

UČNI NAČRT PREDMETA / COURSE SYLLABUS	
Predmet:	Raziskovanje v klinični praksi
Course title:	Research in Clinical Practice

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
BIOMEDICINSKA TEHNOLOGIJA/ BIOMEDICAL TECHNOLOGY 3. stopnja/3rd Degree		1	1/2

Vrsta predmeta / Course type

Temeljni/Basic

Univerzitetna koda predmeta / University course code:

Predavanja Lectures	Seminar Seminar	Sem. Vaje Tutorial	Lab. Vaje Laboratory work	Rač. vaje Com. Work	Samost. Delo Individ. Work	ECTS
17	8		35	15	195	9

Nosilec predmeta / Lecturer:

Prof. dr. Ivan Krajnc

Jeziki /

Languages:

Predavanja / Lectures:

Vaje / Tutorial:

Slovenščina/Slovene

Slovenščina/Slovene

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:

Prerequisites:

Kandidat mora imeti pred vpisom ustrezno znanje iz naravoslovnih ved z ustreznega področja na nivoju univerzitetnega študija.

Prior to entering, the candidate for postgraduate program must have an appropriate knowledge and understanding of bioscience (biology, chemistry, physics, mathematics) on the university level.

Vsebina:

Content (Syllabus outline):

Interdisciplinarni predmet »Raziskovanje v klinični praksi« je razdeljen v 6 sklopov:

1. Klinično preizkušanje zdravil – **prof. dr. Iztok Takač**
2. Povezovanje temeljnih laboratorijskih in kliničnih raziskav – **prof. dr. Uroš Potočnik**
3. Sistemske vezivno-tkivne bolezni – **prof. dr. Ivan Krajnc**
4. Epidemiološke metode - temeljno orodje v klinični medicini in javnem zdravju – **prof. dr. Ivan Eržen**
5. Statistika v medicini – **doc. dr. Petra Povalej Bržan**
6. Najnovejši diagnostični in terapevtski dosežki v dermatovenerologiji - **prof. dr. Jovan Miljković**

1. Klinično preizkušanje zdravil

Ko so končane raziskave na živalih, celicah in tkivih, je mogoče sklepati na učinkovitost in varnost nove učinkovine orientacijsko v bioloških sistemih.

Pri kliničnem raziskovanju oz. preizkušanju zdravil so štiri faze, po tretji pride do registracije zdravila, četrta faza pa vključuje vse raziskave od tedaj naprej.

Za registracijo zdravila je potrebna kemijska analiza zdravila, pri generičnih zdravilih pa klinične farmakokinetične raziskave.

Smernice za klinično preizkušanje zdravil so zajete v principih dobre klinične prakse oz. mednarodnih konferenc za harmonizacijo.

Interdisciplinary subject »Research in Clinical Practice« is divided into 6 sections:

1. Clinical medications/drug testing – **Prof. Iztok Takač**
2. Integration of basic laboratory and clinical research – **prof. dr. Uroš Potočnik**
3. System connective-tissue diseases – **Prof. Ivan Krajnc**
4. Epidemiological methods – basic tools in clinical medicine and health system – **prof. Ivan Eržen**
5. Statistics in medicine – **assist. prof. Petra Povalej Bržan**
6. Most up to date diagnostic and therapeutic achievements in dermatovenerology – **Prof. Jovan Miljković**

1. Clinical drug testing

When researches on animals, cells and tissues had been finished, it is possible to come to conclusion about safety and efficiency of new substance to biological systems.

In clinical research, or testing of drugs there are four phases, after the third, a drug can be registered; the fourth phase includes all researches after this point.

For registration of the drug, chemical analysis of the drug is needed, and for generic drugs clinical pharmacokinetics researches are needed. Directions for clinical drug testing are included in the principles of good clinical practice, i.e. international conferences on harmonisation.

