecular cellular and systemic activity of the drugs. Ability to retain and apply a methodology to consolidate a critical knowledge of the main categories of pharmacological agents and their direct action on specific organs and systems - Acquisition of a dynamic and "analytical" assessment concerning the fields of pharmacological applications, according to the Guidelines and the scientific Literature. Developing the ability to discuss on the rationale of specific drug therapies with Seniors and also share it with non-expert audience
ASSESSMENT METHODS	The examination consists of at least three oral open questions, including one question pertaining the general pharmacology topics and the others focused on specific drug therapeutics. The student have to demonstrate knowledge and understanding of the discipline contents as well as the ability to apply the knowledge gained in the clinical context. An appropriate use of the specific pharmacological terms is also requested.The evaluation will be as following: - Excellent (30-30 with laude): Excellent knowledge of teaching contents; students should show high analytical and synthetic capabilities and should be able to apply their knowledge to solve highly complex problems. - Very Good (27-29): Very good knowledge of the teaching contents and excellent language control; students should show analytical and synthetic skills and be able to apply their knowledge to solve problems of medium and, in some cases, even higher complexity. -Good (24-26): Good knowledge of teaching contents and good language control; the students should be able to apply their knowledge to solve problems of medium complexity -Satisfactory (21-23): Average knowledge of the teaching contents, in some cases limited to the main topic; acceptable ability to use the specific discipline language and independently apply the acquired knowledge. - Sufficient (18-20): Minimum teaching content knowledge, often limited to the main topic; modest ability to use the subject specific language and independently apply the acquired knowledge. - Fail: Lack of an acceptable knowledge of the main teaching content knowledge; very little or no ability to use the specific subject language and apply independently the acquired knowledge
TEACHING METHODS	Lectures

DOCENTE: Prof.ssa CARLA CANNIZZARO- *Sede CHIRONE*

PREREQUISITES	Students will have acquired the basics of Human Physiology, Microbiology, General Pathology, Pathophysiology and Medical Methodology and pathology, Systematic Pathology 1, Systematic Pathology 2
LEARNING OUTCOMES	Knowledge and understanding - Acquisition of the most appropriate means to reach a competent comprehension of the issues and knowledge of the effects of pharmacological properties of the molecules employed in therapy -Acquisition of a proper language, suitable to the description of molecular cellular and systemic activity of the drugs. Ability to retain and apply a methodology to consolidate a critical knowledge of the main categories of pharmacological agents and their direct action on specific organs and systems - Acquisition of a dynamic and "analytical" assessment concerning the fields of pharmacological applications, according to the Guidelines and the scientific Literature. Developing the ability to discuss on the rationale of specific drug therapies with Seniors and also share it with non-expert audience.
ASSESSMENT METHODS	Written and/or oral examination; the grades are on a scale of 30 There might be a written test of the duration of 60 minutes including 13 questions with multiple choices (a-d) and 2 open questions. Each multiple choice question will be valued +2 (exact); -0,50 (wrong) or 0 (lack) while each open question will receive a score from 0 to 2 with 2 the highest score and 0 the lowest score. The summation of the results will be the final mark including lode. The test could be followed by an oral examination usually lasting 10 minutes. As an alternative the examinee must answer at least three orally questions regarding all object parts of the program, with reference to the recommended texts. Final assessment aims to evaluate whether the student has knowledge and understanding of topics concerning the effects of pharmacological agents. The pass mark (18/30) will be reached when the student showed that he understood and assimilated the arguments, at least in general lines, and has reached sufficient competence regarding the knowledge of the main categories of pharmacological compounds and their direct action on specific organs and system, so that he can talk about them Below this threshold the examination will be considered insufficient. More the examinee is able to better expose the exam topics, more its assessment will be positive until reaching the 30/30 vote with possible praise when in-depth critical knowledge is displayed
TEACHING METHODS	Lectures

