



Div.III-10/ED/MD

**CALL FOR APPLICATIONS FOR ADMISSION TO THE SINGLE CYCLE DEGREE PROGRAMME IN
MEDICINE AND SURGERY IN ENGLISH (CLASS LM-41)
INTERNATIONAL MEDICAL SCHOOL
ACADEMIC YEAR 2019/2020**

THE RECTOR

HAVING REGARD TO

Law no. 264 of 02 August 1999 regulating access to university programmes;

HAVING REGARD TO

Ministerial Decree no. 270 of 22 October 2004, “Amendments to the regulations on the educational autonomy of universities” (*Modifiche al regolamento recante norme concernenti l'autonomia didattica degli atenei*) approved with Decree of the Minister for Universities and Scientific and Technological Research no. 509 of 3 November 1999;

HAVING REGARD TO

Ministerial Decree no. 542 of 18 June 2019 that defines the procedure and content of the admission exam to the single cycle degree programme in Medicine and Surgery in English, academic year 2019/2020;

HAVING REGARD TO

Ministerial Decree no. 595 of 27 June 2019 that defines 34 places available for the admission in the first year of the single cycle degree programme in Medicine and Surgery in English, academic year 2019/2020;

HAVING REGARD TO

Ministerial Decree no. 597 of 28 June 2019 that defines 16 places reserved to non-EU students residing abroad for the admission in the first year of the single cycle degree programme in Medicine and Surgery in English, academic year 2019/2020;

DECREES

A competition for admission to the single cycle degree programme in Medicine and Surgery in English for the academic year 2019/2020.



Art. 1 - Admission requirements

Applicants with an upper secondary school diploma, or equivalent qualification obtained abroad, can take the admission exam.

Foreign qualifications are valid if obtained after at least 12 years of schooling and if allow the admission to University in the country where they have been obtained.

Further information about the foreign qualifications and about the access of foreign students to Italian Universities is contained in the relevant Ministerial provisions for the academic year 2019/20, published on the Ministry website: <http://www.studiare-in-italia.it/studentistranieri/> and reported on the University portal www.unimi.it in the sections dedicated to international students.

The eligibility of the foreign qualification in any case is assessed by the University having regard to the ministerial instructions on the subject and in implementation of bilateral applicable agreements.

Art. 2 - Number of places available

The number of places available for enrolment in the first year is as follows:

EU and non-EU citizens resident in Italy: 34 places

Non-EU citizens resident abroad: 16 places

Art. 3 - Registering for the admission exam and deadlines

Admission exam registration will begin on 3rd July 2019 and terminate at 3pm (GMT+2) on 25 July 2019 exclusively by the procedure indicated on the website: www.universitaly.it.

During registration on the UNIVERSITALY website, candidates must indicate their email address and the universities they wish to attend in order of preference, as well as any language certificates they hold (see Annex B of the present announcement).

If the candidate intends to sit for the exam in an Italian centre, the first option constitutes automatically the centre where the exam will have to be taken. University preferences cannot be changed or added to after 3pm (GMT+2) of 25 July 2019. In any case, the last “confirmation” expressed by the candidate before that deadline will be considered valid.

Candidates who do not follow the registration procedure cannot sit for the exam.

Candidates intending to sit for the exam abroad must indicate an exam venue as defined in art.6.

An admission fee must be paid with the modalities indicated on the portal www.universitaly.it. The payment not accompanied by the online admission receipt does not allow to sit for the exam.

Besides online university enrolment, **non-EU applicants resident abroad**, must also present an application for **pre-enrolment to the Italian diplomatic office in their country of origin**, in accordance with the methods and deadlines set out in current provisions regarding the enrolment of foreign students in university programmes published on the Ministry of



Education, Universities and Research webpage: <http://www.studiare-italia.it/studentistranieri/>.

Art. 4 - Disabled applicants

Applicants with disabilities who want to require extra time and/or specific aids during the exam must fill in the [Online application for aids during admission tests](#), available on the portal www.unimi.it in the section [General Forms](#).

The application must be submitted within the deadline for admission, uploading a certificate of legal disability and/or acknowledgement of status of handicap under law 104/92 or of civil invalidity.

Disabled candidates residing abroad must submit the disability certification issued in the country of residency, together with an official translation in Italian or in English.

