

Course Title	Evidence-based biomedical research methods and statistics			
Course Code	DLSEH513			
Course type	Compulsory			
Level	Master			
Year / Semester of study	1 st /1 st			
Teacher's Name				
ECTS	10	Lectures / week		Laboratories/week
Course Purpose	<p>The aim of the course is to introduce students to the concept of health care based on scientific data. In particular, the individual modules focus on issues of training students in the appropriate assessment of disease or risk indications and the provision of appropriate decision-making skills. Biostatistics is the branch of statistical science that deals with the application of statistical methods in medicine, in biology and generally in the field of health sciences. Its main purpose, as a specialized branch of Statistics, is to contribute to the correct and "safe" drawing of conclusions from the surveys conducted in this field. The aim of this module is to understand the basic concepts of biostatistics and its application in research in the field of health sciences. Its specific objectives are to enable students to conduct, analyze, present the results and interpret the findings in research carried out in medicine and health in general. In addition, its aim is the analytical presentation of the basic concepts of statistics, the different types of variables, the descriptive statistical measures. Finally, its purpose is to provide students with the necessary skills for the proper use and handling of appropriate statistical methods, but also with the appropriate knowledge for the correct interpretation, mapping and evaluation of research results in the field of health sciences.</p>			
Learning Outcomes	<p>Upon completion of the course, students are expected to:</p> <ul style="list-style-type: none"> • Describe the stages of analysis and clinical decision making based on the evidence-based approach • Organize information with proper search through the use of necessary technologies • document health decision-making • They collaborate through experiential activities • Develop critical thinking and analysis • They possess the skills in statistical science that will allow them to evaluate and judge the results of research plans and strategies in the field of health. • Apply the basic principles of statistics and data analysis. • Develop the basic knowledge in Biostatistical science and its applications in data management and analysis in the field of health. 			

	<ul style="list-style-type: none"> • They describe the elementary statistical methods of univariate experimental data. • They apply the correct statistical analyses and methods on a case-by-case basis. • They use the right statistical analyses and methods on a case-by-case basis. • They perform simple and complex statistical checks of both descriptive and inferential statistics. • They present the results of statistical tests. • Correctly interpret and correctly reflect the findings of statistical tests. • They use in combination the knowledge, tools and techniques they have been taught. • They present their findings and achievements in different ways. 		
Prerequisites		Corequisites	
Course Content	<p>Evidence-based practice (EBP) enhances the quality of healthcare, improves patient outcomes, reduces health system costs and supports the role of healthcare professionals while providing them with professional confidence.</p> <p>The content of the teaching modules per week will briefly include the following:</p> <ul style="list-style-type: none"> • In week 0 there is a discussion of general concerns about students' studies. • In week 1 an introduction to the basic concepts and terms of the module is made and benefits of the implementation of EBP for the patient himself, the healthcare professionals and the health system where it is applied are analyzed. • Week 2 analyses the steps of IT, the role of management and the concept of an IT friendly climate. • Week 3 analyses the importance of healthcare professionals' IT preparedness. • In week 4 the method of formulating the research question is presented. • In week 5, the methodology of searching for clues in the scientific literature is presented. • In week 6 the search methodology is analyzed in specific databases as valid and reliable sources. • Week 7 analyzes the concept and importance of critical appraisal and presents critical appraisal checklists. • At week 8, the models of its application in clinical practice are analyzed. • At week 9 the importance of disseminating the evidence is presented. 		

	<p>The module of Statistics will last 3 weeks (Week 9-12). During the module, the basic and digital material will be posted on the e-learning platform, which students should refer to and study carefully. A teleconference will be held including lectures. The telemeeting will be recorded and posted on the e-learning platform. In addition, PowerPoint presentations and electronic material with images and diagrams will be used, to deepen and better understand the concepts related to T.E.</p> <p>During the module, students are expected to participate in interactive activities and prepare assignments, in the context of which they are asked to process real data and present them in the form of a report. In addition, students will have the opportunity to participate in self-assessment programs through questions related to the teaching units.</p> <p>The module in Biostatistics will last 3 weeks and will include material, activities and lectures on the following:</p> <ul style="list-style-type: none"> - Biostatistics and its applications - Types of variables - Descriptive Statistics - Frequency and affinity tables - Charts - Descriptive statistical measures (Location measures - Dispersion measures) - Normal distribution - Measures of asymmetry and curvature - Correlation coefficient - Parametric and non-parametric methods of statistical analysis <p>The last week is a week of repetition.</p>
Teaching Methodology	<p>The course is structured and developed based on the principles of distance learning, good practices as well as the guidelines of the Evaluation Body and finally the Pedagogical Framework developed and implemented by our University. Also, through the design and development of distance learning courses, synchronous and asynchronous interaction, communication and collaboration are taken into account at 3 levels: 1) between instructor and student, 2) between students, and 3) between students and content.</p> <p>The course is taught entirely online through the electronic platform Moodle LMS. Mandatory, optional and additional bibliography (e.g. books, articles, links, open educational resources, case studies) in combination with notes, course presentations and suggestions for reading study (bibliography) are available to students through an electronic platform. Also, a variety of appropriate educational material is given through the online platform in the form of presentations with notes, presentations with narration, interactive presentations and videos, interactive learning scenarios, gamification activities, avatars, digital twins, audio files, online quizzes). Various online tools, new and emerging technologies are being exploited: communication tools (e.g. video conferencing, chat rooms), collaboration tools (e.g. discussion forums, blogs, wikis), as well as content development tools. Students are encouraged through the platform and various technological tools to interact with their fellow students and the instructor, in order to become active members of the online learning community created within the</p>

