| University of Belgrade<br>Faculty of Pharmacy | **DOCTORAL ACADEMIC STUDIES** | |
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**Course title:** Methodology of scientific research

**Teachers:** Savić M. Miroslav, Krajnović M. Dušanka, Kotur-Stevuljević M. Jelena, Bogavac-Stanojević B. Nataša

**Course status:** Mandatory common, module: Doctoral academic studies

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| **Semester:** I | **Year of studies:** I |
| **ECTS points:** 5 | **Course code:** Д1О31 |

**Requirements:** none

**Course aims:**

The aim of this course is to provide participants with general scientific skills in order to formulate a scientific problem and plan the experiment, as well as to understand the complete process of preparation and publication of scientific research results

**Course outcomes:**

By the end of this course participants will be able to summarize and apply the principles of the methodology of scientific-researh work and scientific writing

**Course contents:**

Science and scientific method. Problem and scientific problem. Hypothesis. Hypothesis verification: scientific observation and scientific experiment. Common methodology of scientific research in biomedicine. Classification of research. Experimental research in laboratory. Animal experiments. Types of studies in epidemiological investigations. Ethics and biomedical investigations. Ethical codex of scientific-researh work. Generation of biomedical information. Communications. Networks. Internet. Internet search engines. Authorship/co-authorship. Role and duties of principal investigator. Protection of intellectual property. Classification of scientific work. Writing of scientific and professional papers. Literature citing. Review process. Oral presentation of scientific work (adaptation to audience and situation). Designing PowerPoint slides for a scientific presentation. Introduction to writing of project proposals. Master's thesis and doctoral dissertation.

**Recommended literature:**

1 Cargill, M, O'Connor P. Writing scientific research articles: Strategy and steps. John Wiley & Sons, 2013.

2. Baumgartner TA, Hensley LD. Conducting and Reading Research in Health and Human performance. Mc Graw Hill, Boston, 2006

3. Machin D, Campbell MJ. Design of studies for medical research. John Wiley & Sons, Hoboken, 2005.

4. Peat J, Elliot E, Baur L, Keena V. Scientific writing – easy when you know how. BMJ Books, London, 2002.

5. Albert T. The A-Z of medical writing. BMJ Books, London, 2000.

6. Hudson Jones A, McLeallan F. Ethical Issues in Biomedical Publication. Baltimore: John Hopkins University Press, 2000.

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| **The total of active learning classes** | **Lectures:** 30 |
| | **Individual research work:** 30 |

**Teaching methods:**

Lectures and study-research work

**Grading system:**

Seminar: 30 points; written exam: 70 points

| University of Belgrade<br>Faculty of Pharmacy | DOCTORAL ACADEMIC STUDIES | |
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**Course title:** Statistics in research

**Teachers:** Bogavac-Stanojević B. Nataša, Kotur-Stevuljević M. Jelena

**Course status:** Mandatory common, module: Doctoral academic studies

| **Semester:** I | **Year of studies:** I |
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| **ECTS points:** 5 | **Course code:** Д1О32 |

**Requirements:** One semester of undergraduate studies in mathematics and statistics
pharmaceutical / medical biochemistry / medicine

**Course aims:**

Understanding advanced statistical methods. Applying advanced statistical analyses in scientific research.

**Course outcomes:**

After completing the course students will be trained to:

- Recognizing the type of statistical analysis
- Interpret the significance of the obtained statistical indicators and discuss the results,
- Understand the importance of the application of statistical methods in the scientific research,
- Use statistical software in the data analysis

**Course contents:**

One-way analysis of variance (ANOVA). Two-way analysis of variance. ANOVA with replication. Post-hoc tests. Simple linear regression analysis. Multiple regression analyses. Logistic regression. Analysis of covariance. Nonparametric analysis of variance. Nonparametric correlation. Chi-square test. Confidence interval.

Student's research: Solving different statistical problems and tasks.

