STUDY PROGRAM 0911.1 STOMATOLOGY

CHAIR OF SOCIAL MEDICINE AND MANAGEMENT "NICOLAE TESTEMITANU"

APPROVED
at the meeting of the Commission for Quality Assurance and Evaluation of the Curriculum faculty of Stomatology
Minutes No. 1 of 22.09.20
Chairman PhD in medicine, associate professor
Stepco Elena _____

APPROVED
at the Council meeting of the Faculty of Stomatology
Minutes No. 2 of 30.09.20
Dean of Faculty PhD in medicine, associate professor
Solomon Oleg _____

APPROVED
at the meeting of the Chair of social medicine and management "Nicolae Testemitanu"
Minutes No. 2 of 21.09.2020
Head of chair, PhD in medicine, associate professor
Raevschi Elena _____

CURRICULUM

DISCIPLINE **METHODOLOGY OF RESEARCH IN ELABORATION OF THESIS WORK**

Integrated studies

Type of course: **Optional**

Chisinau, 2020

I. INTRODUCTION

- **General presentation of the discipline: place and role of the discipline in the formation of the specific competences of the professional / specialty training program**

The research methodology is a discipline that allows the formation of a systemic conception about the main methodological orientations, methods and procedures of research in medicine. The aim is to form a general research culture, to understand the useful of bioinformatics techniques in a wider context, as well as working in the team or independently.

Medicine is an ever-changing science. As new research and clinical experience broaden our knowledge, changes in treatment and drug therapy are required.

This implies the presence of knowledge and skills, concerning analysis and synthesis of information, in order to find regularities and formulate accurate conclusions. Therefore, the study of research methodology at the university level will help future doctors to solve problems related to the analysis of information about health status of population and apply confidently the results of medical studies to patient care.

Research methodology knowledge will help dentists students to evaluate critically the literature, to apply study results to patient care, to interpret vital statistics, to understand epidemiologic problems, to interpret information about drugs and equipment, to use diagnostic procedures, to keep abreast of current trends and to be critical about data, to evaluate study protocols, articles etc.

The importance of research methodology has increased greatly in recent years because the dentists students are involved in various scientific researches within the license thesis. In order to successfully carry out various researches, students should know basic biostatistics and research methodology, be familiar with various types of epidemiological studies, use various methods of sampling selection, and calculate different types of indicators, assesses the veracity the obtained results, present them with tables and graphs and formulate the correct conclusions.

Mission of the curriculum (aim) in professional training

Discipline The research methodology aims to provide students knowledge about main concepts of research methodology and develop skills and competences concerning on the elaboration and practical realization of a research project, the critical evaluation of the scientific literature and the correct writing of biological and medical data in order to perform qualitatively the license research.

- **Language (s) of the course**: Romanian, English.
- **Beneficiaries:** students of the V year, Faculty of Stomatology.

II. MANAGEMENT OF THE DISCIPLINE

Code of discipline		**S.10.A.119**	
Name of the discipline		**Methodology of Research in Elaboration of Thesis Work**	
Person(s) in charge of the discipline		**Spinei Larisa, Globa Nina, Nicov Irina**	
Year	**Y**	Semester	**IX**

Total number of hours, including:	30		
Lectures	10	Practical/laboratory hours	10
Seminars		Self-training	10
Clinical internship			
Form of assessment	CD	Number of credits	1

III. TRAINING AIMS WITHIN THE DISCIPLINE

At the end of the discipline study, the student will be able to:

- ***at the level of knowledge and understanding:***
  - Describe the stages of primary and secondary studies.
  - List and describe research methods.
  - Describe the advantages and disadvantages of different types of selection.
  - Describe ways of presenting statistical data.
  - Name the most important sources of scientific information
  - Describe the aim, objectives and methods of descriptive epidemiological investigation.
  - List the main areas of application and basic features of experimental and operational investigations.
  - Describe the main features of cohort, case-control and randomized clinical trials.
  - Describe the advantages and disadvantages of different types of studies: descriptive, case - control, cohort and randomized.
  - Name and describe the types of literature analysis.
  - Describe the parts of a scientific article.