	<p>framework of the course. Finally, with the use of various technological tools, each student is expected to create his own online learning community. More information about distance learning at Frederick University, the Pedagogical Background developed and implemented, as well as the toolkit used, can be found at the following link.</p> <p>About Distance Learning - Frederick University</p>
Bibliography	<p>1st</p> <p>Freely accessible digital material EBP Sciences Discoveries https://www.youtube.com/watch?v=XiZdrPWcWGw&ab_channel=EuropeanNursingCenter EBP Development of Nursing Research https://www.youtube.com/watch?v=l3DeqmxymjU&feature=emb_logo Introduction to Evidence Based Practice https://www.youtube.com/watch?v=GZWkh-gpC8U Viva La Evidence https://www.youtube.com/watch?v=QUW0Q8tXVUc</p>
	<p>2nd</p> <p>Free accessible scientific article. Tucker, S., McNett, M., O'Leary, C., Rosselet, R., Mu, J., Thomas, B., Gallagher-Ford, L., & Melnyk, B. M. (2022). EBP education and skills building for leaders: An RCT to promote EBP infrastructure, process and implementation in a comprehensive cancer center. <i>Worldviews on evidence-based nursing</i>, 19(5), 359–371. https://doi.org/10.1111/wvn.12600 Freely accessible digital material 5 Steps of EBP https://www.youtube.com/watch?v=mS3k9s5rv-Y</p>
	<p>3rd</p> <p>Free accessible scientific article. Hohl, S. D., Melillo, S., Vu, T. T., Escoffery, C., DeGroff, A., Schlueter, D., Ross, L. W., Maxwell, A. E., Sharma, K. P., Boehm, J., Joseph, D., & Hannon, P. A. (2022). Development of a Field Guide for Assessing Readiness to Implement Evidence-Based Cancer Screening Interventions in Primary Care Clinics. <i>Preventing chronic disease</i>, 19, E25. https://doi.org/10.5888/pcd19.210395</p>
	<p>4th</p> <p>Freely accessible digital material PICO: Developing the Answerable Clinical Question https://www.youtube.com/watch?v=0bGJoN2NHc8 Using PICO to Frame Clinical Questions https://www.nlm.nih.gov/oet/ed/pubmed/pubmed_in_ebp/02-100.html</p>
	<p>5th</p> <p>Freely accessible digital material Search bibliography – Reliability of online sources https://www.youtube.com/watch?v=JR6KjFwghng BIBLIOGRAPHY SEARCH (GOOGLE SCHOLAR, SCOPUS) https://www.youtube.com/watch?v=6vLcgiuqZ4</p>
	<p>6th</p> <p>Freely accessible digital material Search in bibliographic databases_PubMed https://www.youtube.com/watch?v=6Q3wBlE6N0 Boolean AND/OR/NOT operators https://www.youtube.com/watch?v=bCAULDuMcs0</p>

	7th	<p>Free accessible scientific article Sasanna, S., Amini, M., Moosavi, M., Askarinejad, A., Moghadami, M., Ziaee, H., & Vara, F. (2022). Critical appraisal skills training to undergraduate medical students: A Randomized Control Study. <i>Journal of advances in medical education & professionalism</i>, 10(4), 253–258. https://doi.org/10.30476/JAMP.2022.94852.1610</p> <p>Freely accessible digital material What is Critical Appraisal? https://libguides.daemen.edu/EBP/appraise</p> <p>Freely accessible digital material CASP CHECKLISTS https://casp-uk.net/casp-tools-checklists/ JBI Checklists https://jbi.global/critical-appraisal-tools What is critical appraisal? https://www.quest.scot.nhs.uk/hc/en-gb/articles/360000104089-What-is-Critical-Appraisal</p>
	8th	<p>Freely accessible digital material Models for EBP https://www.youtube.com/watch?v=8LPbuDnTlr8 The IOWA MODEL https://www.youtube.com/watch?v=fplN-o0Gapo</p>
	9th	<p>Freely accessible digital material Dissemination of EBP change https://www.youtube.com/watch?v=z9_XbC-GyGI Evaluating & Disseminating Outcome https://www.youtube.com/watch?v=1TsK7r1Qjo4</p> <p>Free accessible scientific article Skela-Savič, B., Gotlib, J., Panczyk, M., Patelarou, A. E., Bole, U., Ramos-Morcillo, A. J., ... & Ruzafa-Martínez, M. (2020). Teaching evidence-based practice (EBP) in nursing curricula in six European countries—A descriptive study. <i>Nurse Education Today</i>, 94, 104561. Patelarou, A. E., Mechili, E. A., Ruzafa-Martinez, M., Dolezel, J., Gotlib, J., Skela-Savič, B., ... & Patelarou, E. (2020). Educational interventions for teaching evidence-based practice to undergraduate nursing students: a scoping review. <i>International journal of environmental research and public health</i>, 17(17), 6351.</p>
	10th-12th	<p><u>Material for study in the section of Biostatistics</u> <u>Basic Material</u></p> <ul style="list-style-type: none"> • Galanis P. Design methodology of studies. <i>Arch Eil Doctor</i> 2017, 34:559-566. • Galanis P. Applications of Statistics in research articles. <i>Arch Eil Doctor</i> 2013, 30(4):491- 498. • Galanis P. Univariate analysis of epidemiological data. <i>Arch Eil Doctor</i> 2014, 31:221- 243.