**Recommended literature:**

1. Sheskin DJ. Handbook of parametric and nonparametric statistical procedures Chapman & Hall/CRC, Washington, D.C., 2000.
2. Vitingoff E, Shiboski SC, Glidden DV, McCulloch CE. Regression Methods in Biostatistics,Springer Science + Business Media, New York, 2005.
3. Selvin S. Statistica Analysis of Epidemiological Data, Oxfor University Press, Oxford, 1996.
4. Tamhane AJ, Dunlop DD. Statistics and Data Analysis, Prentice Hall, Upper Saddle River, NJ, 2000.

| **The total of active learning classes** | **Lectures:** 30 |
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| | **Individual research work:** 30 |

**Teaching methods:**

Lectures, computer exercises, solving practical problems

**Grading system:**

The presence at lectures: 30 points; Written Exam: 70 points.

| University of Belgrade<br>Faculty of Pharmacy | **DOCTORAL ACADEMIC STUDIES** | |
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**Course title:** Seminar 1

**Teachers:** Ivanović P. Darko, Zečević L. Mira, Malenović M. Anđelija, Stojanović S. Biljana, Miletić Đ. Ivanka, Šobajić S. Slađana, Stanković M. Ivan, Đorđević I. Brižita, Vuleta M. Gordana, Milić R. Jela, Primorac M. Marija, Savić D. Snežana, Vasiljević D. Dragana, Krajišnik R. Danina, Đekić M. Ljiljana, Spasić M. Slavica, Jelić-Ivanović D. Zorana, Spasojević-Kalimanovska V. Vesna, Stojanov D. Marina, Ignjatović D. Svetlana, Topić S. Aleksandra, Dopsaj B. Violeta, Bogavac-Stanojević B. Nataša, Kotur-Stevuljević M. Jelena, Tasić M. Ljiljana, Marinković D. Valentina, Krajnović M. Dušanka, Miljković R. Branislava, Vezmar Kovačević D. Sandra, Vučićević M. Katarina, Kovačević N. Nada, Petrović D. Silvana, Maksimović A. Zoran, Kundaković D. Tatjana, Drobac M. Milica, Ugrešić D. Nenad, Stepanović-Petrović M. Radica, Savić M. Miroslav, Ilić V. Katarina, Novaković N. Aleksandra, Tomić A. Maja, Leposavić M. Gordana, Arsenović-Ranin M. Nevena, Stojić-Vukanić M. Zorica, Plećaš-Solarović A. Bosiljka, Pešić P. Vesna, Nedeljković S. Miodrag, Milenković T. Marina, Antić Stanković A. Jelena, Parojčić V. Jelena, Ibrić R.Svetlana, Đuriš D.Jelena, Grbić V. Sandra, Đurić R. Zorica, Vladimirov M.Sote, Agbaba D. Danica, Bulat L. Zorica,

Matović J. Vesna, Antonijević M. Biljana, Vujanović L. Dragana, Đukić M. Mirjana

**Course status:** Mandatory common, module: Doctoral academic studies

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| **Semester:** I | **Year of studies:** I |
| **ECTS points:** 5 | **Course code:** Д1О33 |

**Requirements:** none

**Course aims:**

This course aims to enable the participant to: search the scientific literature effectively and thoroughly; perform a critical analysis of publications relevant for his/her study field; apply the principles of making a successful oral presentation in English.

**Course outcomes:**

By the end of this course participants will be able to: search the scientific literature effectively and thoroughly; perform a critical analysis of publications relevant for his/her study field; apply the principles of making a successful oral presentation in English

**Course contents:**

Collecction of pertinent literature (by use of bibliographic databases, web sites of publishers, general search engines). Preparation of personal databases. Contextual analysis of key publications in a field. Preparation and presentation of the published results.

**Recommended literature:**

1. Alley M. The craft of scientific presentations. Critical steps to succeed and critical errors to avoid. Springer-Verlag New York, Inc., 2003.

2. Original scientific papers and review articles in the field of the participant's research activity.

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| **The total of active learning classes** | **Lectures:** 30 |
| | **Individual research work:** 60 |

**Teaching methods:**

Study-research work

**Grading system:**

Seminar: 70 points; written exam: 30 points

| University of Belgrade<br>Faculty of Pharmacy | **DOCTORAL ACADEMIC STUDIES** | |
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**Course title:** Seminar 2

