

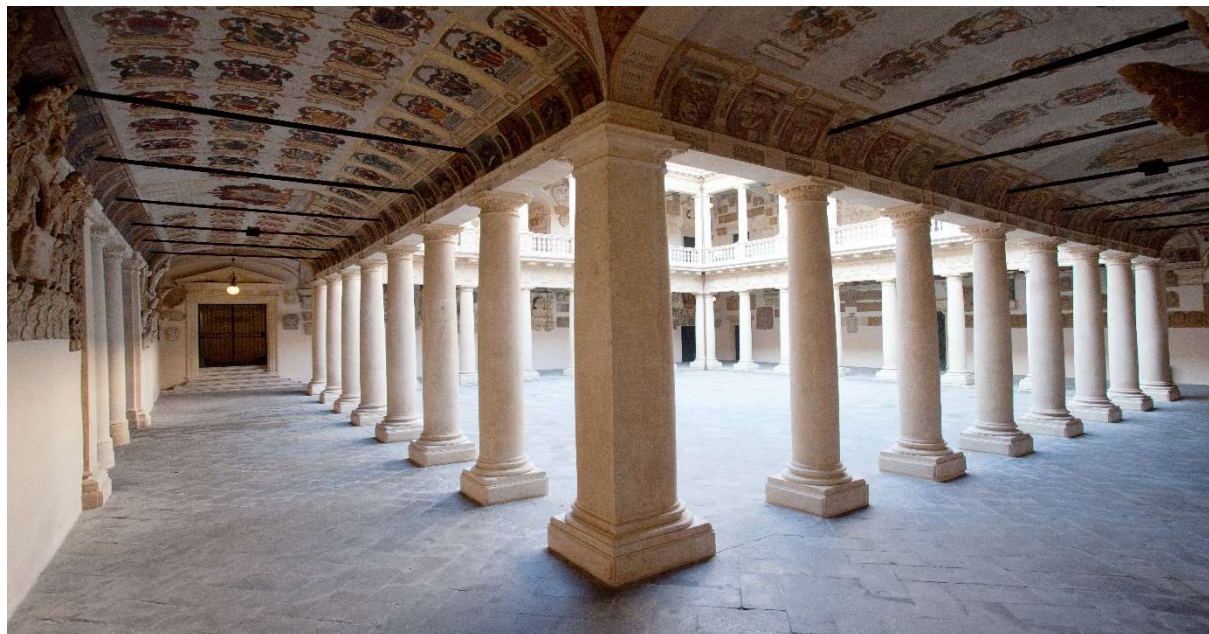
AMMINISTRAZIONE CENTRALE

AREA DIDATTICA E SERVIZI AGLI STUDENTI
UFFICIO CARRIERE STUDENTI

1222-2022
800
ANNI



UNIVERSITÀ
DEGLI STUDI
DI PADOVA



SCHOOL OF MEDICINE AND SURGERY

CALL FOR ADMISSION TO YEARS SUBSEQUENT TO THE FIRST A.Y. 2021/22

Limited access Single-cycle degree programme held in English

MEDICINE AND SURGERY



infographic



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*NB: Click on any item of the table of contents to browse through the document.
However, applicants are recommended to read all the information carefully.*

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INTRODUCTION

Selection is open for the 2021-2022 a.y.¹ admissions to years subsequent to the first of the Single-cycle degree programme in Medicine and Surgery.

Pursuant to the provisions in section 6 of the call for admission to the limited access Single-cycle degree programme in Medicine and Surgery held in English, the selection process is reserved for applicants who applied for recognition of prior learning (**art. 15 of Student career regulation issued by Rector's Decree no. 2125 dated 25/06/2020**) and, following approval, were deemed eligible for admission to a year of study subsequent to the first, provided that places for the year they applied for are available.

1. PLACES AVAILABLE

As a result of:

- ◇ withdrawal from studies;
- ◇ change of campus;
- ◇ change of degree programme

the number of places available in the a.y. 2021-2022 is given below:

- Medicine and Surgery

- 2nd year: 1 place
- 3rd year: 2 places

Please note that only the first three years of the degree programme have been activated.