- ***at the application level student will be able to:***
  - Apply different methods of collecting and processing information.
  - Use formulas to determine the size of a representative sample of different types of studies.
  - Calculation and interpretation of the standard error and confidence interval.
  - Apply nonparametric tests in comparison of absolute, relative and central tendency indicators.
  - Make tables and diagrams under the standard requirements.
  - Design a descriptive study.
  - Design a cohort study.
  - Measure the associations between expose and result in a cohort study.
  - Design a case – control study.
  - Measure the associations between expose and result in a case-control study.
  - Design a randomize trial and calculate indicators for this type of study.
  - Evaluate critically various scientific publications.
  - Make a correct list of the studied literature.
  - To formulate the conclusions obtained from the research in connection with the objectives set.

- To draw up correctly a list of the studied literature.
- Create a spreadsheet and analyze the research results, using the Excel application.
- Create a database using the EPI INFO program.
- To calculate indicators using the EPI INFO program and to interpret the obtained results.
- Make graphs and diagrams using Excel and EPI INFO programs.

- ***at the integration level:***
  - Argue the necessity of research methodology studying by students - physicians.
  - Organize a scientific research using theoretical knowledge and practical skills obtained during the study course.
  - Prepare an article for publication.
  - To apply the knowledge obtained in preparing the thesis for the license.
  - Use correct rules for Power Point presentation.

IV. PROVISIONAL TERMS AND CONDITIONS

For successful acquisition and successful completion of the course, students must have a thorough knowledge of biology, mathematics, biostatistics and basic knowledge in medicine, public health and stomatology.

V. THEMES AND ESTIMATE ALLOCATION OF HOURS

Lectures, practical hours/ laboratory hours/seminars and self-training

No. d/o	TOPICS	Number of hours		
		Courses	Practical Lessons	Individual Work
1.	Methodology of Scientific Research: terminology and fundamental concepts. Stages of scientific research. Ethics of biomedical research.	2	2	-
2.	Characteristic of descriptive, analytical (observational and experimental) and diagnostic studies. Elaboration of the Research Protocol according to the type of study. Calculation of the indicators.	2	2	2
3.	Secondary studies. Quantitative and qualitative syntheses. Application of the Evidence-Based Medicine principles in clinical decision making.	2	2	2
4.	License Thesis: structure and elaboration of the study design. Rules for formulating purpose and objectives. Interpretation of results and formulation of conclusions. Presentation of the researches results. Rules regarding the writing of the bachelor's thesis, articles and scientific abstracts.	2	2	2

No. d/o	TOPICS	Number of hours		
		Courses	Practical Lessons	Individual Work
5.	Statistical Programs for Analyzing Research Results.	2	2	4
	Totally	**10**	**10**	**10**

REFERENCE OBJECTIVES OF CONTENT UNITS

Objectives	Content units
Theme (chapter) 1. **Methodology of Scientific Research: terminology and fundamental concepts. Stages of scientific research. Ethics of biomedical research.**	
- To define the main concepts of the scientific research methodology; - To know the content of the main stages of scientific research; - To demonstrate knowledge of the fundamental survey research concepts; - To apply ethical rules in creating the criteria for inclusion and exclusion from research; -To integrate the knowledge obtained in the field of Scientific Research Methodology in the clinical and scientific activity of the doctor.	1. Research: definition, classification, characteristics of research; 2. Research stages. Designing a study plan; 3. The main methods of data collection; 4. Survey research. Statistical questionnaire; 5. Sampling methods (probabilistic and non-probabilistic). Sample volume; 6. Random errors and systematic errors in scientific research. 7. Confusion factors; 8. Causality in statistical association. 9. Validity of the study. Level of evidence of studies (study pyramid).
Theme (chapter) 2. Characteristic of descriptive, analytical (observational and experimental) and diagnostic studies. Elaboration of the Research Protocol according to the type of study. Calculation of indicators.	
• Define the methodological principles of epidemiological studies; • To know the advantages and disadvantages of epidemiological studies; • To demonstrate the understanding and interpretation of the results of analytical studies; • To apply the methods of calculating the association quantities used in the analytical studies and to interpret their results; • To integrate the knowledge obtained in the field of analysis of epidemiological studies in the clinical and scientific activity of the doctor.	1. Classification of epidemiological studies. 2. Descriptive observational studies: • case reports and case series • cross-sectional studies • advantages and disadvantages of Descriptive Studies. 1. Observational analytical studies. Case-control study: • methodological principles • advantages and disadvantages • odds ratio (OR) and attributive risk (AR)