**Teachers:** Ivanović P. Darko, Zečević L. Mira, Malenović M. Anđelija, Stojanović S. Biljana, Miletić Đ. Ivanka, Šobajić S. Slađana, Stanković M. Ivan, Đorđević I. Brižita, Vuleta M. Gordana, Milić R. Jela, Primorac M. Marija, Savić D. Snežana, Vasiljević D. Dragana, Krajišnik R. Danina, Đekić M. Ljiljana, Spasić M. Slavica, Jelić-Ivanović D. Zorana, Spasojević-Kalimanovska V. Vesna, Stojanov D. Marina, Ignjatović D. Svetlana, Topić S. Aleksandra, Dopsaj B. Violeta, Bogavac-Stanojević B. Nataša, Kotur-Stevuljević M. Jelena, Tasić M. Ljiljana, Marinković D. Valentina, Krajnović M. Dušanka, Miljković R. Branislava, Vezmar Kovačević D. Sandra, Vučićević M. Katarina, Kovačević N. Nada, Petrović D. Silvana, Maksimović A. Zoran, Kundaković D. Tatjana, Drobac M. Milica, Ugrešić D. Nenad, Stepanović-Petrović M. Radica, Savić M. Miroslav, Ilić V. Katarina, Novaković N. Aleksandra, Tomić A. Maja, Leposavić M. Gordana, Arsenović-Ranin M. Nevena, Stojić-Vukanić M. Zorica, Plećaš-Solarović A. Bosiljka, Pešić P. Vesna, Nedeljković S. Miodrag, Milenković T. Marina, Antić Stanković A. Jelena, Parojčić V. Jelena, Ibrić R.Svetlana, Đuriš D.Jelena, Grbić V. Sandra, Đurić R. Zorica, Vujić B. Zorica, Čudina A. Olivera, Bulat L. Zorica, Matović J. Vesna, Antonijević M. Biljana, Vujanović L. Dragana, Đukić M. Mirjana

**Course status:** Mandatory common, module: Doctoral academic studies

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| **Semester:** II | **Year of studies:** I |
| **ECTS points:** 5 | **Course code:** Д1О34 |

**Requirements:** none

**Course aims:**

This course aims to enable the participant to: search the scientific literature effectively and thoroughly; perform a critical analysis of publications relevant for his/her study field; upgrade his/her capacities for giving a successful oral presentation in English.

**Course outcomes:**

By the end of this course participants will be able to: search the scientific literature effectively and thoroughly; perform a critical analysis of publications relevant for his/her study field; apply the principles of making a successful oral presentation in English

**Course contents:**

Collecction of pertinent literature (by use of bibliographic databases, web sites of publishers, general search engines). Preparation of personal databases. Contextual analysis of key publications in a field. Preparation and presentation of the published results.

**Recommended literature:**

1. Alley M. The craft of scientific presentations. Critical steps to succeed and critical errors to avoid. Springer-Verlag New York, Inc., 2003.
2. Original scientific papers and review articles in the field of the participant's research activity.

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| **The total of active learning classes** | **Lectures:** 30 |
| | **Individual research work:** 60 |

**Teaching methods:**

Study-research work

**Grading system:**

Seminar: 70 points; written exam: 30 points

| University of Belgrade<br>Faculty of Pharmacy | **DOCTORAL ACADEMIC STUDIES** | |
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**Course title:** Seminar 3

**Teachers:** Ivanović P. Darko, Zečević L. Mira, Malenović M. Anđelija, Stojanović S. Biljana, Miletić Đ. Ivanka, Šobajić S. Slađana, Stanković M. Ivan, Đorđević I. Brižita, Vuleta M. Gordana, Milić R. Jela, Primorac M. Marija, Savić D. Snežana, Vasiljević D. Dragana, Krajišnik R. Danina, Đekić M. Ljiljana, Spasić M. Slavica, Jelić-Ivanović D. Zorana, Spasojević-Kalimanovska V. Vesna, Stojanov D. Marina, Ignjatović D. Svetlana, Topić S. Aleksandra, Dopsaj B. Violeta, Bogavac-Stanojević B. Nataša, Kotur-Stevuljević M. Jelena, Tasić M. Ljiljana, Marinković D. Valentina, Krajnović M. Dušanka, Miljković R. Branislava, Vezmar Kovačević D. Sandra, Vučićević M. Katarina, Kovačević N. Nada, Petrović D. Silvana, Maksimović A. Zoran, Kundaković D. Tatjana, Drobac M. Milica, Ugrešić D. Nenad, Stepanović-Petrović M. Radica, Savić M. Miroslav, Ilić V. Katarina, Novaković N. Aleksandra, Tomić A. Maja, Leposavić M. Gordana, Arsenović-Ranin M. Nevena, Stojić-Vukanić M. Zorica, Plećaš-Solarović A. Bosiljka, Pešić P. Vesna, Nedeljković S. Miodrag, Milenković T. Marina, Antić Stanković A. Jelena, Parojčić V. Jelena, Ibrić R.Svetlana, Đuriš D.Jelena, Grbić V. Sandra, Đurić R. Zorica, Vujić B. Zorica, Čudina A. Olivera, Bulat L. Zorica, Matović J. Vesna, Antonijević M. Biljana, Vujanović L. Dragana, Đukić M. Mirjana

