UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Biomedicina, Neuroscienze e Diagnostica avanzata
ACADEMIC YEAR	2023/2024
MASTER'S DEGREE (MSC)	MEDICINE AND SURGERY
INTEGRATED COURSE	COMPUTER SCIENCE, BIOINFORMATICS AND TECHNICAL-SCIENTIFIC ENGLISH LANGUAGE - INTEGRATED COURSE
CODE	21797
MODULES	Yes
NUMBER OF MODULES	2
SCIENTIFIC SECTOR(S)	ING-INF/05, L-LIN/12
HEAD PROFESSOR(S)	VITABILE SALVATORE Professore Ordinario Univ. di PALERMO
OTHER PROFESSOR(S)	VITABILE SALVATORE Professore Ordinario Univ. di PALERMO CANZIANI TATIANA Ricercatore Univ. di PALERMO
CREDITS	11
PROPAEDEUTICAL SUBJECTS	
MUTUALIZATION	
YEAR	1
TERM (SEMESTER)	2° semester
ATTENDANCE	Mandatory
EVALUATION	Out of 30
TEACHER OFFICE HOURS	**CANZIANI TATIANA** Wednesday 09:00 12:00 Tramite piattaforma Teams o in presenza presso il Plesso di Anatomia ed Istologia. Per prenotare il ricevimento inviare una mail alla docente. **VITABILE SALVATORE** Monday 16:30 18:30 Piattaforma Microsoft Teams, Dipartimento di Biomedicina, Neuroscienze e Diagnostica avanzata, Plesso di Radiologia – 1° piano, Stanza n. 108.

PREREQUISITES	An A2 level of English (as described by the Common European Framework of References for Languages is recommended but not compulsory.
LEARNING OUTCOMES	Knowledge and understanding At the end of the course students will be expected to have acquired: 1) linguistic and communicative skills (B2 Level of CEFR), a basic use of the specialized terminology and language registers required to pursue the medical profession in different communicative situations; 2) the main basic principles of both Information and Communication Technologies and Python programming language to comprehend and be an active part in the design and development process of medical procedures and devices based on software systems in order to develop an interdisciplinary knowledge. Applying knowledge Students should be able to: 1) understand and write simple specialized texts (e.g. abstract; formal letters), record patient data on a clinical chart, deal with most communicative situations likely to arise when talking with a patient according to the different language registers; 2) to develop simple software applications for medical data analysis and processing; to create and manage an electronic health record; to access, retrieve and analyze the nucleotide and protein sequences in biological databanks. Making judgments The teaching activities carried out during the course will allow student to develop critical thinking skills as well as the ability to develop and use the most adequate data processing strategies and bioinformatics procedures for achieving a specific experimental aim. Students will be also expected to have acquired the ability to identify, in an autonomous way, the different registers of English, the relevant specialized terminology of Medicine and Surgery, the consequences arising from proper\improper use of a foreign language in medical contexts. Communicative skills Students should be able to report (in a clear and confident way) on the topics dealt with during the course and related to doctor-patient communication. Students should also acquire the required Health Informatics language skills in order to participate in clinical and research interdisciplinary teams. Learning skills This course does not pretend to cover all the aspects and topics of English for Medicine, Medical Informatics and Bioinformatics but it aims at developing students' awareness of the acquired competences for self-directed learning of content and methods necessary and required in their professional lives.
ASSESSMENT METHODS	The aim of the exam is to assess and verify the level and quality of knowledge and skills acquired by the student during the course. As far as the Medical Informatics and Bioinformatics examination is concerned, it consists of 1) a practical examination in the computer lab to assess the knowledge acquired, focusing on programming, the development and management of an electronic health record and the ability to select and use primary sources in digital biological databases; 2) an oral examination to assess the candidate's knowledge and understanding of the topics covered in the course, as well as exposure and elaboration skills. In order to improve the learning process, an intermediate exam could be planned. As far as the scientific English exam is concerned, it consists of reading and translating a clinical case followed by an oral examination to test knowledge and understanding of the topics covered in the course. To pass the examination, students must achieve a mark of at least 18\30 in both the informatics examination and the scientific English one. The candidate will be assessed on their level of understanding and the exam final grade is out of thirty (the passing mark is 18\30). The assessment criteria can be found on the website of the Faculty of Medicine and Surgery at http://. www.unipa.it/scuole/dimedicinaechirurgia.
TEACHING METHODS	Theoretical and practical lessons in the computer room.

MODULE
COMPUTER SCIENCE AND BIOINFORMATICS

Prof. SALVATORE VITABILE

SUGGESTED BIBLIOGRAPHY

1) D. Sciuto, G. Buonanno, L. Mari; Introduzione ai sistemi informatici, 6/ed, ISBN: 8838655022, McGraw-Hill.
2) Cay S. Horstmann, Rance D. Necaise, Concetti di informatica e fondamenti di Python, Ed. 2, Apogeo Education, ISBN: 889163543X;
3) Arthur M. Lesk; Introduzione alla Bioinformatica; ISBN: 8838661901; McGraw-Hill Education;
4) P. Manghi, A. Brogi, V. Gervasi, A. Martinelli, G. Fiorentino, A. P: Pala; Le basi di Dati per Medicina e Farmacia, Collana IT4PS, ISBN: 8838662576, McGraw-Hill.

Materiali didattici integrativi:
1) Dispense e lucidi forniti dal docente.