	2. Observational analytical studies. Coho study: • methodological principles • advantages and disadvantages • Relative Risk (RR) and Attributab Risk (AR) 3. Experimental studies (clinical trials): • Methodological principles of th clinical trial • Types of clinical trials: ✓ parallel treatment model ✓ crossover treatment model ✓ substitution treatment model 5. Advantages and disadvantages of clinica trials 6. Processing and analysis of clinical tria results: -Experimental Event Rate (EER); - Control Event Rate (CER); - Relative Risk (RR); - Relative Risk Reduction (RRR); - Absolute Risk Reduction (ARR); - Number Needed to Be Treated (NNT). 7. Experimental diagnostic studies: ✓ Methodological principles o diagnostic studies ✓ Advantages and disadvantages o diagnostic studies ✓ Processing and analysis of the result of diagnostic studies: o Sensitivity (Se); o Specificity (Sp); o Positive predictive value (PPV); o Negative predictive value (NPV); o Positive probability ratio (+PR); o Negative probability ratio (-PR) ROC curves
Theme (chapter) 3. Secondary studies. Quantitative and qualitative syntheses. Application of the Evidence-Based Medicine principles in clinical decision making.	
- To define the syntheses types; - To know the stages of the formation of systematic qualitative and quantitative	1. Classification of secondary studies. 2. Definition of EBM. The goals of EBM. Six

syntheses. - To demonstrate the advantages of using systematic syntheses in clinical decision making; - To apply knowledge, to determine the relevance and validity of the experimental studies results; - Integrate knowledge to understand the relevance, validity and significance of research results.	steps of EBM. 3. The advantages of practicing EBM for doctor and patient. Limitations of EBM. 4. Evaluation of the quality of an article in the treatment plan (relevance, validity, significance of the results: RR, PR, CI95, ARR, NNT). 5. Evaluation of the quality of an article in the diagnostic plan (relevance, validity, significance of the results: (Se, Sp, PPV, PNV, PR +, PR-). 6. Narrative, systematic reviews. 7. Elaboration / stages of systematic qualitative and quantitative reviews. 8. Meta-analysis: definition, stages, relevance and valuation. Description Forest-plot. 9. The advantages of systematic reviews. Navigating sources.
Theme (chapter) 4. License Thesis: structure and elaboration of the study design. Rules for formulating purpose and objectives. Interpretation of results and formulation of conclusions. Presentation of the researches results. Rules regarding the writing of the bachelor's thesis, articles and scientific abstracts.	
- To define the methods of presenting the final results of the scientific research; - To know the structure of a scientific research and the basic rules in its writing; - To demonstrate the ability to clearly distinguish between information already known and interpretations of results obtained from own research; - To apply the knowledge to the respective topic for the realization of a research project in Power Point format and its public support; - To integrate the knowledge gained for the conduct of personal research in the bachelor's thesis, publications and scientific conferences.	- Definition and types of scientific papers. - The structure of a scientific paper. - Basic rules in writing a scientific paper. - Bibliography and citation of other authors. - Programs / software packages used in creating a scientific paper. - Ethics of medical research. Plagiarism. - Public support of a research project (Power Point) by students.
Theme (chapter) 6. Presentation of The Results of Scientific Research in Various Forms: Written, Graphic and Oral. Rules for Writing Scientific Articles and Abstracts.	
• Describe the parts of an article. • To critically evaluate various scientific publications • Prepare an article for publication.	- Definition and types of scientific papers. - The structure of a scientific paper. - Basic rules in writing a scientific paper. - Bibliography and citation of other authors.

