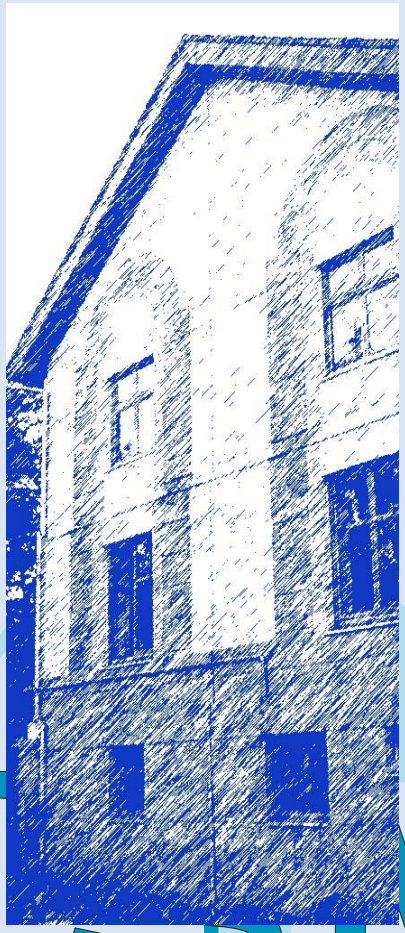
MEDICAL INFORMATICS AND BIOSTATISTICS

STUDY GUIDE

1st Year of Study



ACADEMIC YEAR

2015-2016

CONTENTS

General Goals

1. To help students to gain
    - basic information about information technologies with applications in medicine
    - basic methods of statistics in medical practice and research
2. To allow understanding statistical determinism of medical articles
3. To understand the difference between statistical and clinical significance
4. To do a basic statistical analysis
5. To give the basis of communication with a statistician

Preliminary Knowledge

- Basic arithmetic knowledge
- Basic skills on using computers (working with folders, text editing, Internet: www, e-mail).

Schedule of Didactical Activities

- **English Section - 1:**
    - Lecture: Monday 9^{00}-10^{00} (Dr. Habil. Sorana D. BOLBOACĂ)
    - Practical activities:
        - Monday: 10^{00}-12^{00} groups from 5 to 8
        - Wednesday: 8^{00}-10^{00} groups from 1 to 4
- **English Section - 2:**
    - Lecture: Tuesday 10^{00}-11^{00} (Dr. Habil. Sorana D. BOLBOACĂ)
    - Practical activities:
        - Tuesday: 14^{00}-16^{00} groups from 13 to 16
        - Friday: 8^{00}-10^{00} groups from 9 to 12

Location: Multimedia room, Medical Informatics and Biostatistics Discipline, Louis Pasteur Street No. 6

Teachers for practical activities: Senior lecturer Dr. Habil. Sorana D. BOLBOACĂ, Lecturer Dr. Mădălina A. VĂLEANU, Lecturer Dr. Tudor CĂLINICI, Lecturer Dr. Dan ISTRATE, Lecturer Dr. Daniel C. LEUCUȚA, Asist. Dr. Cosmina I. BONDOR, Asist. Drd. Andrada URDA

Didactical Materials

- Online courses:
    - http://www.info.umfcluj.ro/en/
    - http://sorana.academicdirect.ro/

- Online practical activities:
    - http://www.info.umfcluj.ro/en/
    - http://sorana.academicdirect.ro/

PERFORMANCE EVALUATION. EXAMINATION

Evaluation of theoretical knowledge and practical skills. Modality of examination and notation

Theoretical exam are multiple-choice questions (MCQs) with 5 possible answers. Correcting the answer sheet is done using dedicated programs.

The scoring is as follows:

- ✓ Questions with one correct answer:
  - 5 concordances = 1 point
  - < 5 concordances = 0 point
- ✓ Questions with 2 correct answers:
  - 5 concordances = 1 point
  - 4 concordances = 0.5 points
  - < 4 concordances = 0 points
- ✓ Questions with > 2 correct answers:
  - 5 concordances = 1 point
  - 4 concordances = 0.5 points
  - 3 concordances = 0.25 points
  - < 3 concordances = 0 points

Theoretical exam consists of 35 MCQs and it lasts 90 minutes. Passing score: minimum 17.5 points

If the score is less than 35 points the teacher can give up to 2.5 points for active participation to lectures (answers to questions, solutions to problems, discussions during lectures, etc.)

Each practical activities teacher can give extra 1.5 points if the mark at practical exam is less than 10 and participated continuously and actively to practical activities.

During the semester two optional homework to be send to the teacher will be asked.