Partnerji v klinični raziskavi so: državni organ oz. ministrstvo za zdravje oz. urad za zdravila in etična komisija; raziskovalci, praviloma zdravniki, največkrat v univerzitetnih ustanovah; sponzor oz. plačnik raziskave, ki je lastnik rezultatov in odgovoren za nadzor.

Tipi kliničnih raziskav so: odprta, enojno slepa, dvojno slepa, randomizirana, nerandomizirana, sekvencijska, raziskava v primerjavi s skupino placebo, raziskava z dvema ali več terapevtskimi skupinami, raziskave v enem ali v več centrih, raziskava z zgodovinsko kontrolno skupino, z majhnim številom preiskovancev ali velika klinična raziskava, metaanaliza.

Statistična obdelava rezultatov v kliničnih raziskavah z zdravili. Hranjenje rezultatov kliničnih raziskav. Publiciranje kliničnih raziskav.

2. Povezovanje temeljnih laboratorijskih in kliničnih raziskav:

- Uvod v biomedicinsko raziskovanje za zdravnike v klinični praksi: temeljni principi znanstvene metodologije, orodja za pregled in analizo znanstvene literature, oblikovanje hipoteze in načrtovanje študije; objava izsledkov v obliki znanstvenih člankov in doktorske disertacije;
- Integrirani sistemi za dostop do podatkovnih zbirk na področju biomedicine: Entrez (NCBI)-PubMed, OMIM, Gene, Protein..
- Različni pristopi uporabe laboratorijskih preiskav (biokemijskih in genetskih) kot dopolnitev in nadgradnja kliničnih študij
- Pregled najnovejših laboratorijskih tehnologij uporabnih za klinične študije;
- Na dokazih temelječe delo v medicini (Evidence based medicine EBM)

Laboratorijske vaje:

- Analiza krvi in urina: hematološke, biokemijske in imunološke preiskave;
- Preotčna citometrija;
- Proteomske analize – Uporaba 1D/2D SDS-PAGE, Western blot, LC-MS
- Genetske in epigenetske analize: genska tipizacija polimorfizmov SNP, genska ekspresija sekvenciranje naslednje generacije

3. Sistemske vezivno-tkivne bolezni

Sinonimi za te bolezni so tudi:

- mezenhimopatije,
- sistemske-vezivno-tkivne bolezni,

Sem prištevamo sistemski lupus eritematosus, druge oblike lupusnega sindroma, sjögrenov sindrom, sistemsko sklerozo, polimiozitis, dermatomiozitis, prekrivajoči se sindrom.

Te bolezni so po kliničnih in laboratorijskih značilnostih zelo podobne, ob enem pa dovolj različne, da jih lahko ločimo med seboj.

Partners in clinical practice are: public institution or Ministry for Health, Office for Drugs or Ethical Commission, researchers, usually doctors, most often at university institutions, sponsor or financier of the research who is owner of the results and responsible for supervision.

Types of clinical researches are: open, single-blind, double-blind, randomized, nonrandomized, sequential, research in comparison with placebo group, research with two or more therapeutic groups, research in one or more centres, research with control group from the past, with small group of patients or extensive clinical research, meta-analysis.

Statistical analysis of results in clinical drug researches. Clinical researches results keeping. Publicising of clinical researches.

2. Integration of basic laboratory and clinical research

- Introduction to biomedical research for clinicians: basic principles of scientific methodology, tools for literature analysis, development of hypothesis, experimental study design, publication of scientific papers and doctoral thesis;
- different approaches for integration of laboratory analysis (biochemical, genetic) into clinical studies
- Integrated systems for biomedical data retrieving: ENTREZ (NCBI)-PubMed, OMIM, Gene, Protein...
- Overview of the state-of art laboratory technologies most relevant for integration into clinical studies;
- Evidence based medicine (EBM)

Laboratory:

- Blood and urine analysis: hematological, biochemical and immunological parameters;
- Flow cytometry
- Proteomics: 1d/2D SDS-PAGE, Western blot, LC-MS

Genetic analysis: genotyping of SNPs, gene expression, next generation sequencing

3. System connective-tissue diseases

Synonyms for these diseases are also:

- mesenchymopathies,
- systemic-connective-tissue diseases.