• To draw correctly up a list of the literature studied. • To list different ways of presenting the statistical data. • Apply the type of chart correctly depending on the indicator being analyzed. • To know the requirements regarding the elaboration of tables and diagrams. • To know the requirements for the oral presentation of the research results and to make a presentation of a research project.	- Programs / software packages used in creating a scientific paper. - Ethics of medical research. Plagiarism. - Public support of a research project (Power Point) by students.
Theme (chapter) 7. Statistical Programs for Analyzing Research Results	
- To know various statistical data analysis programs. - Demonstrate operating skills in Excel and EPI INFO. - Create charts and graphical objects using Excel and EPI INFO. - Apply the skills developed in data analysis in undergraduate research. - To integrate the knowledge gained in the practical activity.	1. Create registers and spreadsheets using Excel. Spreadsheet management. 2. Data analysis through formulas in Excel. Creating and editing diagrams and graphic objects. 3. General feature of the EPI INFO program. Main menu. 4. Creating and editing forms and databases in EPI INFO. 5. Statistical analysis of data using the "Classic" and "Visual Dashboard" options. 6. Tabular and graphical representation using EPI INFO.

VI. PROFESSIONAL (SPECIFIC) (SC) AND TRANSVERSAL (TC) COMPETENCES AND STUDY OUTCOMES

SPECIFIC (SC)

SC1. - Knowledge and appropriate use of fundamental concepts of Research Methodology and different types of studies necessary for conducting scientific research and statistical data processing.

SC2- Correct application of a protocol specific to a certain type of epidemiological study (descriptive, observational, experimental).

- Correct formulation of the statistical hypothesis, choice and use of the most appropriate statistical tests depending on the nature of the data and the type of study

SC4. - Application of statistical analysis techniques to solve practical problems in the biomedical field.

SC5. - Application of health analysis methods at community level.

SC6. - Ability to develop a medical scientific paper (eg, drafting a bachelor's thesis, writing a medical article, a paper communicated at conferences, symposia, etc.), analysis and critical interpretation of specialized scientific papers.

Transversal competences (TC)

- TC1. Critical analysis of scientific literature and publications, and the application of principles of evidence-based medicine in practical work.
  Use of statistical analysis knowledge in the context of other disciplines, as well as in solving practical problems.

- TC2. Student development and responsibility;
  To be open to lifelong learning

- TC3. To demonstrate involvement in scientific activities, such as the development of articles and research in the biomedical field;
  Oral and written communication of the results of a scientific research, including the bachelor's thesis.

At the end of the course Research methodology in the realization of the license thesis the student will be able to:

- To plan a scientific research in the form of the license thesis.
- To apply different methods of collecting and processing primary material in the course of a scientific study.
- To calculate the indicators, to apply parametric and nonparametric tests to compare the absolute, relative values or the central tendency.
- To design and calculate indicators for different types of studies: descriptive, case-control, cohort and experimental (treatment and diagnostic) studies.
- To select scientific articles for clinical decision making.
- To publish a scientific article, to prepare a scientific report.

VII. STUDENT'S SELF-TRAINING

No.	Expected product	Implementation strategies	Assessment criteria
1.	Case study analysis	The students will assigned the cases according to the themes studied. Studying supplementary literature, individually, students will solve and present the case to the teacher	1. Correct resolution of the case. 2. The number of alternative solutions identified, 3. The degree of analysis and the way to identify the optimal solution
2.	Venn Chart	Analyzing basic and additional literature on topics related to various types of scientific studies, students would complete and present a Venn chart on	1. Number of correct examples of similarities and differences between the analyzed scientific studies

		similarities and differences between 4 types of studies.	
3.	Critical analysis of two scientific articles	Students will individually select 2 articles published in medical journals to submit to the analysis.	1. Critical assessment of the validity and relevance of scientific research. 2. Number of gaps and mistakes in the structure and content of articles.
4.	The project of scientific research	Students will develop and present a scientific research project on a theme chosen by them individually.	1. How to apply the theoretical knowledge in the elaboration of the project. 2. Fairness and observance of the succession of the research stages. 3. Correct selection of type of study, research methods, representative sample volume, analysis methods, etc.