2. SUBMISSION OF THE APPLICATION FOR RECOGNITION OF PRIOR LEARNING AND EVALUATION BY THE COMMITTEE

Pursuant to the provisions in section 6 of the call for admission to the limited access Single-cycle degree programme in Medicine and Surgery held in English, dated 9/7/2021, and the provisions in art. 15 of Student career regulation issued by Rector's Decree no. 2125 dated 25/06/2020, the applicants who plan to have their credits recognised so as to reduce the time required to complete the limited access Single-cycle degree programme in Medicine and Surgery held in English **must have submitted the application for recognition of prior learning before 15 July 2021**, by

¹ Art.1, point a), Law no. 264 dated 2 August 1999 and subsequent amendments thereto;
Decree by the Head of Department of Medicine and Surgery dated 2/8/2021 "C. di L. e CLM afferenti al DIMED - Avviso di ammissione anno accademico 2021-2022: Ammissione ad anni successivi al primo al Corso di Laurea Magistrale a Ciclo Unico in Medicine and Surgery" (*Bachelor's and Single-cycle degree programmes under the Department of Medicine DIMED - Call for admission to years subsequent to the first of the Single-cycle degree programme in Medicine and Surgery*)

following the instructions given at <https://www.unipd.it/en/credit-recognition> .

The Committee shall assess the applications submitted, recognise prior learning, and notify applicants of the year of study to which they are eligible for admission via online approval.

The Committee shall consider only the learning activities carried out/recognised by the home institution for which the applicant has provided documented details on contents (syllabus and subject area).

The Committee may call on professors in charge of relevant course unit or teaching unit to cooperate when examining specific subjects.

As to the admission test to years subsequent to the first of the limited access Single-cycle degree programme in Medicine and Surgery, the list of candidates eligible for the test, by year of study they compete for, will be made public twenty days before the test date.

3. ADMISSION TO YEARS SUBSEQUENT TO THE FIRST: HOW TO REGISTER ON-LINE FOR THE TEST AND ADMISSION TEST

3.1 Admission test

The test will take place **at 11.00 a.m. on 05 October 2021**. Details on where to sit the test will be given in the pre-enrolment summary page.

In order to participate in the selection process for admission to years subsequent to the first, the candidates who meet the requirements set out in the introduction to this call **must** have applied for prior learning recognition, in accordance with the provisions in section 6 of the call for admission to the limited access Single-cycle degree programme in Medicine and Surgery held in English, dated 9/7/2021, and the provisions in art. 15 of Student career regulation issued by Rector's Decree no. 2125 dated 25/06/2020.

In order to take the test candidates must also submit the pre-enrolment application form **by 12.00 noon on 28 September 2021** on the website www.uniweb.unipd.it .

If candidates do not have the credentials to access the portal www.uniweb.unipd.it , they are required to enter their personal data at

<https://uniweb.unipd.it/AddressBook/ABStartProcessoRegAction.do>

After registering, candidates will be emailed a username and an activation code to access the following page <https://uniweb.unipd.it/password/index.php/it/utenti/identifica/azione/a> and set three security questions, along with a new password.

Username and password enable candidates to log in to the personal area of the portal <https://uniweb.unipd.it>.

Following login, candidates should access the pre-enrolment application form by clicking on *Home* → *Pre-enrolment for limited access degree programmes* → *Select course "6 years single cycle*

degree” → Ammissioni ad anni successivi al primo del Corso di laurea magistrale a ciclo unico in Medicine and Surgery.

After the closing date, 12.00 noon on 28 September 2021, candidates will not be able to connect to the page and register for the test.

The service may be suspended temporarily for technical updates.

For any difficulty candidates may contact the University Call Centre, from Monday to Friday 9.00am-5.00pm at +39 0498273131 or email immatricolazioni.studenti@unipd.it . Further assistance channels will be activated if necessary. Contact details will be given on the web page <https://www.unipd.it/immatricolazioni>.

The **test** consists of multiple-choice questions (four options, one of which is correct) on the contents provided by the degree programme of the University of Padua in the year(s) before the one to which candidates apply for admission.

The Examination Board shall set 60 questions on the subjects listed in the table below:

ADMISSION TO THE 2 ND YEAR		ADMISSION TO THE 3 RD YEAR	
Subjects	no. questions	Subjects	no. questions
GENERAL CHEMISTRY	10	METABOLIC BIOCHEMISTRY	10
PHYSICS	10	MOLECULAR BIOLOGY	5
STRUCTURAL BIOCHEMISTRY	10	PHYSIOLOGY	10
CELL BIOLOGY	15	GENETICS	10
HISTOLOGY	15	ANATOMY	10
		IMMUNOLOGY	5
		PHYSICS	5
		CHEMISTRY	5
Total no. of questions	60	Total no. of questions	60

The syllabi are detailed in annex 1, which is integral part of this call for admission.