DOCENTE: Prof.ssa MARIA MELI- *Sede IPPOCRATE*

PREREQUISITES	Knowledge of chemistry, biochemistry, physiology, microbiology, pathology. Passing the exams of the systematic patologies.
LEARNING OUTCOMES	Knowledge and understanding: Students will gain knowledge in the field of pharmacology including the most recent acquisitions relative to the pharmacodynamics and pharmacokinetics properties of drugs. They have to demonstrate familiarity with the specific terminology of this discipline. Applying knowledge and understanding: The students will be able to apply their pharmacological knowledge in the clinical practice by choosing the correct drug in different clinical contexts taking into account the variability of drug actions in each patient and balancing the costs and benefits of treatments. Making judgements: Students will be capable of obtaining and evaluating the information on drug therapies in the clinical context and take autonomous clinical decisions taking into account also the ethical, social and scientific implications of their actions. Communication skills: Students will acquire the specific pharmacologic terminology so that they can clearly explain any pharmacologic problem to patients and/or colleagues. Learning skills: Students will acquire the ability to obtain new information on pharmacological themes by consulting scientific journals and/or databases on the web or by participating to meetings and courses ad hoc. They will be capable of interpreting critically the results of preclinical or clinical studies and selecting the information that is relevant for the clinical practice.
ASSESSMENT METHODS	The examination consists of at least three oral open questions, including one question pertaining the general pharmacology topics and the others focused on specific drug therapeutics. The student have to demonstrate knowledge and understanding of the discipline contents as well as the ability to apply the knowledge gained in the clinical context. An appropriate use of the specific pharmacological terms is also requested.The evaluation will be as following: -Excellent (30-30 with laude): Excellent knowledge of teaching contents; students should show high analytical and synthetic capabilities and should be able to apply their knowledge to solve highly complex problems. - Very Good (27-29): Very good knowledge of the teaching contents and excellent language control; students should show analytical and synthetic skills and be able to apply their knowledge to solve problems of medium and, in some cases, even higher complexity. -Good (24-26): Good knowledge of teaching contents and good language control; the students should be able to apply their knowledge to solve problems of medium complexity -Satisfactory (21-23): Average knowledge of the teaching contents, in some cases limited to the main topic; acceptable ability to use the specific discipline language and independently apply the acquired knowledge. - Sufficient (18-20): Minimum teaching content knowledge, often limited to the main topic; modest ability to use the subject specific language and independently apply the acquired knowledge. - Fail: Lack of an acceptable knowledge of the main teaching content knowledge; very little or no ability to use the specific subject language and apply independently the acquired knowledge.
TEACHING METHODS	Lectures

MODULE
PHARMACOLOGY I

Prof. FULVIO PLESCIA - Sede HYPATIA, - Sede HYPATIA

SUGGESTED BIBLIOGRAPHY

Farmacologia generale e molecolare. Clementi F, Fumagalli G. 5° Edizione - edra - ISBN: 9788821444364
Trattato di Farmacologia. L.Annunziato – G. Di Renzo. Idelson-Gnocchi (III Edizione) - ISBN: 9788879477291

AMBIT	50415-Farmacologia, tossicologia e principi di terapia medica
INDIVIDUAL STUDY (Hrs)	60
COURSE ACTIVITY (Hrs)	40

EDUCATIONAL OBJECTIVES OF THE MODULE

Knowing the basics of pharmacodynamics, different classes of drugs, molecular and cellular mechanisms of their action, therapeutic uses, response variability in relation to genetic and pathophysiological factors, interactions Pharmacological properties and criteria for defining therapeutic patterns.