Here belong System Lupus Erythematosus, other forms of lupus syndrome, Sjögren syndrome, systemic sclerosis, polymyositis, dermatomyositis, and overlapping syndrome.

These diseases are similar according to their clinical and laboratory features, but at the same time enough different to be distinguished.

Skupne značilnosti so:

- avtoimunska patogeneza,
- prisotnost genov HLA-DR lokusa.

Prizadenejo lahko različne organe, značilna in specifična so serumska avtoprotitelesa, nekatere bolezni so tudi posledica vpliva raznih zdravil.

4. Epidemiološke metode – temeljno orodje v klinični medicini in javnem zdravju

V okviru tega sklopa bo predstavljena epidemiologija kot temeljna znanost ki omogoča opis, in kvantifikacijo določenih zdravstvenih problemov ter proučevanje vzrokov za pojav le teh. V okviru predmeta se bodo študenti seznanili s temeljnimi epidemiološkimi metodami in postopki. Predstavljeni bodo principi in namen posameznih epidemioloških študij ter možnosti in omejitve teh študij ter tipične vrste študij v okviru deskriptivne in analitične epidemiologije. Poseben poudarek bo namenjen naslednjim področjem:

- merjenje pojavov v epidemiologiji;
- merjenje in mere pogostosti pojavov;
- mere povezanosti med pojavi;
- mere potencialnega učinka pojavov na zdravje ljudi;
- načrtovanje in potek epidemioloških raziskav;
- interpretacija rezultatov epidemioloških raziskav;
- orodja za epidemiološko raziskovanje;
- etični vidiki epidemiološkega raziskovanja.

5. Statistika v medicini

Uporabnost in pasti uporabe statistike. Osnovno o multivariatnih statističnih metodah. Soodvisne in prikrite spremenljivke.

6. Najnovejši diagnostični in terapevtski dosežki v dermatovenerologiji

- dermatoimunohistopatološka diagnostika v dermatologiji;
- diagnostični postopki in zdravljenje spolno prenosljivih okužb;
- fototerapija;
- biološka zdravila v dermatologiji;
- dermatoonkologija;
- dermatoskopija.

Common characteristics are:

- autoimmune pathogenesis,
- presence of the HLA -DR locus genes.

Diseases can affect different organs, one of the features is presence of specific serum auto antibodies, and some diseases are also consequences of the influence of different medications.

4. Epidemiological methods – basic tool in clinical medicine in public health system

Within this frame, epidemiology as basic science which enables description, quantification of certain health problems and research of their causes will be presented. Students will introduce basic epidemiological methods and procedures. Principles and purposes of the epidemiological studies, abilities and limitations of these studies, and typical kinds of studies within descriptive and analytical epidemiology. Special accent will be put on the following fields:

- measurement of the phenomena in epidemiology;
- measurement and incidence measures of the phenomena,
- measurements of the association /linkage of the phenomenon,
- measurement of the potential effect of the phenomena on the people's health,
- plans and course of the epidemiological research,
- interpretation of the results of the epidemiological research,
- tools for epidemiological researches,
- ethical aspects of epidemiological research.

5. Statistics in medicine

Applicability and pitfalls of the use of statistics. Basics of multivariate statistic methods. Dependent and hidden variables

6. The newest diagnostic and therapeutic achievements in dermatovenerology

- dermato-imunohistopatological diagnostic in dermatology,
- diagnostic procedures and treatment of sexually transmissible infections,
- phototherapy,
- biologic drugs in dermatology,
- dermatooncology,
- dermatoscopy.

Temeljni literatura in viri / Readings:

1. Klinično preizkušanje zdravil

- Zakon o zdravilih. Ur List RS št. 31, 24.3.2006.
- Bennett PN, Brown MJ. Clinical pharmacology. Ninth ed. London: Clirchill Livinstone, 2003.
- Gallin JI. Principles and practice of clinical research. Amsterdam: Academic Press, 2002.