For further information, please contact the Servizio Disabili e DSA of the University of Milan at the e-mail address: ausili.ammissioni@unimi.it.

Art. 5 - Applicants with SLD

Applicants with specific learning disabilities (SLD) who want to require extra time and/or specific aids during the exam must fill in the [Online application for aids during admission tests](#), available on the portal www.unimi.it in the section [General Forms](#).

The application must be submitted within the deadline for admission, uploading a certificate of specific learning disabilities (SLD) under law no. 170/2010.

The certification must be issued by the National Health Service, accredited private facilities or specialists, together with an ASST (Azienda Socio Sanitaria Territoriale) conformity document and must be issued no more than three years earlier if the applicant was underage at the time of the issuance of the certification.

Candidates with SLD residing abroad must submit the certification of SLD issued in the country of residency, together with an official translation in Italian or in English.

For further information, please contact the Servizio Disabili e DSA of the University of Milan at the e-mail address: ausili.ammissioni@unimi.it.

Art. 6 - Admission exam schedule and procedure

The admission exam will take place on **12 September 2019** at the times and places indicated in the following table:

Country	City	Centre Name	Starting time (local time)
Brazil	Sao Paolo	Winner Idiomas	9:00
Canada	Toronto	Global Village English Center	9:00
Cyprus	Nicosia	Pascal Education Ltd	15:00



China	Beijing	School of International Education, Beijing Foreign Studies University	19:00
France	Paris	The British School of Paris	14:00
Germany	Essen	Stevens English Training	14:00
Germany	Munich	Münchner Volkshochschule GmbH	14:00
Greece	Athens	Hellenic English Council Ltd	15:00
Hong Kong	Hong Kong	ITS Tutorial School	19:00
India	Gurugram	Planet EDU - Pvt Limited	17:30
Israel	Tel Aviv	Mobile Testing Solutions	15:00
Italy	Bari	Università degli Studi di Bari	14:00
Italy	Milan	Università degli Studi di Milano	14:00
Italy	Milan	Università degli Studi di Milano - Bicocca	14:00
Italy	Rome	Università degli Studi di Roma " <i>Sapienza</i> "	14:00
Italy	Rome	Università degli Studi di Roma " <i>Tor Vergata</i> "	14:00
Italy	Naples	Università degli Studi della Campania " <i>Luigi Vanvitelli</i> "	14:00
Italy	Naples	Università degli Studi di Napoli Federico II	14:00
Italy	Bologna	Università di Bologna	14:00
Italy	Turin	Università di Torino	14:00
Italy	Pavia	Università degli Studi di Pavia	14:00
Italy	Siena	Università degli Studi di Siena	14:00
Italy	Messina	Università degli Studi di Messina	14:00
Italy	Padova	Università degli Studi di Padova	14:00
Pakistan	Lahore	British Council Lahore	17:00
Poland	Warsaw	Lang LTC	14:00
Saudi Arabia	Jeddah	British Council Jeddah	15:00
Switzerland	Zurich	Swiss Exams	15:00
South Africa	Johannesburg	British Council Johannesburg	14:00
Spain	Madrid	CESMA Business School	14:00
Turkey	Istanbul	British Side	15:00
United Arab Emirates	Dubai	British Council, Dubai	16:00
United Kingdom	London	Mobile Testing Solutions Ltd	13:00
USA	New York	OHC New York	09:00

The duration of the exam is 100 minutes.

Candidates electing to sit for the exam at the University of Milan must arrive at 12 noon at the Teaching Sector in Via Celoria 26.



All candidates must bear the valid identity document indicated during registration for the admission exam.

Candidates without documents or with invalid documents, or arriving late, will not be admitted to the exam.

Candidates will be distributed in the examination rooms according to age, except in the case of twins.

The addresses of the examination venues and rooms will be published on the MIUR and University websites on 2nd August 2019.

In the examination room, each candidate will receive a folder containing:

- a) a personal data form the candidate has to mandatorily fill in, without any identification code;
- b) the examination questions bearing the identification code of the folder and 2 sheets for the draft;
- c) an answer form bearing the identification code of the folder;
- d) a sheet printed with the identification code of the folder, the name of the University and the degree programme of the admission exam.