SYLLABUS

Hrs	Frontal teaching
4	PHARMACODYNICS - Pharmacodynamic concepts. Mechanisms of drug action. Signaling pathways and drug action
4	THE AUTONOMIC AND SOMATIC MOTOR NERVOUS SYSTEMS. MUSCARINIC RECEPTOR AGONISTS AND ANTAGONISTS - Acethylcoline and its muscarinic receptor target. Muscarinic receptor agonists and antagonists. ANTICHOLINESTERASE AGENTS - Acetylcholinesterase inhibitors. Therapeutic uses of AChE inhibitors. NICOTINE AND AGENTS ACTING AT THE NEUROMUSCOLAR JUNCTION AND AUTONOMIC GANGLIA. ADRENERGIC AGONISTS AND ANTAGONISTS - Classification of sympathomimetic drugs. Endogenous catecholamines. Beta-adrenergic receptor agonists. Alfa-adrenergic receptor agonists. Alfa-adrenergic receptor antagonists. Beta-adrenergic receptor antagonists.
3	GENERAL ANESTHETICS - Actions and Mechanisms of general anesthetics. Parenteral and inhalational anesthetics. Anestetic adjuncts. LOCAL ANESTHETICS - Actions, Mechanisms and chemistery and structure activity relationship. Local anesthetics and related agents. Clinical uses of local anesthetics
3	INTRODUCTION TO THE PHARMACOLOGY OF CNS DRUG. SEDATIVE-HYPNOTIC DRUGS. Classification of sedative-hypnotic drugs. Pharmacokinetics and pharmacodynamics of Benzodiazepines, Barbitures and Newer Hypnotics. Tolerance: Psychological & Physiologic Dependence. Clinical pharmacology of sedative-hypnotics. Z-compounds. ANTISEIZURE DRUGS.
4	DRUG THERAPY OF DEPRESSION AND ANXIETY DISORDERS - Characterization of depressive and anxiety disorders. Pharmacotherapy for depression and anxiety. Anxiolytic drugs. DRUG THERAPY OF DEPRESSION AND ANXIETY DISORDERS - Treatment of psychosis. Treatment of mania.
2	TREATMENT OF CENTRAL NERVOUS SYSTEM DEGENERATIVE DISORDERS - Parkinson Disease. Alzheimer Disease .
2	OPIOIDS, ANALGESIA, AND PAIN MANAGEM - Enndogenous opioid peptides opioid receptors. Effects of acute and chronic opiate receptor activation. Mechanisms of tolerance/dependence/ withdrawal. Effects of clinically used opioids. Clinically employed opioid drugs Nonanalgesic therapeutic uses of opioids. Novel nonopioid treatments for pain.
3	PULMONARY PHARMACOLOGY - Mechanisms of Asthma and COPD. Bronchodilators, Corticosteroids, Chromones, PDE inhibitors, Antistamines and Antileukotrienes. Immunomodulatory therapy. Antitussives. Drugs for Dyspnea and Ventilator Control.
4	NONSTEROIDAL ANTI-INFLAMMATORY DRUGS, DISEASE-MODIFYING ANTIRHEUMATIC DRUGS - Nonsteroidal anti-inflammatory drugs. Aspirin. COX-2 selective inhibitors. Non selective cox inhibitors - Disease-Modifying Antirheumatic Drugs. Other analgesics. ADRENOCORTICOSTEROIDS & ADRENOCORTICAL ANTAGONISTS - Adrenocorticosteroids. Synthetic corticosteroids. Antagonists of adrenocortical agents and mineralocorticoid antagonists.
4	AGENTS USED IN DYSLIPIDEMIA PANCREATIC HORMONES & ANTIDIABETIC DRUGS – Insulin preparation. Sulfonylureas. Meglitinide. d-phenylalanine derivative. Biguanides. Thiazolidinediones. Glucagon-like peptide-1 (glp-1) receptor agonists. Dipeptidyl peptidase 4 (dpp-4) inhibitors. Other Drugs.
4	ANTIBACTERIAL AGENTS - Sulfamides, penicillins, cephalosporins, cefamycins, carbapenems, monobactams, glycopeptides
3	ANTIBACTERIAL AGENTS - Tetracyclines, aminoglycosides, macrolides, quinolones, Metronidazole, nitrofurantoin, clindamycin

MODULE
PHARMACOLOGY I

Prof.ssa ANNA CALASCIBETTA - Sede IPPOCRATE, - Sede IPPOCRATE

SUGGESTED BIBLIOGRAPHY	
Goodman & Gilman Le basi farmacologiche della terapia - Il manuale Seconda edizione, Edizioni Zanichelli.	
AMBIT	50415-Farmacologia, tossicologia e principi di terapia medica
INDIVIDUAL STUDY (Hrs)	60
COURSE ACTIVITY (Hrs)	40
EDUCATIONAL OBJECTIVES OF THE MODULE	
The course (Pharmacology I) provides knowledge in the areas of pharmacodynamics, and clinical pharmacology that is essential for the appropriate clinical use of drugs in individual patients. It will also address the characteristics of some of the main drug classes by discussing their mechanisms of action at the molecular and cellular level, the pharmacokinetics, the clinical uses, the main source of variability in drug response due to physiopathological and/or genetic factors, their drug interactions and adverse drug reactions.	