Brunton LL, Lazo JS, Parker KL. Goodman & Gilman's The pharmacological basis of therapeutics. 19th ed. New York: McGraw-Hill, 2006.	Brunton LL, Lazo JS, Parker KL. Goodman & Gilman's The pharmacological basis of therapeutics. 19th ed. New York: McGraw-Hill, 2006.
2. Povezovanje temeljnih laboratorijskih in kliničnih raziskav - Michael Lieberman, Allan Marks, Alisa Peet.: Marks' basic medical biochemistry : a clinical approach. 4th ed., Philadelphia : Lippincott Williams & Wilkins, 2013. - Robert Nussbaum, Roderick McInnes, Huntington Willard. Thompson & Thompson Genetics in Medicine. 8th ed., Philadelphia:Elsevier, 2015	2. Povezovanje temeljnih laboratorijskih in kliničnih raziskav - Michael Lieberman, Allan Marks, Alisa Peet.: Marks' basic medical biochemistry : a clinical approach. 4th ed., Philadelphia : Lippincott Williams & Wilkins, 2013. - Robert Nussbaum, Roderick McInnes, Huntington Willard. Thompson & Thompson Genetics in Medicine. 8th ed., Philadelphia:Elsevier, 2015
3. Sistemske vezivno-tkivne bolezni - Ruddy S, Harris ED, Sledge CB, Budd RC, Sargent JS, editors. Kelley's textbook of rheumatology. 6th ed. Philadelphia, New York, London, St. Louis, Sidney, Toronto: W B Saunders Company; 2001: 1145-52 - Ronald A. Asherson, Ricard Cervera, Jean-Charles Piette, Yehuda Shoenfeld, editors. The Antiphospholipid Syndrome II – Autoimmune Thrombosis. Amsterdam: Elsevier; 2002. - Kocijančič A, Mrevlje F, Štajer D. Interna medicina. Ljubljana, 2005.	3. Sistemske vezivno-tkivne bolezni - Ruddy S, Harris ED, Sledge CB, Budd RC, Sargent JS, editors. Kelley's textbook of rheumatology. 6th ed. Philadelphia, New York, London, St. Louis, Sidney, Toronto: W B Saunders Company; 2001: 1145-52 - Ronald A. Asherson, Ricard Cervera, Jean-Charles Piette, Yehuda Shoenfeld, editors. The Antiphospholipid Syndrome II – Autoimmune Thrombosis. Amsterdam: Elsevier; 2002. - Kocijančič A, Mrevlje F, Štajer D. Interna medicina. Ljubljana, 2005.
4. Epidemiološke metode – temeljno orodje v klinični medicini in javnem zdravju - Premik M. Uvod epidemiologijo. Ljubljana: Medicinska fakulteta, Inštitut za socialno medicino, 1998. - Zaletel-Kragelj L, Eržen I, Premik M. Uvod v javno zdravje. Ljubljana: Medicinska fakulteta UL, 2007. - Brownson RC, Baker EA, Leet T, Gillespie KN. Evidence based public health. Oxford, New York: Oxford University Press, 2003. - Izbrana poglavja iz učbenika: Detels R, McEwen J, Beaglehole R, Tanaka H, eds. Oxford textbook of public health. Oxford: Oxford University Press, 2002. R. Beaglehole, R. Bonita, T. Kjellstrom Basic Epidemiology. World Health Organisation (WHO). 1994 - Greenberg, R.S. Daniels, F.W. Flanders, J.W. Eley, J.R. Boring: Medical Epidemiology, Appleton&Lange, East Norwalk, 1993. - Lilienfeld AM, Lilienfeld ED. Foundations of Epidemiology, Oxford, New York: Oxford University Press, 1980.	