Candidates are given **1 hour and 30 minutes** to complete the test.

The Examination Board shall assess the tests according to the following criteria:

- ✓ 1 point for each correct answer
- ✓ - 0.25 for each wrong answer
- ✓ 0 points for each unanswered question.

In case of a tie, priority will be given to the candidate with the highest number of recognised credits, as per the Committee's approval for examinations or activities passed by the closing date for application for recognition of prior learning.

In case of a further tie, priority shall be given to the youngest candidate.

3.2 Customised admission test (disabilities and SLD)

Candidates with **disabilities or Specific Learning Disabilities (SLD)** can sit the test with the support they need, by making explicit request to the **Student Service Office - Inclusion Unit**. This requires candidates to:

- 1) apply for an individual test during pre-enrolment procedure on [Uniweb](#);
- 2) send an email to inclusione.studenti@unipd.it and specify the kind of assistance or compensatory measures they need. Any additional time given cannot exceed 50% (candidates with disabilities) or 30% (candidates with SLD) of the time given for regular completion of the test;
- 3) submit certified copies of documents stating the disability or SLD to the Student Service Office - Inclusion by sending a scanned and easy-to-read copy by email (inclusione.studenti@unipd.it), along with a copy of the candidate's ID card **not later than 12.00 noon on 28 September 2021**. The form to fill in for submission is available at www.unipd.it/accoglienza-prove-ingresso.

The candidates whose medical certificate is not up to date, due to the limitation of the NHS's activity for the Covid-19 emergency, may be admitted to the test conditionally pending subsequent submission of the additional documents required herein.

The documents to submit for individual assistance and support are listed below:

- certificate of disability and/or certificate that complies with law no. 104 of 1992, issued by the relevant medical examination board, stating the type of disability and/or the disability level recognised
- certified diagnosis of SLD (issued no more than 3 years before now or renewed at the age of eighteen, by the National Health Service or by authorised specialists and facilities).

EU and non-EU candidates with disabilities or specific learning disabilities (SLD) residing abroad who plan to benefit from customised tests must submit a certificate stating their disability or SLD issued in their country of residence, along with a certified translation (either by the translator or the Italian diplomatic authorities) into Italian or English.

The kind of support for the test shall be chosen by taking into account the documents submitted and after a possible interview with dedicated personnel (arrangements to be defined).

Therefore, candidates are advised to contact the Student Service Office - Inclusion Unit well in advance of the date of the test, by sending an email to inclusione.studenti@unipd.it.

Further information at www.unipd.it/accoglienza-prove-ingresso .

4. RANKING LIST FOR ADMISSION TO MEDICINE AND SURGERY AND ENROLMENT APPLICATION

The ranking list will be made available at <https://www.unipd.it/graduatorie-ammissione> on **12 October 2021**. Selected candidates are required to secure their place by the deadlines and following the steps that will be specified on the same date.

Failing to submit the documents required will automatically result in the candidate's withdrawal.

Should further places be still available after the deadline, due to candidates' withdrawal, the Student Office - Enrolment Unit will carry on reallocation of places by directly contacting candidates in ranking order.

5. INTERNATIONAL AND ITALIAN STUDENTS WITH A QUALIFICATION OBTAINED ABROAD

Admission of students with a qualification obtained abroad is subject to provisions of Italian Ministry of University and Research, available at <https://www.mur.gov.it/it>, - Università - Studenti stranieri, after passing the envisaged tests and submitting the required documents.

For any enquiry, candidates should contact the Global Engagement Office - Admissions and Welcome Unit, email international.admission@unipd.it.

5.1 Enrolment procedure for EU and non-EU candidates residing in Italy

Citizens from Norway, Iceland, Liechtenstein, Switzerland, and the Republic of San Marino are classed as EU-equated citizens. Non-EU candidates residing in Italy are admitted conditionally, until checks on the residence permit are made.

To participate in the selection process candidates must:

1. **pre-enrol** on the portal <https://www.uniweb.unipd.it/> following the procedure and by the deadline specified in this call for admission ([section 3.1](#));
2. sit the **admission test** following the rules and meeting the deadlines specified in this call ([section 3.1](#));
3. upload the required documents to the portal <https://apply.unipd.it/> so as to allow for **checks on the international entry qualification** and for the upper secondary school final mark to be added to the ranking list, if necessary. The procedure is available at <https://www.unipd.it/studiare-italiano-come-fare-domanda>. The application must be submitted **by 12.00 noon - local time - (GMT +1) on 28 September 2021**.