The following rules must be observed during the exam:

- a) a black pen, provided by the University or the test center, must be used to mark the answer form;
- b) candidates who interact or bring and/or use cell phones, tablets, smartphones, smartwatches, earphones, webcams and the like, or pencils, pens or other instrument suitable for writing, manuals, schoolbooks, even if in partial reproduction, handwritten notes, blank papers or other material to consult into the examination room will be disqualified;
- c) on delivery of the answers, candidates who do not fill in the personal data form and sign the declaration that the codes mentioned in g) are identical will be disqualified;
- d) candidates can correct one (and only one) answer to a question by completely blacking out the previously chosen box and choosing another: only one of the five boxes must be crossed in order to score a point;
- e) next to the sequential numbers of the questions, the answer form bears a small circular figure to mark in the case of “no answer”: once marked, the choice cannot be modified. If no mark is placed in the circle or in any box, “no answer” is in any case scored;
- f) at the end of the exam, the candidate is invited to reach a dedicated station equipped with a specific pen, at reasonable distance from the committee, where he/she will find:
 - a box for the delivery of the personal data form, on the side of which is shown the specimen of the personal data form itself;



- the pairs of adhesive labels on which barcodes are reported.
- g) each candidate must choose a pair of adhesive labels. One label must be applied on the answer form and one on the personal data form by the candidate, who has to personally check the correspondence between the alphanumeric codes reported on the pair of labels chosen. The candidate has then to undersign, at the bottom of the personal data form, the declaration of authenticity of the personal data and of correspondence between the alphanumeric codes applied on the personal data form and on the answer form. In conclusion of these operations, the candidate must insert the personal data form in the box present at the dedicated station and successively go to the committee desk, where he/she can insert the answer form in the specific box.

The candidate's exam is invalidated in the following cases:

1. If the candidate sits for the exam in a room different from the one to which he/she is assigned, unless the change is authorised by the Examining committee and mentioned in the committee report;
2. If the candidate brings a cell phone, tablet, smartphone, smartwatch, earphones, webcam and the like, or manual, schoolbook, handwritten notes or other material to consult into the examination room;
3. If the answer form is signed or marked by the candidate or by a member of the Committee (both front and back);
4. If candidates interact and/or try to copy and/or exchange any material, including the exchange of personal data forms and/or answer forms in possession of the candidates.

The invalidation of the exam is decided by the Examining Committee. In case of invalidation no score is attributed to the exam.

The Committee and the assisting personnel supervise observation of the rules and can take measures in the case of non observation. For aspects not specified in the present announcement, the rules for public competition are applied.

Art. 7 - Examining committee

The examining committee is appointed by Rectoral Decree.

During the exam the committee is assisted by teaching and administrative staff, who are responsible for supervising and identifying candidates.

Art. 8 - Examination programme

The admission exam is arranged by the Ministry for Education (MIUR) and is based on the Cambridge Assessment.

It consists of 60 multiple-choice questions with five possible answers. The candidate has to choose one, discarding wrong, arbitrary or less probable answers. The topics are general knowledge and logical reasoning, biology, chemistry, physics and mathematics.



Based on the school subjects and arguments listed in Annex A, which is part of the announcement, the exam consists of 12 questions on general knowledge, 10 on logical reasoning, 18 on biology, 12 on chemistry and 8 on physics and mathematics.

Art. 9 Ranking lists and assessment criteria

Within the limits of the places available for enrolment, are admitted to the programmes, in decreasing order of score, EU and non-EU applicants resident in Italy who comply with art. 26 law no. 189/2002, who obtained a minimum score of 20 points in the admission exam. Candidates who are not eligible are not included in the ranking list.

Are equally admitted, within the limits of the places reserved for them, in decreasing order of score, non-EU applicants resident abroad to whom is not applicable the threshold of the preceding subparagraph. Non-EU candidates resident abroad who do not answer to any question will not be included in the ranking list.

A maximum of 90 points can be scored in the test, as follows:

- 1.5 points for a correct answer
- minus 0.4 (-0.4) points for a wrong answer
- 0 points for no answer.

The CINECA, on the basis of the score calculated according to the above criteria, draws up a single national ranking list for EU and non-EU citizens complying with art. 26 law no. 189/2002.

The ranking list for non-EU citizens resident abroad is defined by the University.