4. Epidemiološke metode – temeljno orodje v klinični medicini in javnem zdravju - Premik M. Uvod epidemiologijo. Ljubljana: Medicinska fakulteta, Inštitut za socialno medicino, 1998. - Zaletel-Kragelj L, Eržen I, Premik M. Uvod v javno zdravje. Ljubljana: Medicinska fakulteta UL, 2007. - Brownson RC, Baker EA, Leet T, Gillespie KN. Evidence based public health. Oxford, New York: Oxford University Press, 2003. - Izbrana poglavja iz učbenika: Detels R, McEwen J, Beaglehole R, Tanaka H, eds. Oxford textbook of public health. Oxford: Oxford University Press, 2002. R. Beaglehole, R. Bonita, T. Kjellstrom Basic Epidemiology. World Health Organisation (WHO). 1994 - Greenberg, R.S. Daniels, F.W. Flanders, J.W. Eley, J.R. Boring: Medical Epidemiology, Appleton&Lange, East Norwalk, 1993. - Lilienfeld AM, Lilienfeld ED. Foundations of Epidemiology, Oxford, New York: Oxford University Press, 1980.
5. Statistika v medicini - Kirkwood B. R., Sterne J. A. C., Essential medical statistics. Blackwell, Oxford 2003 (2nd ed.). Riffenburgh R. H., Statistics in medicine. Elsevier, London 2006 (2nd ed.). - Ramsey F. L., Schafer D. W., The statistical sleuth (a course in methods of data analysis). Thomson, London 1997	5. Statistika v medicini - Kirkwood B. R., Sterne J. A. C., Essential medical statistics. Blackwell, Oxford 2003 (2nd ed.). Riffenburgh R. H., Statistics in medicine. Elsevier, London 2006 (2nd ed.). - Ramsey F. L., Schafer D. W., The statistical sleuth (a course in methods of data analysis). Thomson, London 1997
6. Najnovejši diagnostični in terapevtski dosežki v dermatovenerologiji - Dermatology, Braun-Falco O et al. 3rd ed., Springer 2005 - Rook's Textbook of dermatology, 7th ed. Blackwell Publishing company 2004 - Philip H McKee, Eduardo Calonje and Scott R Granter. Pathology of the skin, Elsevier Mosby 2006 - Human Molecular Genetics 2. 2nd ed. Tom Strachan & Andrew P. Read.Oxford, UK BIOS Scientific Publishers Ltd - Human genetics: problems and approaches, 3rd ed. F.Vogel, A.G.Motulski. Springer 1997 - Jean L. Bolognia, et al. Dermatology, 3rd ed. St. Louis, Mosby 2003	6. Najnovejši diagnostični in terapevtski dosežki v dermatovenerologiji - Dermatology, Braun-Falco O et al. 3rd ed., Springer 2005 - Rook's Textbook of dermatology, 7th ed. Blackwell Publishing company 2004 - Philip H McKee, Eduardo Calonje and Scott R Granter. Pathology of the skin, Elsevier Mosby 2006 - Human Molecular Genetics 2. 2nd ed. Tom Strachan & Andrew P. Read.Oxford, UK BIOS Scientific Publishers Ltd - Human genetics: problems and approaches, 3rd ed. F.Vogel, A.G.Motulski. Springer 1997 - Jean L. Bolognia, et al. Dermatology, 3rd ed. St. Louis, Mosby 2003