In case of not submitted or incomplete documents, or ineligible qualification, enrolment will not be finalised.

Candidates are exempt from the Italian language test within the meaning of Italian legislative decree no. 286/98 art. 39 paragraph 5 and subsequent amendments and additions thereto.

To allow classes to start smoothly, all selected international students must be fully enrolled and have all the documents required for admission by 31 October 2021.

Candidates eligible for admission who plan to enrol must:

1. submit the online enrolment application through the portal www.uniweb.unipd.it and pay the first instalment by the deadline and following the provisions set forth by this call for admission ([section 4](#));
2. have all the original documents checked by the Global Engagement Office - Admissions and Welcome Unit following the procedures that will be specified on the web page <https://www.unipd.it/studiare-inglese-immatricolarsi>.

5.2 Enrolment procedure for non-EU candidates residing abroad:

To participate in the selection process candidates must:

1. **pre-enrol through the University portal** <https://www.universitaly.it/index.php/dashboard> by selecting the University of Padua and the degree programme. Pre-enrolment is necessary to apply for the student visa to the Italian diplomatic authorities in the country of residence;
2. sit the **admission test** following the rules and meeting the deadlines specified in this call ([section 3.1](#));
3. upload the required documents to the portal <https://apply.unipd.it/> so as to allow for **checks on the international entry qualification** and for the upper secondary school final mark to be added to the ranking list, if necessary. The procedure is available at <https://www.unipd.it/studiare-italiano-come-fare-domanda>. The application must be submitted **by 12.00 noon - local time - (GMT +1) on 28 September 2021**.
4. prove they have a **B2 level in Italian by 30 September 2021**; the Italian language test - not applicable to those falling into the categories established by Italian ministerial guidelines <https://www.studiare-in-italia.it/studentistranieri/> - will take place as described on the following web page <https://www.unipd.it/prova-conoscenza-lingua-italiana>.

In case of not submitted or incomplete documents, or ineligible qualification, enrolment will not be finalised.

To allow classes to start smoothly, all selected international students must be fully enrolled and have all the documents required for admission by 31 October 2021.

Candidates eligible for admission who plan to enrol must:

1. secure their place and pay the first instalment through the portal apply.unipd.it (instructions will be sent);
2. submit all the original documents required to the Global Engagement Office - Admissions and Welcome Unit for checks, upon their arrival in Italy; the procedures will be outlined on the web page <https://www.unipd.it/studiare-inglese-immatricolarsi>.

6. PERSON APPOINTED TO OVERSEE THE PROCEDURE, PERSONAL DATA, NOTES AND WARNINGS

- 1) Pursuant to art. 4 of Law no. 241 dated 7 August 1990 (New rules on administrative procedures and right to access administrative documents) and subsequent amendments thereto, the head of the Committee is appointed to oversee the admission administrative procedure.
- 2) Person appointed to oversee the procedure for accessing documents: Dr Roberta Rasa, Head of the Student Office. Candidates may exercise their right to access the competition records following the procedures set forth by Italian Presidential Decree no. 184, dated 12 April 2006.
- 3) Simultaneous enrolment: simultaneous enrolment is subject to regulations available at <http://www.unipd.it/avvisi-ammissione-corsi>.
- 4) Existing legislation on statements: in the event of false or untrue statements in the submitted documents, without prejudice to criminal sanctions to be applied in accordance with Italian criminal code and special laws (art. 75 and 76 of Italian Presidential Decree DPR 445/2000), the candidate's enrolment automatically lapses. The University of Padua will get back any benefit granted (e.g. scholarships) and will not reimburse any tuition fees already paid. False statements will also entail the possibility of damage claim by counterparts.

Further information on privacy and existing regulations concerning admissions is available at www.unipd.it/privacy and www.unipd.it/avvisi-ammissione-corsi.

Any subsequent amendments and additions to this call for admission will be notified:

- ♦ on the University of Padua's Register;
- ♦ on the University's web pages at <http://www.unipd.it/avvisi-ammissione-corsi> .