In case of equal scores, the following criteria apply:

- a) the candidate with the higher score in logical reasoning and general knowledge, biology, chemistry, physics and mathematics (in that order) has priority;
- b) the candidate in possession of language certificates (as defined in Annex B), as declared during registration for the admission exam, has priority. The certificates has to be obtained before the closing date of registration. Possession of language certificates is self-certified according to art. 46, Presidential decree no. 445/2000. In all phases of the procedure, the University can check the truth of statements certified by applicants. Applicants must therefore provide all necessary elements to enable the verification. If false or misleading statements emerge from the documentation presented, the enrolment is cancelled, any benefits conceded are withdrawn and any taxes and other fees paid are retained by the University. The applicant is also exposed to the possibility of prosecution and damage claims by interested parties under the Criminal Code and special laws regarding false declarations.
- c) in the case of further equal scores, the younger student has priority.

Art. 10 - Publication of ranking lists and deadlines for enrolment

On **26 September 2019**, on behalf of MIUR, CINECA publishes the scores identified by label code at www.university.it, in observance of the laws protecting personal data, ensuring



anonymity of candidates. The results remain available on the public site until conclusion of the procedure.

The results remain available on the candidates' area of the website until conclusion of the procedure.

On **4 October 2019**, candidates can view their answer forms, scores and personal data by accessing their personal page on the UNIVERSITALY website.

On **9 October 2019**, the national ranking list by name is published in the students area of UNIVERSITALY website.

With each update of the ranking list, candidates who:

- a) achieve a position in the list included among the number of places available for their first preference are **ASSIGNED** (*assegnato*) and must enrol by the indicated deadline. If the deadline is not observed, the candidate loses his right to enrol. No excuses for missing the deadline are accepted;
- b) who do not achieve a position in the list among the number of places available for their first preference are **RESERVED** (*prenotato*) for a subsequent choice. In that case the candidate can enrol in the programme at the university of subsequent choice by the indicated deadline, or await the conclusion of enrolments of those with priority in the ranking list, to see if additional places become available for the programme of first choice. If a **RESERVED** candidate enrolls, all the other preferences expressed are automatically cancelled.

On **9 October 2019**, on the basis of the ranking list and the number of available places, the names of candidates **ASSIGNED** and **RESERVED** for the programmes and universities indicated as their first choices are published in the students area, and each university receives a list of these candidates.

The ranking lists of each degree programme are updated as follows for enrolment purposes:

- 1) On **9 October 2019** the ranking list is published in the students area of the website, with the candidates' scores, positions in the ranking list and the university to which they have been **ASSIGNED**, or **RESERVED** or **WAITING FOR** (*in attesa*), considering the position in the ranking list of all the candidates with precedence and their choice of university;
- 2) **ASSIGNED** candidates must enrol according to the procedure of the chosen university. **RESERVED** candidates may do the same. To facilitate management of the national ranking list, **ASSIGNED** and **RESERVED** candidates have **no more than four days to enrol**, including the day the ranking list is updated, excluding Saturdays, Sundays and holidays. **ASSIGNED** students who fail to enrol by the four-day deadline are assumed to have foregone their place. **RESERVED** students who do not enrol do not lose their position in the ranking list.
- 3) On 12 noon of the fifth day after each updating of the ranking list (point 1), excluding weekends and holidays, the various universities inform CINECA of the names of the students who have enrolled.



- 4) On 12 noon of the fifth day after each updating of the ranking list (point 1), excluding weekends and holidays, **all candidates except those who have enrolled or foregone their place and candidates with the status “posti esauriti”, must confirm their interest in enrolment** in the students area of the University website. Candidates who do not confirm lose their position in the national ranking list and their right to enroll, with the following exceptions:
- extraordinary and unexpected fact, i.e. case of force majeure not attributable to the candidate, only if properly documented;
 - injury and/or illness that did not allow the candidate to proceed with the confirmation of the interest within the set deadlines, only if properly attested by a medical certification issued by a General Practitioner or by the territorial health agency (ASL) or accredited facilities or specialists, stating the presence of an injury and/or a disease with temporarily incapacitating effect. The medical certification must report a date not subsequent to the deadline in which the candidate can confirm the interest and must cover the last day useful for the confirmation of the interest.

The requests related to these exceptions with the relative documents must be addressed to the Ministero dell'Istruzione, dell'Università e della Ricerca - Direzione Generale per lo studente, lo sviluppo e l'internazionalizzazione della formazione superiore - in Rome, Via Michele Carcani n. 61, writing to the e-mail address dgsinfs.uffici03@miur.it.