Cilji in kompetence:

1. Klinično preizkušanje zdravil

Udeleženci bodo sposobni razumevati rezultate drugih raziskovalcev kliničnih študij z zdravili, sodelovati aktivno pri kliničnih raziskavah in pripraviti načrt manjše raziskave v enem centru, vključno z izdelavo poročila in statistične obdelave

2. Povezovanje temeljnih laboratorijskih in kliničnih raziskav

Študenti bodo znali na osnovi pregleda znanstvene literature ugotoviti trenutno stanje znanja na področju določene biomedicinske problematike, odkriti še neodgovorjena relevantna znanstvena vprašanja, postaviti hipotezo in načrtovati biomedicinsko študijo, ki bo ustrezno ovrednotila hipotezo. Študenti bodo

Objectives and competences:

1. Clinical drug testing

Participants will be able to understand results of the other clinical studies on drugs take active part in clinical research and prepare plan for the smaller research in one centre, including report and statistical analysis.

2. Integration of basic laboratory and clinical research

Students will be able to perform systematic review of scientific literature and to establish the state-of-art in the specific biomedical research topic. Students will be able to identify relevant open scientific questions, to set the appropriate hypothesis and to design biomedical study to evaluate the hypothesis. Students will be able to write and execute the research project to answer specific clinical

sposobni napisati in izvesti raziskovalni projekt s katerim bodo odgovorili na določena klinična vprašanja s pomočjo rezultatov biokemijskih in genetskih laboratorijskih preiskav.

3. Sistemske vezivno-tkivne bolezni

Podrobno poznavanje vrste sistemskih vezivno-tkivnih bolezni, tako klinično sliko kot laboratorijske specifične znake.

4. Epidemiološke metode – temeljno orodje v klinični medicini in javnem zdravju

Seznanitev slušateljev s pristopi in problemi pri pridobivanju podatkov za epidemiološke raziskave, spoznavanje osnovnih značilnosti posameznih vrst epidemioloških raziskav, seznanitev z velikimi javno zdravstvenimi problemi v Sloveniji. Poleg tega bodo slušatelji usposobljeni za uporabo različnih meril za oceno teže posameznih bolezni ter analizo uspešnosti različnih diagnostičnih in terapevtskih metod.

5. Statistika v medicini

Jasna predstava o možnostih uporabe sodobnih statističnih metod pri raziskovanju v medicini in širše.

6. Najnovejši diagnostični in terapevtski dosežki v dermatovenerologiji

Podrobno poznavanje sodobnih postopkov v diagnostiki nekaterih kožnih bolezni ter novejših možnosti zdravljenja teh bolezni.

questions using the results from biochemical and genetic laboratory investigations.

3. System connective- tissue diseases

In detail knowledge about kinds of the system connective tissue diseases, clinical picture and laboratory specific signs.

4. Epidemiological methods – basic tool in clinical medicine and public health system

Approaches and problems of data gaining for epidemiological research, basic characteristics of some epidemiological researches. Information about large public health problems in Slovenia. Attendants become competent to use different measures/criteria for assessment of the severity of some disease and to carry out outcome analysis of different diagnostic and therapeutic methods.

5. Statistic in medicine

Possibilities of application of modern statistical methods in medical research and wider.

6. Latest diagnostic and therapeutical achievements in dermatovenerology

Thorough knowledge about modern procedures in diagnostic of some skin diseases and advanced possibilities of their treatments.

Predvideni študijski rezultati:

Znanje in razumevanje:

1. Klinično preizkušanje zdravil

Znanje: Prijava raziskave etični komisiji, izdelava protokola manjše klinične raziskave, izdelava poročila in priprava ekspertnega mnenja.

Razumevanje: Razumevanje metaanalize, kompleksnih raziskav z zdravili in kompleksnejših statističnih prikazov. Sposobnost ocenjevati kakovost, ustreznost in novosti pri kliničnih raziskavah z zdravili

2. Povezovanje temeljnih laboratorijskih in kliničnih raziskav:

Študenti bodo poznali in razumeli delovanje najpomembnejših tehnologij za raziskovanje na področju biomedicine, predvsem biokemije in genetike, in bodo znali uporabiti tehnologije za reševanje relevantnih kliničnih vprašanj. Študenti bodo poznali koncept, vlogo in merila na dokazih temelječe medicine.

3. Sistemske vezivno-tkivne bolezni

Znanje patofiziologije avtoimunskih procesov pri vnetnih obolenjih. Analiza in evalvacija testov, s pomočjo katerih ocenjujemo avtoimunska dogajanja.