Final mark:

- Practical exam points (with bonus) * 0.3
- (theoretical exam points (with bonus) / 3.5) * 0.7
- If the final mark is less than 10:
  - Final mark = mark + no. of homework * 0.20
  - Rounding up is automatically applied

Practical exam consist on a series of problems that must be solve using the proper software and/or tests in a given amount of time.

In the theoretical and practical exams students must prove that they have achieved at least 70% of the material (e.g. must solve at least 7 out of 10 subjects achieving 50% of the score for each subject). The marks for both exams (practical and theoretical) should be at least 5 to pass the exam. Practical exam weight 30% of the final grade.

DIDACTIC RULES FOR MEDICAL INFORMATICS AND BIOSTATISTICS DISCIPLINE

1. The student has the obligation of attending 70% of the Medical Informatics and Biostatistics. The students will not be allowed to take part in the exams if they do not attend 70% of the lectures. The course can be recuperated in the next semester or module (if the module is planned in the same academic year). If the module is not planned in the same academic year, the course will be recuperated in the year or a year to come until the percentage of attendance is fulfilled.
2. The students must attend all the practical activities in relation to Medical Informatics and Biostatistics. Absences are not permitted unless they are motivated and recuperated. No change in the planning of the lab classes is allowed.
3. The absences to the practical classes are motivated in maximum 2 weeks from their respective date (the health certificate is issued by the Dean's Office). The certificate is submitted to the group assistant in a copy together with the original.
4. The group assistant is allowed to expel students that have other preoccupations than the lab class content. In these cases the student can't recuperate that respective lab class with a medical certificate.
5. The absences can be recuperated only after the health certificate or the bill showing the payment of the missed classes is submitted in term of 2 weeks from the date of the absences.
6. The lab classes are recuperated in the planned framework provided by the group assistant. No permission is given to recuperate classes with other teaching staff.
7. Only the students who have attended 70 % of the courses and who have recuperated all their absences will be allowed to take part in the exam. All the absences must be recuperated before the beginning of the session of exams. No recuperations are permitted during the session of exams, or in the summer.
8. The students who have not recuperated their practical activities or that have not attended 70 % of the course will have to discuss the means of recuperating classes in the same year or in the following academic years.
9. Students that have absences at more than 20% of the total number of lab hours will have to recuperate the entire module, in the current academic year, or in the following academic years.
10. The theoretical and practical exams defended in the same academic year are acknowledged. The students, who pass only one part of the exams, are not obliged to take the exam once again.
11. The students who have difference exams should plan the exam with the teacher and also pay the university fee for the exam.
12. Exams re-take must be planned before the beginning of the exams session. The students must pay the university fee for the credits. The exam is planned with the full time teaching staff involved in the teaching of the course. Other aspects relevant for the student, for present and previous years (course attendance, lab class attendance, motivation of absences without leave and remaining exams, unpaid fees) are also established with the teacher. Students that have absences at more than 20% of the total number of lab hours will have to recuperate the entire module, in the current academic year, or in the following academic years.

CONSULTATION AND MENTORING PROGRAM

Please schedule the appointment by e-mail: sbolboaca@umfcluj.ro / sbolboaca@gmail.com

Assoc. Prof. Dr. Habil. Sorana D. BOLBOACĂ

- Monday: 12^{00}-13^{00}
- Tuesday: 8^{00}-10^{00}
- Friday: 11^{00}-13^{00}

BIBLIOGRAPHIC RESOURCES

Facilities available at the level of discipline are freely to be used during the week days between 8.00 am and 8.00 pm. Students could use the computers on didactical aims whenever the computer labs are free. It is not allow using the computers for personal aims or socialization.

Due to the dynamics of concepts taught in classes and evaluated during the exams, we recommend as first source of learning the lectures and practical activities.