For anything not specified within this call for admission, reference shall be made to the existing legislation, namely to the Italian M.D. no 730, dated 25 June 2021 "Modalità e contenuti delle prove di ammissione ai corsi di laurea e laurea magistrale a ciclo unico in lingua italiana ad accesso programmato a livello nazionale a.a. 2021/2022" (*Procedures and contents of the admission test to Bachelor's and Single-cycle degree programmes held in Italian with number of places limited on national basis a.y. 2021/2022*) and annexes.

Padova, 5 August 2021

The Rector

Prof. Rosario Rizzuto

Digitally signed pursuant to Italian legislative decree

82/2005

The Head of the Division Dr Roberta Rasa Date	The Director General Ing. Alberto Scuttari Date
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ANNEX 1 - SYLLABI

Syllabi to test knowledge and skills acquired for admission to the 2nd year (60 questions on the topics listed in the table in section 3)

GENERAL CHEMISTRY AND STRUCTURAL BIOCHEMISTRY:

Atoms, chemical elements and compounds. The nucleus and isotopes. Atomic orbitals, electron configuration and periodic trends of elements.

Chemical bonds and weak bonds. Valence bond theory and VSEPR theory. Hybrid orbitals and resonance.

The atomic mass unit and the mole. Interpretating and balancing chemical equations.

The gaseous state and gas laws. The liquid state and phase diagrams. The dissolution processes and colligative properties.

Basics of chemical kinetics. Speed of reactions and reaction mechanisms. Catalysts and enzymes. Chemical equilibrium.

Basics of chemical thermodynamics: enthalpy, entropy, and Gibbs' free energy.

Acids and bases. Acid-base balance and pH. Strong and weak acids and bases. Buffer solutions.

Redox reactions. Electrochemistry. Reduction potentials and the Nernst equation.

Alkanes, alkenes, and alkynes: nomenclature, classification, isomerization, and reactivity.

Benzene and aromatic compounds. Electrophilic substitution.

Chirality and chiral molecules. Enantiomers and diastereomers.

Alkyl halides: nomenclature and reactivity. Nucleophilic substitution and elimination reactions.

Alcohols, phenols, ethers, and thiols.

Amines as bases and nucleophiles. Reactions of amines.

Aldehydes and ketones: nucleophilic addition reaction. Hemiacetals and hemiketals. Imine. Keto-Enol Tautomerism.

Carboxylic acids: chemical properties and reactivity.

Acyl halides, anhydrides, esters, and amides.

PHYSICS:

Physical quantities, dimensions, and measurement error.

Mechanics: equations of motion. Potential and kinetic energy. Conservation of energy, momentum, and angular momentum.

Fluids: fluid statics. Flow and the continuity equation. Fluids and viscosity. Turbulent flow. Surface tension.

Thermodynamics: heat, specific heat. Ideal gases. Thermodynamic transformations. First and second law of thermodynamics.

Electromagnetism: electrostatics and Gauss's law. Circuit elements and applications to bioelectric activities of biological systems. Magnetic field and Lorentz force. Magnetic properties of matter. Maxwell's equations.

Harmonic oscillator. Wave propagation equation. Reflection, refraction, and total reflection. Interference. The Doppler effect. Sound and ultrasound. Fourier analysis. Electromagnetic waves. Light diffraction, dispersion, polarisation. The dioptr. Thin lenses: image formation by thin lenses. Optical systems. Optical fibres.

The atom and electron binding energies. Excitation and ionisation. The electromagnetic spectrum, ionising and non-ionising radiation. X-rays and diagnostic imaging. The nucleus and nuclear forces. Radioactivity and radioactive decay law. Gamma-ray diagnostics and SPECT. Positron Emission Tomography (PET). NMR.

CELL BIOLOGY:

Cells: basic organisation, prokaryotic and eukaryotic cells

Molecular components of the cell: macromolecules;

Proteins: basic knowledge

Nucleic Acids: DNA and RNA, information flow in the cell

Biological membranes: the lipid bilayer and membrane proteins

The nucleus: structure of the nuclear envelope and nuclear lamina; nuclear import and export

Chromatin and gene transcription

Gene transcription: RNA polymerase and promoters, post-transcriptional modifications

Ribosomes and translation

Mitochondria: structure, overview of their functions, mitochondrial DNA and import of proteins into mitochondria

Peroxisomes: structure, functions, and protein import

Endoplasmic Reticulum: structure and general features, functions of smooth ER

Secretory pathway 1: protein import into rough ER, glycosylation, and quality control