SYLLABUS

Hrs	Frontal teaching
4	Pharmacodynamics. Mechanisms of drug action. Receptors and drug-receptor interactions. Agonists and antagonists: partial and inverse agonists. Dose-response curves. Types of drug antagonism.Therapeutic index. Factors affecting drug response.
2	Types and classifications of adverse drug reactions (ADR). Mechanisms of tolerance to drug effects. Drug dependence and addiction. Pharmacovigilance.
2	Polytherapy and drug-drug intractions. Pharmacodinamic and pharmacokinetic basis of drug interactions.
2	Pharmacogenetics.
2	Monoclonal Antibodies.
4	Mediators of inflammation. Non-steroidal and steroidal anti-inflammatory drugs. Pharmacotherapy of gout.
4	Antihistamines and immunosuppressant drugs. Anti-asthmatic agents. Agents used in the therapy of osteoporosis.
4	Opiates and non-opiate analgesic agents. Local anaesthetics. Anti-migraine agents.
2	Pharmacotherapy of Epilepsies.
3	Drug therapy of Depression. Treatment of Parkinson Disease.
2	Drugs used in the treatment of diabetes. Insulins and oral hypoglycaemic agents. Drug therapy of dyslipidemia.
6	Principles of chemotherapy of infective diseases. Resistance to antimicrobial agents. Batteriolitic, bactericidal and bacteriostatic agents: mechanisms of action, spectrum of antibacterial activity, pharmacokinetics, clinical uses and drug toxicity. Post-antibiotic effect and PK/PD index. Antimycobacterial agents.
1	Antimycotic agents.
2	Antiviral agents: anti-herpesvirus, anti-influenza, anti-hepatitis virus and anti-HIV agents. HAARTand drug combinations in antiviral therapy.

MODULE
PHARMACOLOGY I

Prof.ssa CARLA CANNIZZARO - Sede CHIRONE, - Sede CHIRONE

SUGGESTED BIBLIOGRAPHY

Farmacologia generale e molecolare. Clementi F, Fumagalli G. 5° Edizione - edra - ISBN: 9788821444364
Trattato di Farmacologia. L.Annunziato – G. Di Renzo. Idelson-Gnocchi (III Edizione) - ISBN: 9788879477291
The Pharmacological Basis of THERAPEUTICS. Goodman & Gilman's. ISBN: 9781259584732

AMBIT	50415-Farmacologia, tossicologia e principi di terapia medica
INDIVIDUAL STUDY (Hrs)	60
COURSE ACTIVITY (Hrs)	40

EDUCATIONAL OBJECTIVES OF THE MODULE

The goal of this course is to understand the properties, and mechanism of actions and adverse effects of the drugs employed in therapy.To stimulate the students to critically and independently evaluate and learn the rationale of the correct employment of the drugs in Therapy according to the latest scientific publications and evidence based updates.

SYLLABUS

Hrs	Frontal teaching
4	neurotransmission and pharmacological targets
2	General anesthetics, local anesthetics
6	Central Nervous System: drug therapy of depression anxiety disorders, epilepsy
4	Opioids, analgesia, and pain management
6	Pharmacotherapy of neurodegenerative disorders: Parkinson- , Alzheimer,-'s Disease and Multiple Sclerosis
2	Drug abuse and drug addiction: Cocaine, Amphetamine: Allucinogens, MDMA, LSD Cannabinoids. THC receptors. Pharmacological effects. Clinical uses of synthetic THC analogs
6	Treatment of Myocardial Ischemia and Hypertension
2	Pharmacotherapy of Congestive Heart Failure
2	Anti-Arrhythmic Drugs,
4	Blood coagulation and anticoagulant, fibrinolytic, and antiplatelet drugs; Antiinfiammatori
2	Drug therapy for hypercholesterolemia and dyslipidemia. Pharmacotherapy of diabetes