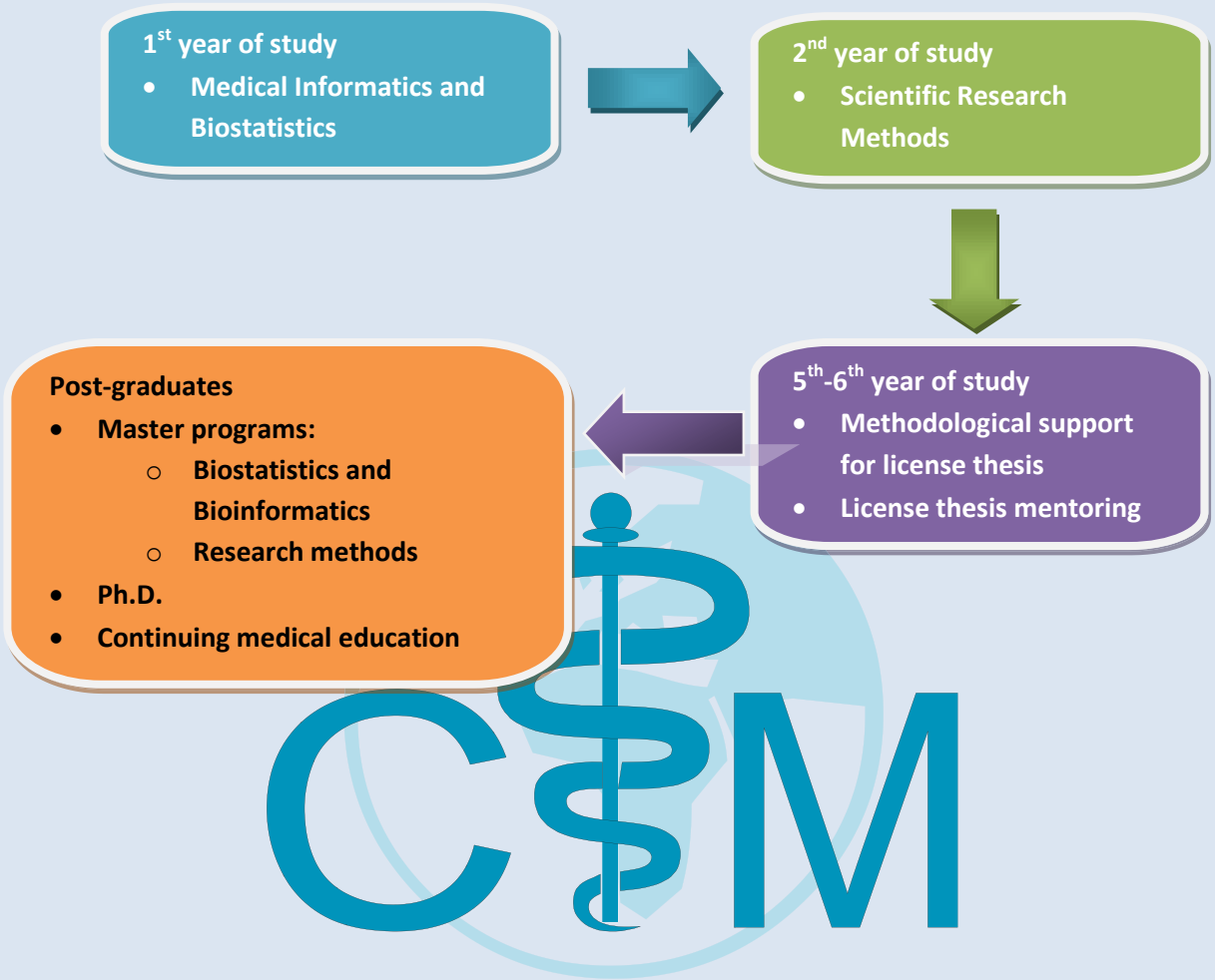
Recommended bibliography:

1. PowerPoint presentations: http://www.info.umfcluj.ro/en/ & http://sorana.academicdirect.ro/
2. Practical activities: http://www.info.umfcluj.ro/en/ & http://sorana.academicdirect.ro/
3. Supplementary materials and homework: http://sorana.academicdirect.ro/
4. Sorana BOLBOACĂ, Horaţiu COLOSI, Tudor DRUGAN, Andrei ACHIMAŞ, Ştefan ŢIGAN. Elements of Medical Informatics and Biostatistics. SRIMA Publishing House, Cluj-Napoca, Romania, 211 pages, 2003, ISBN 973-85285-0-X.
5. Bernard ROSNER. Fundamentals of Biostatistics. Any edition.
6. Robert H. RIFFENBURGH. Statistics in Medicine. Any edition.

Scientific activities

Department of Medical Informatics provides the access of students to its laboratories and facilities for students' research activities. Methodological and/or statistical help is provided to students in designing the studies, collecting analyzing data for undergraduate students whenever possible.