The secretory pathway 2: the Golgi apparatus, structure, and functions

Secretory pathway 3: vesicle trafficking and secretion

Endocytosis, endosomes, and lysosomes

The cytoskeleton: microtubules, microfilaments, intermediate filaments, and associated proteins

The plasma membrane and its specialisations: microvilli, cilia, primary cilia

DNA replication, repair, and recombination

The cell cycle and mitosis

Meiosis

Cell death

autophagy

HISTOLOGY:

How to study tissues: general overview of histological methods

Cell adhesion and cell junction

The extracellular matrix (ECM)

How tissues are made and maintained: cell death and renewal, the concept of stem cells

epithelial tissue: structure, properties, position; some examples

Glandular tissue 1: exocrine glands, structure and functioning

Glandular tissue 2: endocrine glands, hormone production and releasing

Connective tissue proper: structure, types, properties, and positions

Adipose tissue: structure and properties

Cartilage: structure, types, properties, and positions

Osseous tissue: structure, properties, and development

Blood: composition and properties of plasma; blood cells: structure, properties, and origin (hematopoiesis)

Lymphoid tissue: overview of the lymphatic system and the immune system

Nervous tissue: introduction to the anatomy of nervous system; neurons and glial cells: structure and properties

Muscle tissue: structure and properties of skeletal, cardiac, and smooth muscle tissue

Syllabi to test knowledge and skills acquired for admission to the 3rd year (60 questions on the topics listed in the table in section 3)

METABOLIC BIOCHEMISTRY:

Enzymology, bioenergetics and metabolic energy conservation, oxygen, oxidoreductase, carbohydrate metabolism, acetyl-CoA and Krebs cycle, lipid and plasma lipoprotein metabolism, nitrogen and amino acid metabolism, signal transduction mechanisms and regulation in different nutritional conditions and in diabetes. Metabolic hormones and transcriptional and post-transcriptional regulation of metabolism. Role of sirtuins and AMPK in metabolism.

MOLECULAR BIOLOGY:

Structural organisation of genes in prokaryotes and eukaryotes

- Transcription mechanisms and different levels of prokaryotic and eukaryotic gene expression regulation

- Fundamentals of basic genetic engineering techniques and recent genetic manipulation and

genome-editing strategies

- Fundamentals of techniques for studying gene expression and epigenetic regulation of cells and tissues
- Fields of application of the techniques in diagnostics and medical research
- Interpretation of the genotype of prokaryotic or eukaryotic organisms from their phenotype: problems and solutions
- the discovery process in basic research: solutions to simple problems or questions
- the main biochemical and biophysical communication pathways in cells and tissues: examples of cells and tissues involvement in embryological and pathological processes.

PHYSIOLOGY:

CARDIOVASCULAR PHYSIOLOGY

The heart

Cardiac muscle; The heart as a pump and function of the heart valves, rhythmical excitation of the heart. The normal electrocardiogram. Electrocardiographic interpretation of cardiac muscle and coronary blood flow abnormalities: vectorial analysis. Cardiac arrhythmias and their electrocardiographic interpretation.

The circulation

Overview of the circulation; Biophysics of pressure, flow, and resistance. Vascular distensibility and functions of the arterial and venous systems.

The microcirculation and lymphatic system: capillary fluid exchange, interstitial fluid, and lymphatic flow

Local and humoral control of tissue blood flow. Nervous regulation of the circulation and rapid control of arterial pressure. Role of the kidney in long-term regulation of blood pressure and hypertension: the integrated blood pressure regulation system.

Cardiac output, venous return, and their regulation.

Muscle blood flow and cardiac output during exercise; the coronary circulation and ischemic heart disease. Heart failure, heart valves and heart murmurs; Congenital heart and valve defects

Circulatory shock and treatment. Red blood cells, anaemia, and polycythaemia. Blood types; Transfusion; Tissue and organ transplantation. Haemostasis and blood coagulation

BODY FLUIDS; THE KIDNEY

The body fluid compartments: extracellular and intracellular fluids; Edema. Urine formation and the kidneys: I. Glomerular filtration, renal blood flow and their regulation.

Urine formation and the kidneys: II. Tubular reabsorption and secretion. Urine concentration and dilution; Regulation of extracellular fluid osmolarity and sodium concentration.

Renal regulation of potassium, calcium, phosphate, and magnesium; Integration of renal mechanisms for control of blood volume and extracellular fluid volume. Acid-base regulation. Diuretics, kidney disease.