VIII. METHODOLOGICAL SUGGESTIONS FOR TEACHING-LEARNING-ASSESSMENT

- ***Teaching and learning methods used***

In the teaching process of the Research methodology in the realization of the license thesis discipline are used different didactic methods, oriented towards the efficient acquisition and achievement of the objectives of the didactic process. In the theoretical lessons, along with the traditional methods (lesson-exposure, lesson-conversation, synthesis lesson), modern methods (lesson-debate, lecture-conference, problematic lesson) are also used. In the practical lessons, forms of individual, frontal and group working are widely used.

- ***Applied teaching strategies / technologies*** *(specific to the discipline)*

Interactive lecture, guided discussion, demonstration, brainstorming, brainstorming, brain writing, group work, case study, Venn diagram, individual study, debate, problem solving.

- ***Methods of assessment*** *(including the method of final mark calculation)*

Current: frontal and / or individual control through:

- case studies analysis.

- assessment tests application,
- control work- 2 test papers
- individual work assessment

Final: differential colloquium

The final mark will consist of the average score from 2 control papers and the mark at student's individual work (score-0.5),+ the final test (score-0.5).

The average annual mark and the marks of all the final colloquium stages (written form) - all will be expressed in numbers according to the scoring scale (according to the table) and the obtained final mark will be expressed in two decimal number being passed in the credit book.

Method of mark rounding at different assessment stages

Intermediate marks scale (annual average, marks from the examination stages)	National Assessment System	ECTS Equivalent
1,00-3,00	**2**	**F**
3,01-4,99	**4**	**FX**
5,00	**5**	**E**
5,01-5,50	**5,5**	
5,51-6,0	**6**	
6,01-6,50	**6,5**	**D**
6,51-7,00	**7**	
7,01-7,50	**7,5**	**C**
7,51-8,00	**8**	
8,01-8,50	**8,5**	**B**
8,51-8,00	**9**	
9,01-9,50	**9,5**	**A**
9,51-10,0	**10**	

Absence on examination without good reason is recorded as "absent" and is equivalent to 0 (zero). The student has the right to have two re-examinations.

IX. RECOMMENDED LITERATURE:

A. Compulsory:

1. Katz David L., Clinical Epidemiology& Evidence-Based Medicine. Fundamental Principles of Clinical Reasoning& Research, eBook, 2018.
2. Gordis Leon, Epidemiology, fifth edition, eBook, 2014.
3. Raevschi, Elena. Biostatistics & research methodology : methodological recommendation for medical students / E. Raevschi, D. Tintiuc ;. - Chisinau : Medicina, 2012 – 203 ex.
4. BacâreaV.,Sabău M., Măruşteri M., Bacârea A. Metodologia cercetării ştiinţifice medicale. Târgu Mureş, 2009.
5. Spinei L. Metode de cercetare și de analiză a stării de sănătate. Chișinău, 2012, 511p.
6. Boldea Maria, Boldea Bogdan Ion. Excel 2007. Teorie și aplicații. Timișoara 2010.

http://moodle.usm.md/moodle/pluginfile.php/17063/mod_resource/content/1/Excel2007.pdf.

7. https://www.cdc.gov/epiinfo/support/userguide.html.
8. https://epdf.pub/fundamental-of-research-methodology-and-statistics.html
9. http://tinread.usarb.md:8888/tinread/fulltext/secrieru/metodologia.pdf

B. Additional

1. Aschengrau A.,Seage G. Essentials of Epidemiology in Public Health. Boston, 2008, p.201-261.
2. Bhopal R. Concepts of Epidemiology. OXFORD,2002, p.251-255.
3. Last JM. Dictionary of Epidemiology. 4th ed.New York, NY:Oxford University Press; 2001.
4. Dawson Beth, Trapp Robert G., Basic &Clinical Biostatistics, USA, 2004, 438 p.

6. https://epdf.pub/fundamental-of-research-methodology-and-statistics.html