MODULE
PHARMACOLOGY I

Prof.ssa MARIA MELI - Sede IPPOCRATE, - Sede IPPOCRATE

SUGGESTED BIBLIOGRAPHY

Goodman & Gilman. Le basi farmacologiche della terapia - Il manuale. Seconda edizione, Edizioni Zanichelli

Farmacologia. A cura di H.P. Rang, J.M. Ritter, R.J. Flower, G. Henderson. Ottava edizione. Edra Masson, Milano

Farmacologia - Principi di base e applicazioni terapeutiche. A cura di F. Rossi, V. Cuomo, G. Riccardi. IV edizione, Edizioni Minerva Medica, Torino

Farmacologia Generale e Clinica a cura di di B.G. Katzung e A.J. Trevor, XI edizione, Edizioni Piccin, Padova

AMBIT	50415-Farmacologia, tossicologia e principi di terapia medica
INDIVIDUAL STUDY (Hrs)	60
COURSE ACTIVITY (Hrs)	40

EDUCATIONAL OBJECTIVES OF THE MODULE

The course (Pharmacology II) provides knowledge in the area of pharmacokinetics that is essential for the appropriate clinical use of drugs in individual patients. It will also address the characteristics of some drug classes including cardiovascular agents, psychoactive and antitumor drugs, and will describe their mechanisms of action at the molecular and cellular level, their farmacokinetics, the clinical uses, the main source of variability in drug response due to physiopathological and genetic factors, drug interactions and adverse drug reactions.

SYLLABUS

Hrs	Frontal teaching
1	Introduction to pharmacology: drug names and classifications. Pharmacokinetics. Phases of pharmacokinetics (ADME). Plasma- or serum-concentration vs time curve.
2	Drug absorption. Transfer of drugs across membranes: influence of pH and pKa. Routes of drug administration: oral, rectal, parenteral, transdermal, pulmonary, topical.
2	Bioavailability. First-pass metabolism. P-glycoprotein. A.U.C. Determination of drug bioavailability.
2	Drug distribution. Blood flow. Binding to plasma proteins. Blood-tissue barriers. Volume of distribution. Loading dose.
2	Pathways of drug metabolism. Phase I, II and III of drug metabolism. CYP450. Prodrugs and drug metabolites. Enzyme induction and inhibition.
2	Drug elimination. Routes of drug excretion: renal, fecal, pulmonary and others. Clearance, half-life. Steady state and drug dosing. Therapeutic drug monitoring.
2	Drug research and development. Clinical trials of phase I, II, III, IV. Meta-analysis. Pharmacoepidemiology.
4	Introduction to the pharmacology of the autonomic nervous system. Neurotransmitters and receptors. Muscarinic receptors agonists and antagonists. Anticholinesterase agents. Nicotinic agonists and antagonists.
4	Adrenergic agonists and antagonists. The treatment of shock.
2	Antihypertensive drugs. Diuretic agents.
3	Drugs acting on the renin-angiotensin system. Calcium channel blockers. Vasodilators.
3	Anti-anginal drugs. Classification and main features of anti-arrhythmic drugs. Digoxin and treatment of heart failure.
3	Pharmacology of hemostasis. Parenteral and oral anticoagulant agents. Antiplatelet and fibrinolytic drugs.
3	Actions of drugs in the CNS. Anxiolytic and hypnotic drugs: benzodiazepines and Z compounds. Typical and atypical antipsychotic drugs.
4	Principles of cancer chemotherapy. Mechanisms of anticancer drug resistance. Main classes of cytotoxic anticancer agents: alkylating agents, topoisomerase inhibitors, antimitotic agents, antimetabolites. Targeted agents including tyrosine kinase inhibitors, antiangiogenic and new immunotherapeutic drugs. Hormonal drugs.
1	Principles of prescription order writing. Reading of scientific articles regarding pharmacologic subjects.