RESPIRATORY PHYSIOLOGY

Structure and function of the respiratory system. Pulmonary ventilation. Pulmonary circulation, pulmonary edema, pleural fluid. Physical principles of gas exchange; Diffusion of oxygen and carbon dioxide through the respiratory membrane. Transport of oxygen and carbon dioxide in blood and tissue fluids. Regulation of respiration. Respiratory insufficiency: pathophysiology, diagnosis, oxygen therapy. Regulation of the respiratory system during exercise. Pulmonary function tests

GASTROINTESTINAL PHYSIOLOGY

General principles of gastrointestinal function: motility, nervous control, and blood circulation. Propulsion and mixing of food in the alimentary tract. Secretory functions of the alimentary tract. Digestion and absorption in the gastrointestinal tract. Physiology of gastrointestinal disorders. The liver as an organ.

ENDOCRINOLOGY AND REPRODUCTION

Introduction to Endocrinology. Pituitary hormones and control by the Hypothalamus. Thyroid hormone regulation of metabolism. Adrenocortical hormones. Endocrine functions of the Pancreas and regulation of carbohydrate metabolism. Hormonal control of Calcium and Phosphate metabolism and the physiology of bone. Reproductive and hormonal functions of the male (and function of the pineal gland). Female physiology before pregnancy and female hormones. Pregnancy and lactation.

GENETICS:

General aspects and definitions: organisation of the human genome, databases and software for storing and viewing genomes.

Cytogenetics and chromosome disorders: chromosome structure, chromosome abnormalities and their origins (NAHR, NHEJ).

Population genetics: Hardy-Weinberg principle, allele frequencies, genetic drift, founder effect, selection. Haldane's rule.

Mendelian disorders: classification of mutations and nomenclature, molecular basis of dominance and recessivity, genetic linkage.

Non-Mendelian disorders: mitochondrial genetics, triplet repeat diseases, genetic imprinting disorders, diagnostic techniques.

Fundamentals of genetic disease diagnosis: standard cytogenetic analysis, genetic risk estimation.
Multifactorial diseases: gene and environment, polygenic inheritance, quantitative traits, heritability, twins and predictive testing.

The genetics of cancer: proto-oncogenes and tumour-suppressor genes

Pharmacogenetics and pharmacogenomics

Epigenetics and clinical practice

Genetic therapies: cell therapy, stem cells, and pharmacological approaches

Selected examples of genetic disorders: Facioscapulohumeral muscular dystrophy type I and II, mutations in miRNA genes, spinal muscular atrophy, cystic fibrosis.

ANATOMY:

Anatomical terminology. Hollow organs and solid organs. Surface reference lines; regions. Body cavities and planes. LOCOMOTOR SYSTEM. Classification and morphology of bones and muscles. Synarthrosis and diarthrosis. Morphology of CRANIAL STRUCTURES; norms; cranial fossae; cranial joints; mimic and masticatory muscles. Osteo-arthrology and muscles of the SPINE, THORAX (including intrinsic and extrinsic muscles and diaphragm), ABDOMEN (including inguinal canal), and PELVIS (including pelvic diaphragm and perineum), NECK: muscles; fasciae. Osteo-arthrology and muscles of the UPPER AND LOWER LIMBS. HEART: morphology, position, orientation; external and internal configuration; topography and relationship with the surrounding structure; cardiac wall structure; conduction system; vessels and nerves. Pericardium. VESSELS: general characteristics, portal systems, atero-venous anastomoses. Fetal circulation. The pulmonary trunk and its branches; pulmonary veins. Aorta: course, collateral branches and terminal branches. Superior and inferior vena cava: roots and tributaries; azygos system; portal vein; porto-caval anastomoses. Arterial circulation of the head and trunk. Superficial and deep arterial and venous circulation of the upper and lower limbs. SPLANCHNOLOGY. Macroscopic, microscopic, topographic, and clinical anatomy of the viscera. LYMPHATIC SYSTEM: lymph and lymphatic vessels; thoracic and right lymphatic ducts. Lymph nodes lymphatic vessels of the head, neck, thorax, abdomen pelvis, upper and lower limbs. Thymus, spleen, lymph nodes, and tonsils. RESPIRATORY SYSTEM: morphology of the airways; lungs; pleura. DIGESTIVE SYSTEM: oral cavity; major and minor salivary glands; pharynx; esophagus; stomach; small and large intestines; liver and bile duct; pancreas. Peritoneum, structure, mesenteries, and spaces. URINARY SYSTEM: kidneys; urinary pathways. MALE GENITAL SYSTEM: testicle; genital tract; external genitalia. FEMALE GENITAL SYSTEM: ovary, genital tract; external genitalia; breast. ENDOCRINE SYSTEM: hypophysis, thyroid gland; parathyroid gland; pancreatic islets; adrenal gland. Diffuse endocrine system. INTEGUMENTARY SYSTEM: basics of skin and adnexa.