AMBIT	50422-Funzioni biologiche integrate di organi, sistemi e apparati umani
INDIVIDUAL STUDY (Hrs)	90
COURSE ACTIVITY (Hrs)	60

EDUCATIONAL OBJECTIVES OF THE MODULE

The course aims at providing the basic knowledge associated to the Information and Communication Technology, as a useful support for diagnostic, therapeutic, and preventive health practice for
identifying suitable diagnostic paths using advanced methods and techniques provided by information technology, bioinformatics and Artificial Intelligence.
The course starts offering an introduction to computer systems analysing the related operating principles of the basic infrastructures: the hardware, the software, and the network infrastructures. Information systems and databases will be also presented as the basic elements for electronic health record development and management.
The second part of the course will be focused on the Python programming language. Python delivers power and simplicity in one and it has been designed to serve a wide range of interests and abilities in the medical and biological domains.
Finally, students will learn fundamental concepts and methods in bioinformatics, a field at the intersection of biology and computing. This surveys a wide range of topics including biological databases organization, structure, and search strategies; pairwise and multiple sequence alignment principles; the most common on-line alignment search tools.

SYLLABUS

Hrs	Frontal teaching
2	Course introduction; Data and Information; Coding Systems.
3	Information representation and coding.
3	Main characteristics of algorithms, programming languages, and source codes.
4	Hardware Infrastructure: introduction to computer architecture; central processing unit; memory systems; I/O devices.
3	Software Infrastructure: features and purposes of an operating system; major components of an operating system.
3	Network Infrastructure: data and information transmission; computer networks. A brief introduction to TCP/IP.
4	Clinical Application software. Clinical and biological data format. Telemedicine.
2	An introduction to Information Systems, databases, and DBMS.
5	Database and DBMS: design and management of electronic health records
2	An introduction to Python programming language.
2	Python: Programming with numbers and strings
6	Python: Cycles, Decisions, Functions, Lists
6	Python: Medical and biological application development and testing
4	A brief introduction to Bioinformatics. Organization and structure of biological databases.
3	Pairwise sequence alignment. BLAST: Basic Local Alignment Search Tool
2	Multiple sequence alignment; Clustal Omega.
3	Information Retrieving from biological databases.
3	Nucleotide and protein sequences analysis.

MODULE
TECHNICAL SCIENTIFIC ENGLISH LANGUAGE

Prof.ssa TATIANA CANZIANI

SUGGESTED BIBLIOGRAPHY

Testi consigliati\recommended texts
Per la parte grammaticale\Grammar:
1. Hird, J., The Complete English Grammar for Italian Students, Oxford University Press. ISBN 0194810054.
2. Swan M., Practical English Usage, Oxford University Press, ISBN 0194202410.

Testi consigliati per la parte di Inglese specialistico\Specialised language texts (recommended but not compulsory):
Mungra, P. Reading Skills in Medical English. Delfino Editore, ISBN 8872873339.
Bettinelli et al. English for Medicine. Hoepli. ISBN 9788820332457.
Pesce, Carlo (2020). Medical English. Zanichelli. ISBN 8808420493.
Materiali didattici integrativi\Supplementary teaching materials:
Power point forniti dal docente e materiale tratto dal web su argomenti specifici della comunicazione medico-paziente\
Teacher's resources and web materials on doctor-patient communication.

AMBIT	50405-Inglese scientifico e abilità linguistiche, informatiche e relazionali, pedagogia medica, tecnologie avanzate e a distanza di informazione e comunicazione
INDIVIDUAL STUDY (Hrs)	75
COURSE ACTIVITY (Hrs)	50

EDUCATIONAL OBJECTIVES OF THE MODULE

The main focus of this course is to improve students' vocabulary, grammar, and reading skills with particular attention to doctor-patient communication and biomedical engineering vocabulary. The teaching objectives of this course are: 1) enhancement of students' ability to communicate with their patients using different language registers; 2) improvement of students' reading comprehension ability while browsing English Medical websites. Special attention will be given to the specialised lexicon, and the lexical composition and reading of specialised texts in order to guide students to use English in their professional daily life and research.

SYLLABUS

Hrs	Frontal teaching
1	Subject and object personal pronouns, possessive adjectives and pronouns.
2	Regular and irregular plurals and the plural of nouns of Greek and Latin origin; the Possessive Case.
1	Cardinal and ordinal numbers. How to say the date and the time.
1	Definite and indefinite articles. Use of the definite article before parts of the body and diseases. Indefinite Pronouns.
1	Time and place prepositions.
2	Relative and question pronouns. Defining and non-defining relative clauses.
1	Comparative and superlative adjectives.
2	The nominal style in medical English. Particular use of the -ing form to build up discourse. The gerund. Some preopositions followed by the -ing form.
2	The Simple Present of auxiliary and non auxiliary verbs. The Present Continuous.
4	The forms of future.
1	The Imperative.
2	Simple Past and Present Perfect. Frequency adverbs and time expressions.
2	Present and Past Perfect Simple and Continuous and Duration Form.
3	The Conditionals: 0, 1st, 2nd and 3rd type with particular attention to doctor/patient communication. Future in the past and Mixed Conditionals.
2	Present and Perfect Conditional and Past Perfect.
3	Modal and semi-modal verbs.
1	Question Tags.
2	Phrasal verbs. The Passive Form.
1	Make\Let\Get\have + infinitive.
1	Reported Speech and modifiers.
9	Doctor – patient communication in English when filling a medical chart. Asking about personal details (1); Asking about pain: location, duration and type of pain (2); General health questions concerning: - Medical history (2) - Family History (2) On examination: Instructions (2)
2	Medical Written Communication: abstract, scientific paper and IMRAD with a special focus on narrative tenses.

3	Specialized lexicon: Human body, clinical chart, medical specialties, health professions,Hospital wards\departments, medical acronyms and initialisms. Medical and lay terms when talking about symptoms in doctor-patient communication. Biomedical Engigneering vocabulary.
1	Expressing habits in the past: used to and would. Expressing regrets: wish and if only.