ACADEMIC PATHWAY TO OUR DISCIPLINE



PLANNING OF LECTURES AND PRACTICAL ACTIVITIES

LECTURES

No	Content	Details
1	**Introduction to medical informatics and statistics**	Medical informatics: Objectives & applications Requirements Rules and regulations
2	**Fundamental concepts**	Measurements of information Hardware and software structure Internet: current technology
3	**Introduction in statistics**	Data and variables Population Sample and sampling methods
4	**Descriptive statistics I**	Measures of centrality & dispersion Graphical representation of data I
5	**Descriptive statistics II**	Measure of localization & symmetry Graphical representation of data II
6	**Probabilities**	Classical definition of probability. Event space Conditional probabilities. Risks and rates Random experiment and random variables
7	**Probability distributions** **Estimators** **Confidence intervals** **Testing hypotheses I**	Main probability distribution: normal, student, Poisson, Binomial Point medical estimators and % confidence intervals Testing hypothesis: general approach
8	**Testing hypotheses II** **Tests on means**	Comparison of two means using parametric tests: • Independent samples • Dependent samples Comparison of more than two means
9	**Statistical Problems I**	Statistical problems by examples **# 1st Homework**
10	**Testing hypotheses III** **Tests on frequencies**	Contingency tables Chi-square test Fisher exact test Z-test for proportions
11	**Correlations and regressions**	Regression analysis: definition, types of regressions, linear regression Graphical representation of linear regression Correlation analysis: coefficients of correlation and their interpretation Determination coefficient and its interpretation
12	**Statistical Problems II**	Statistical problems by examples **# 2nd Homework**
13	**Testing hypotheses IV** **Non-parametric tests**	Non-parametric tests by examples
14	**Exams by examples**	Recapitulation Problems and solutions

PRACTICAL ACTIVITIES

No	Content	Details
1	Word documents	Creation and formatting (page & text) Word documents Working with tables and figures Working with predefined styles, references and tables of contents
2	PowerPoint	Creation of PowerPoint presentation (design & tables & figures & animations on slides) Basic on searching medical information using PubMed Using online expert programs Using PowerPoint for Homework and Projects
3	Excel by example	Working with tables in Excel Managing data with Microsoft Excel Working with predefines and user-defined formulas
4	Graphical representation of medical data	Represent medical data using Microsoft Excel charts
5	Descriptive statistics	Descriptive statistics to summarize medical data: measures of centrality & dispersion & measure of localization & symmetry
6	Probabilities	Probabilities Contingency tables
7	Estimators and Confidence intervals	Calculation of estimators (means and proportions) and associated 95% confidence intervals (CI)
8	Testing hypothesis	Tests on means Presentation of results
9	Statistical analysis I	Conducting a descriptive statistical analysis Presentation and interpretation of results using PowerPoint
10	Contingency tables and association tests	Chi-square test Fisher exact test Presentation and interpretation of results using PowerPoint
11	Correlation and regression analysis	Linear regression analysis Graphical representation of correlation with scatter Interpretation of results
12	Statistical analysis II	Conducting a descriptive statistical analysis Presentation and interpretation of results using PowerPoint
13	Recapitulation	Practical exam by example
14	Practical exam	Practical exam

INTERNAL RULES FOR MEDICAL INFORMATICS AND BIOSTATISTICS DEPARTMENT

1. Students may only use software installed by the network administrator.
2. Students may use the computers for learning purposes only, involving materials published on the department web site.
3. Students are not allowed to plug-in or plug-out any electronic equipment. Students may not power-on or power-off the computers; this operation may only be performed by teaching or technical staff of the department.
4. For their own protection, students must announce any equipment malfunction to the department technician, in order to institute proper maintenance measures.
5. Installing and working with external software is strictly prohibited.
6. Saving practical activities on memory devices can be done only by request, on a special system protected to viruses, only by technical staff of the department.
7. Every student must scan his/her personal access card using the electronic presence-registration system at the ground-floor entrance, each time they enter or exit an activity at our Department (course or practical activity).
8. Transmitting the personal access card or communicating the personal password to other users is strictly prohibited.
9. Please keep the department building tidy. For hygiene and safety reasons, eating or drinking in the classrooms is not allowed. Any food or beverage must be kept inside the luggage, in properly sealed containers, to be used only outside the classrooms.
10. Smoking is strictly prohibited, both inside the Department building and within 25 feet (8 meters) of its doorways.
11. Facilities inside the department (equipment, restrooms, furniture, etc.) should be used in a careful and civilized manner.
12. Students may enter the department no more than 10 minutes in advance of their scheduled activity (course or practical activity). Students who are more than 10 minutes late for their scheduled activity will be marked absent for the whole duration of that activity. Students who leave their classroom before the scheduled end of an activity, without an express approval from their professor, will receive an unjustified absence for the whole duration of that activity.
13. Repair costs for any damage resulting from abuse of department facilities or other university property will be covered at the sole expense of the individual(s) who produced the damage. In severe cases, future access to Department facilities may be denied to individuals inflicting facility damage.
14. Any violation of the above regulations and safety rules may be sanctioned by withdrawing the student's right to access the Department, for a progressive time-span between 2 weeks and 1 semester, according to the severity of the violation. For all activities taking place during the respective time-span, the student will receive unjustifiable absences.
15. These rules represent also an instruction of work safety for the students attending didactic activities at Medical Informatics and Biostatistics Department.