IMMUNOLOGY:

Immunology:

The immune system

Innate immunity

The major histocompatibility complex (MHC) and antigen-presenting cells (APC)

Molecules with receptor function: the receptor for the antigen of T lymphocytes (TCR)

T lymphocytes: antigen recognition and lymphocyte activation

Molecules with receptor function: the receptor for the antigen of B lymphocytes (BCR) and immunoglobulins (Ig)

B lymphocytes: antigen recognition and lymphocyte activation

The complement system: the classical pathway

Effector phase of the immune response

Immunopathology:

Hypersensitivity reactions, general aspects and classification according to Gell and Coombs

Type I reactions, allergies

Type II reactions and notions of immunohematology

Type III reactions and immune complex diseases

Type IV reactions

Autoimmunity and autoimmune diseases. Mechanisms of autoimmune diseases.

Immunity and tumours. Tumour antigens. Cancer immune response.

Cancer immunotherapy. New modalities of immunological tumour therapy.

Immunity and transplants

Vaccines and principles of vaccinotherapy

PHYSICS:

Physical quantities, dimensions, and measurement error.

Mechanics: equations of motion. Potential and kinetic energy. Conservation of energy, momentum, and angular momentum.

Fluids: fluid statics. Flow and the continuity equation. Fluids and viscosity. Turbulent flow. Surface tension.

Thermodynamics: heat, specific heat. Ideal gases. Thermodynamic transformations. First and second law of thermodynamics.

Electromagnetism: electrostatics and Gauss's law. Circuit elements and applications to bioelectric activities of biological systems. Magnetic field and Lorentz force. Magnetic properties of matter. Maxwell's equations.

Harmonic oscillator. Wave propagation equation. Reflection, refraction, and total reflection. Interference. The Doppler effect. Sound and ultrasound. Fourier analysis. Electromagnetic waves.

Light diffraction, dispersion, polarisation. The dioptr. Thin lenses: image formation by thin lenses. Optical systems. Optical fibres.

The atom and electron binding energies. Excitation and ionisation. The electromagnetic spectrum, ionising and non-ionising radiation. X-rays and diagnostic imaging. The nucleus and nuclear forces. Radioactivity and radioactive decay law. Gamma-ray diagnostics and SPECT. Positron Emission Tomography (PET). NMR.

CHEMISTRY:

Atoms, chemical elements and compounds. The nucleus and isotopes. Atomic orbitals, electron configuration and periodic trends of elements.

Chemical bonds and weak bonds. Valence bond theory and VSEPR theory. Hybrid orbitals and resonance.

The atomic mass unit and the mole. Interpreting and balancing chemical equations.

The gaseous state and gas laws. The liquid state and phase diagrams. The dissolution processes and colligative properties.

Basics of chemical kinetics. Speed of reactions and reaction mechanisms. Catalysts and enzymes. Chemical equilibrium.

Basics of chemical thermodynamics: enthalpy, entropy, and Gibbs' free energy.

Acids and bases. Acid-base balance and pH. Strong and weak acids and bases. Buffer solutions.

Redox reactions. Electrochemistry. Reduction potentials and the Nernst equation.

Alkanes, alkenes, and alkynes: nomenclature, classification, isomerization, and reactivity.

Benzene and aromatic compounds. Electrophilic substitution.

Chirality and chiral molecules. Enantiomers and diastereomers.

Alkyl halides: nomenclature and reactivity. Nucleophilic substitution and elimination reactions.

Alcohols, phenols, ethers, and thiols.

Amines as bases and nucleophiles. Reactions of amines.

Aldehydes and ketones: nucleophilic addition reaction. Hemiacetals and hemiketals. Imine. Keto-Enol Tautomerism.

Carboxylic acids: chemical properties and reactivity.

Acyl halides, anhydrides, esters, and amides.