Intended learning outcomes:

Knowledge and understanding:

1. Clinical drug testing

Knowledge: Application of the research to Ethical Commission, smaller clinical research protocol, report and preparation of the expert opinion.

Met analyse, complex research with drugs and more complex statistics account. Quality assessment ability in adequacy and novelties in clinical drug researches.

2. Integration of basic laboratory and clinical research

Students will understand the working the state-of-art laboratory technology most relevant for biomedical research, including biochemistry and genetics, and will be able to use the technology to address relevant clinical issues. Students will understand concepts, the role and the measures of the evidence based medicine.

3. System connective-tissue diseases

Pathophysiology of autoimmune processes in inflammatory diseases. Analyse and evaluation of assessment tests for autoimmune happenings.

4. Epidemiološke metode – temeljno orodje v klinični medicini in javnem zdravju Sluša telji poznajo in razumejo pristope in probleme pri pridobivanju podatkov za epidemiološke raziskave, osnovne značilnosti posameznih vrst epidemioloških raziskav, poznajo pristope, probleme in rešitve pri ocenjevanju pomena posameznih postopkov na področju diagnosticiranja in zdravljenja posameznih bolezni ali stanj. Sluša telji lahko s pridobljenim znanjem sodelujejo pri proučevanju razširjenost zdravstvenih problemov kot tudi pri analizi uspešnosti obvladovanja posameznih bolezni in stanj ter pri ocenjevanju učinkovitost zdravljenja. Pridobljeno znanje lahko uporabijo pri zagotavljanju kakovosti posameznih procesov dela. 5. Statistika v medicini Poznavanje osnovnih multivariatnih metod. Uporaba statistike kot orodja pri raziskavah, razumevanje rezultatov in tolmačenje. 6. Najnovejši diagnostični in terapevtski dosežki v dermatovenerologiji • Lažje razumevanje patofizioloških procesov pojava nekaterih kožnih bolezni. • Sodobne možnosti zdravljenja nekaterih kožnih bolezni in razumevanje mehanizmov zdravljenja. Evalvacija pridobljenih rezultatov, njihova korelacija s klinično sliko ter pomen teh pri zdravljenju.	4. Epidemiological methods – elemental tool in clinical medicine and public health Attendants get to know and understand procedures and problems of epidemiological research data collecting, basic features of some epidemiologic researches, understand approaches, problems and solutions of assessment of the meaning of the procedures in the field of diagnostic and treatment of some diseases and states. Gained knowledge should enable students to participate in researching about extension of health problems and analysis of the efficiency of prevention of the particular diseases states and treatment efficiency. Acquired knowledge should enable student to ensure work quality process. 5. Statistics in medicine Knowledge about elementary_multivariate methods. Use of statistics as tools in researches, understanding of results and their interpretation. 6. Up to date diagnostic and therapeutic achievements in dermatovenerology • understanding of pathophysiological processes in some skin diseases, • modern possibilities of treatment of some skin diseases and understanding of the treatment mechanisms. Evaluation of acquired results, their correlation with clinical picture and their importance in treatment.
Metode poučevanja in učenja: Delo v majhnih skupinah, samostojno raziskovalno delo	Learning and teaching methods: Work in small groups, independent research work

Načini ocenjevanja:	Delež (v %) / Weight (in %)	Assessment:
Način (pisni izpit, ustno izpraševanje, naloge, projekt) opravljene laboratorijske vaje in opravljene računalniške vaje s preizkusom so predpogoj za opravljanje seminarske naloge seminarska naloga (oblikovana kot prispevek za objavo članka v Actabiotechnica angleškem jeziku)	100%	Type (examination, oral, coursework, project): Completed laboratory practice and completed computer practice with a test are a preliminary condition for completing a seminar assignment (formed as a contribution for the publishing of an article in Actabiotechnica in the English language).

Reference nosilca / Lecturer's references:

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