- 5) On **16 October 2019** CINECA, having received the information of point 3 and with regard to the position of merit and the preferences expressed, publishes the updated ranking list as described in points by 2 to 4.
- 6) Subsequent updating of the ranking lists repeats the procedures and deadlines indicated in points 2 and 4 until the Ministry for Education closes the ranking lists.

Students with a sufficiently high position in the ranking list can be enrolled in second and subsequent years after recognition of their credits by the University and after ascertaining that places are available for the required year. These procedures, like withdrawals after enrolment, lead to updating of the ranking list to the exclusive benefit of students who have not enrolled but who hold a sufficiently high position to do it, only if communicated until places are available in the programme of the University. Any further requests to change or the foregoing of places after all places in the programme have been covered does not lead to further updating of the ranking list.

After recognition of credits by the required university, enrolments in second and subsequent years can only occur in relation to places that were defined in the annual planning decrees if places become available because a student foregoes a place, transfers or abandons the year of the programme in question. In this case, it is not necessary to pass any entrance examination.

Enrolments of students from another EU or non-EU University in second and subsequent years can only occur after the verification of the academic career of the student, with regard to the peculiarity of the degree programme, to the exams passed, the studies carried out and



the practical experiences gained in the University of origin and in relation to places that were defined in the annual planning decrees. These students have to submit a transfer application with the procedures and the deadlines settled by the University Regulations regarding transfer applications for the programmes Medicine and Surgery and Dental Medicine at the University of Milan. The document, as well as and the number of places available for the second and subsequent years, is published on the University website at the page <https://www.unimi.it/en/study/bachelor-and-master-study/degree-programme-enrolment/transferring-milan-university>.

Art. 11 - Enrolment procedure

The procedures of enrolment at University of Milan are published at the webpage <http://studente.unimi.it/immatricolazioni/primolivello/>.

Detailed information on the enrolment procedure are available at the page <https://www.unimi.it/en/node/12697>.

Applicants with qualifications gained abroad must complete the enrolment delivering the following documentation to the **International Students Office - Via Santa Sofia 9/1, Milan** - by the deadlines indicated above:

- Upper secondary school diploma, translated into Italian, legalized by the authorities in the country where the qualification was issued and carrying a *Dichiarazione di valore* or statement of validity issued by ENIC_NARIC centres or by diplomatic missions resident in Italy;
- Certificate of enrolment at university with a list of the exams taken, or certificate of post-secondary education obtained in a non-university higher education institute if the local education system provides less than 12 years of schooling;
- Certificate of academic eligibility if provided for in the country of origin;
- Any other document stating specific requirements of validity of the title (e.g. Aps for the United States titles, A-level for British titles);
- Valid residence permit (only for non-EU citizens).

Verification of the validity of qualifications gained abroad is conducted on presentation of the official documents. Until then, applicants are admitted to the programme conditionally and may be excluded from the ranking list if they prove not to have the necessary qualifications.

The International Students Office is available by appointment. For the reservation please refer to the Infostudenti Service at the page www.unimi.infostudente.it.

Art. 12 - Procedure Manager and contacts

Pursuant to law no. 241 of 7 August 1990 the manager of the procedure related to this announcement is Ms. Monica Delù (Head of the Students Welcoming Service).



UNIVERSITÀ DEGLI STUDI DI MILANO

For any further information regarding the content of this call for applications please use the Infostudenti service (www.unimi.infostudente.it) by selecting the category: “Iscrizioni, test e graduatorie”.

THE RECTOR
Elio Franzini



Annex A Admission exams for second cycle degree programmes in Medicine and Surgery, Dental Medicine, Veterinary Medicine and health profession degree programmes

For admission to the programmes, candidates are tested on general knowledge, especially literature, history, philosophy, sociology, institutions, comprehension and analysis of written texts of different types, and logical-mathematical reasoning.

The knowledge and skills required are those taught in schools under programmes of the Ministry for Education for the final secondary school diploma, and include the scientific subjects of biology, chemistry, physics and mathematics.