	<ul style="list-style-type: none"> • GALANIS P. Data analysis methodology in health sciences. Applications with IBM SPSS Statistics. Broken Hill Publishers Ltd, Athens, 2014, Chapter 10, p. 95 – 120. <p>Additional material</p> <p>Apostolakis I., Dara T. Stamoulis M.A., SPSS Exercises in Health, Issue A', Papazisis Publications, Athens, 2022, Chapter 2, p. 85 – 136.</p> <p>Digital Multimedia Material</p> <p>In this section, the first teleconference will take place in the thematic section of Biostatistics, which will include lectures for the presentation of the theoretical background, and detailed presentations with PowerPoint and electronic material with images and diagrams will be used in order to deepen and better understand the concepts. The teleconference will be videotaped and posted on the e-learning platform.</p> <p>Additional material</p> <ul style="list-style-type: none"> - Galanis P. Research methodology in health sciences. Kritiki Publications, Athens, 2017. - Rothman KJ. Epidemiology. An introduction. Oxford University Press, New York, 2002. - Bernard Rosner (2016), Fundamentals of Biostatistics, Eighth Edition, Cengage Learning, USA - David Bowers (2011), Fundamental Concepts in Biostatistics - Introduction for Health Professionals, P.C. Paschalidis Medical Publications, Athens - Apostolakis I., Daras T., M.A. Stamoulis (2007), Exercises in Computational Statistics in Health, Volume A', "Section 8", Papazisis Publications, Athens. - Galanis P. Data analysis methodology in health sciences. Applications with IBM SPSS Statistics. Broken Hill Publishers LTD & Paschalides SA, Nicosia, 2015. - Galanis P. Management of variables and data in epidemiological studies. Nursing 2011, 50:132-146. - Gnardellis C., (2013), Data Analysis with IBM SPSS Statistics 21 Papazisis Publications, Athens. - Hand J. Statistics: a very short introduction. Oxford University Press, Oxford, 2008. Shasha D, Wilson M. Statistics is easy. Morgan & Claypool Publishers. Washington, 2008. - Matthews D, Farewell V. Using and understanding medical statistics. 4th ed. Karger, Basel, 2007. - Ktenas E. (2003), Statistics in the field of Health, ZYMEL Publications, Athens. - Bersiris S., Sahlas A. (2016), Applied Statistics with emphasis on Health Sciences, Tziola Publications, Athens. - Rugg G. Using statistics: a gentle introduction. Open University Press, Berkshire, 2007. - Peat J, Barton B. Medical statistics. A guide to data analysis and critical appraisal. BMJ Books, Massachusetts, 2005. - Van Belle G. Fisher L, Heagerty P, Lumley T. Biostatistics. A
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	<p>methodology for the health sciences, 2nd ed. John Willey & Sons, New Jersey, 2001.</p> <p>- Wilcox R. Basic statistics. Oxford University Press, Oxford, 2009.</p>
Assessment	<p>The evaluation of the course includes activities of continuous / formative evaluation (formative), self-evaluation (self-evaluation and debriefing / final evaluation (summative). Specifically, the evaluation of this course includes the following: final written exam, 3 evaluation assignments, 2 evaluative online interactive 3 graded activities, various weekly educational activities such as interactive activities, interactive presentations/videos and self-assessment activities.</p> <p>From the above, the following are scored:</p> <ul style="list-style-type: none"> • Graded activity 1 (quiz) – 15% • Graded activity 2 (present a recent scientific article) – (20%) • Graded activity 3 (quiz) – 20% • Final exam (50%) <p>All assignments (except the final exam) are assigned and delivered to the online platform, as well as a plagiarism check through the turnitin tool. The final exam is developed by the instructor and completed by the students on a special platform used exclusively for the exams.</p>
Language	English / Greek