General Knowledge and Logical Reasoning

The exam tests ability to use the Italian language correctly and to pursue an argument logically, coherently with the premises. It consists of multiple choice questions in symbolic or verbal form that may also be formulated with brief propositions. The candidate must exclude wrong, arbitrary and less probable conclusions.

The questions focus on scientific or literary texts by classical or contemporary authors, or on current affairs articles in newspapers, magazines or specialist journals. They also focus on cases or problems, which may be abstract and require different types of logical reasoning to solve.

Tests of general knowledge included in the school syllabus complete this section of the admission exam.

For the historical section, questions may be related, inter alia, to the main characters of the XX century history and today's world.

As per the social and institutional area, with regards to the national indications and guidelines and in relation to the activities carried out in "Cittadinanza e Costituzione" (Citizenship and Constitution), the questions may be related, inter alia, to the Constitutional Charter, communication and media, organization of economics and political life; various forms of State and government.

Biology

- The chemistry of living things
- The biological importance of weak interactions
- Organic molecules in living organisms and their respective functions. The role of enzymes.
- The cell as the basis of life
- Cell theory. Cell size. Prokaryotic and eukaryotic cells of animals and plants. Viruses.
- Cell membrane: structure and function - membrane transport
- Cell structures and their specific functions
- Cell cycle and multiplication: mitosis and meiosis - chromosomal equipment and maps
- Bioenergetics
- The energy currency of cells: ATP
- The processes of oxidation and reduction in living things



- Energy processes: Photosynthesis. Glycolysis. Aerobic respiration. Fermentation.
- Reproduction and Inheritance
- Life cycles. Sexual and asexual reproduction
- Mendelian genetics: laws and applications
- Classical genetics: chromosome theory of inheritance - models of inheritance
- Molecular genetics: DNA structure and duplication, genetic code and its translation, protein synthesis. DNA of prokaryotes. Chromosome structure of eukaryotes. Regulation of gene expression.
- Human genetics: transmission of mono and multi-factorial traits, hereditary diseases with autosomal and X-linked transmission.
- Biotechnology: recombinant DNA and its potential bio-technological applications.
- Inheritance and environment.
- Mutations. Natural and artificial selection. Evolutionary theories. The genetic basis of evolution.
- Anatomy and physiology of animals and humans
- Animal tissues
- Anatomy of the major organs and their functions and interactions in humans
- Homeostasis

Chemistry

- The constitution of matter: states of matter; heterogeneous and homogeneous systems; compounds and elements.
- Ideal Gas Laws
- Atomic structure: Elementary particles, atomic number and mass number, isotopes, electronic structure of atoms of the elements.
- The periodic table of elements: Groups and periods, transition elements, periodic properties of elements: atomic radius, ionization potential, electron affinity, metals and non-metals; relations between electronic structure, position in the periodic table and properties.
- Chemical bonds: ionic bonds, covalent and metallic bonds, bond energy, bond polarity, electronegativity, intermolecular bonds.
- Fundamentals of inorganic chemistry: nomenclature and main properties of inorganic compounds: oxides, hydroxides, acids, salts.
- Chemical reactions and stoichiometry: atomic and molecular weight, Avogadro constant, concept of mole and its applications, elementary stoichiometric calculations, types of chemical reactions.
- Solutions: solvent properties of water, solubility, the main ways of expressing the concentration of solutions.
- Equilibrium in aqueous solutions.
- Elements of chemical kinetics and catalysis.
- Oxidation and reduction: Oxidation number, the concepts of oxidising and reducing agents, balancing simple reactions.



- Acids and bases: concepts of acid and base, acidity, neutrality and alkalinity of aqueous solutions, pH, buffers, hydrolysis.
- Fundamentals of organic chemistry: bonds between carbon atoms; molecular, structural and displayed formulae; concept of isomers; aliphatic, alicyclic and aromatic hydrocarbons; functional groups: alcohols, ethers, amines, aldehydes, ketones, carboxylic acids, esters, amides. Elements of nomenclature.

Physics

- Measures: direct and indirect measures, fundamental and derived quantities, physical dimensions of quantities, knowledge of the metric system and the CGS System of Units, Technical (or practical) (ST) and the International System (SI) of Units (names and relationships between fundamental and derived units), and multiples and submultiples (names and values).
- Motion: kinetic quantities, various types of motion with particular regard to uniform and uniformly accelerating rectilinear motion, uniform circular motion, harmonic motion (for all motion: definition and relationships between measures).
- Dynamics: vectors and operations with vectors. Forces, moment of a force about a point. Vector composition of forces. Definitions of mass and weight. Acceleration due to gravity. Density and specific gravity. Law of universal gravitation, 1st, 2nd and 3rd laws of motion. Work, kinetic energy, potential energy. Principle of conservation of energy. Impulse and momentum. Principle of conservation of momentum.
- Fluid mechanics: pressure and its units of measurement (not only in the SI system). Archimedes principle. Pascal's principle. Stevino's law.
- Thermodynamics: thermometry and calorimetry. Specific heat, heat capacity. Mechanisms of heat propagation. Changes of state and latent heat. Ideal Gas Laws. First and second laws of thermodynamics.
- Electrostatics and electrodynamics: Coulomb's law. Field and electric potential. Dielectric constant. Capacitors. Capacitors in series and in parallel. Direct current. Ohm's law. Kirchhoff's law. Electrical resistance and resistivity, electrical resistors in series and in parallel. Work, Power, Joule effect. Generators. Electromagnetic induction and alternating current. Effects of electrical currents (thermal, chemical and magnetic).

Mathematics

- Algebra and numerical sets: natural numbers, integers, rational and real numbers. Sorting and comparison, scales and scientific notation. Operations and their properties.
- Proportions and percentages. Powers with whole and rational exponents and their properties. Roots and their properties. Logarithms (base 10 and base e) and their properties. Elements of combinatorics. Algebraic and polynomial expressions. Special products of binomials, n^{th} power of a binomial, factorisation of polynomials. Algebraic fractions. Algebraic equations and inequalities of the first and second order. Systems of equations.



- **Functions:** basic concepts of functions and their graphical representations (domain, codomain, sign, maxima and minima, increasing and decreasing, etc.). Elementary functions: whole and fractional algebraic functions, exponential, logarithmic and trigonometric functions. Composite functions and inverse functions. Trigonometric equations and inequalities.
- **Geometry:** polygons and their properties. Circle and circumference. Measurement of length, area and volume. Isometries, similarities and equivalences in the plane. Geometric loci. Measurement of angles in degrees and radians. Sine, cosine, tangent of an angle and their significant values. Trigonometric formulas. Solving triangles. Cartesian reference system in a plane. Distance between two points and the midpoint of a segment. Equation of a line. Concepts of parallel and perpendicular. Distance of a point from a straight line. Equation of the circle, parabola, hyperbola, ellipse and their representation in the Cartesian plane. Theorem of Pythagoras. First and second theorems of Euclid.
- **Probability and Statistics:** frequency distributions and their graphic representation. Concepts of random experiments and events. Probability and frequency.



Annex B

List of language certificates recognised under art. 3, par. 4, letter a) of Ministerial decree no. 464 of 3 July 2015.

Certification body	Level	English language certificate of the 4 abilities
Cambridge English Language Assessment	C2	Cambridge English: Proficiency (CPE)
	C1	Cambridge English: Advanced (CAE) Cambridge English: Business Higher (BEC Higher)
	B2	Cambridge English: First (FCE) Cambridge English: Business Vantage (BEC Vantage)
City and Guilds (Pitman)	C2	Level 3 Certificate in International ESOL Diploma Mastery C2
	C1	Level 2 Certificate in International ESOL Diploma Expert C1
	B2	Level 1 Certificate in International ESOL Diploma Communicator B2
Edexcel/Pearson Ltd	C2	PTE General Level 5 Proficient
	C1	PTE General Level 4 Advanced
	B2	PTE General Level 3 Upper Intermediate
EDI (LCCIEB)	C1	JETSET Level 6 English for Business Level 4
	B2	JETSET Level 5 English for Business Level 3 English for Commerce Level 3
IELTS	C2	IELTS band 8.5 - 9.0
	C1	IELTS band 7.0- 8.0
	B2	IELTS band 5.5- 6.5
TCL Trinity College London	C2	Integrated Skills in English (ISE) IV
	C1	Integrated Skills in English (ISE) III
	B2	Integrated Skills in English (ISE) II
TOEFL ETS	C1	TOEFL score 110-120
	B2	TOEFL score 87-109

Language certification is automatically recognised to students who attended a school taught in English for at least one scholastic year.