**Course status:** Mandatory common, module: Doctoral academic studies

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| **Semester:** III | **Year of studies:** II |
| **ECTS points:** 5 | **Course code:** Д2О31 |

**Requirements:** none

**Course aims:**

This course aims to enable the participant to: search the scientific literature effectively and thoroughly; perform a critical analysis of publications relevant for his/her study field; upgrade his/her capacities for giving a successful oral presentation of results of personal reserch activities

**Course outcomes:**

By the end of this course participants will be able to: search the scientific literature effectively and thoroughly; perform a critical analysis of publications relevant for his/her study field; apply the principles of making a successful oral presentation in English

**Course contents:**

Collecction of pertinent literature (by use of bibliographic databases, web sites of publishers, general search engines). Preparation of personal databases. Contextual analysis of key publications in a field. Preparation and presentation of the published results.

**Recommended literature:**

1. Alley M. The craft of scientific presentations. Critical steps to succeed and critical errors to avoid. Springer-Verlag New York, Inc., 2003.

2. Original scientific papers and review articles in the field of the participant's research activity.

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|---|---|
| **The total of active learning classes** | **Lectures:** 30 |
| | **Individual research work:** 60 |

**Teaching methods:**

Study-research work

**Grading system:**

Seminar: 70 points; written exam: 30 points

| University of Belgrade<br>Faculty of Pharmacy | **DOCTORAL ACADEMIC STUDIES** | |
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**Course title:** Seminar 4

**Teachers:** Ivanović P. Darko, Zečević L. Mira, Malenović M. Anđelija, Stojanović S. Biljana, Miletić Đ. Ivanka, Šobajić S. Slađana, Stanković M. Ivan, Đorđević I. Brižita, Vuleta M. Gordana, Milić R. Jela, Primorac M. Marija, Savić D. Snežana, Vasiljević D. Dragana, Krajišnik R. Danina, Đekić M. Ljiljana, Spasić M. Slavica, Jelić-Ivanović D. Zorana, Spasojević-Kalimanovska V. Vesna, Stojanov D. Marina, Ignjatović D. Svetlana, Topić S. Aleksandra, Dopsaj B. Violeta, Bogavac-Stanojević B. Nataša, Kotur-Stevuljević M. Jelena, Tasić M. Ljiljana, Marinković D. Valentina, Krajnović M. Dušanka, Miljković R. Branislava, Vezmar Kovačević D. Sandra, Vučićević M. Katarina, Kovačević N. Nada, Petrović D. Silvana, Maksimović A. Zoran, Kundaković D. Tatjana, Drobac M. Milica, Ugrešić D. Nenad, Stepanović-Petrović M. Radica, Savić M. Miroslav, Ilić V. Katarina, Novaković N. Aleksandra, Tomić A. Maja, Leposavić M. Gordana, Arsenović-Ranin M. Nevena, Stojić-Vukanić M. Zorica, Plećaš-Solarović A. Bosiljka, Pešić P. Vesna, Nedeljković S. Miodrag, Milenković T. Marina, Antić Stanković A. Jelena, Parojčić V. Jelena, Ibrić R.Svetlana, Đuriš D.Jelena, Grbić V. Sandra, Đurić R. Zorica, Vujić B. Zorica, Čudina A. Olivera, Bulat L. Zorica, Matović J. Vesna, Antonijević M. Biljana, Vujanović L. Dragana, Đukić M. Mirjana

**Course status:** Mandatory common, module: Doctoral academic studies

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| **Semester:** IV | **Year of studies:** II |
| **ECTS points:** 5 | **Course code:** Д2О32 |

**Requirements:** none

**Course aims:**

This course aims to enable the participant to: search the scientific literature effectively and thoroughly; perform a critical analysis of publications relevant for his/her study field; upgrade his/her capacities for giving a successful oral presentation of results of personal reserch activities; prepare publications containing the results obtained in the performed personal investigation

**Course outcomes:**

By the end of this course participants will be able to: search the scientific literature effectively and thoroughly; perform a critical analysis of publications relevant for his/her study field; apply the principles of making a successful oral presentation and preparing publications containing the personal results

**Course contents:**

Collecction of pertinent literature (by use of bibliographic databases, web sites of publishers, general search engines). Preparation of personal databases. Contextual analysis of key publications in a field. Preparation and oral and written presentation of the personal results.

**Recommended literature:**

1. Alley M. The craft of scientific presentations. Critical steps to succeed and critical errors to avoid. Springer-Verlag New York, Inc., 2003.
2. Original scientific papers and review articles in the field of the participant's research activity.

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|---|---|
| **The total of active learning classes** | **Lectures:** 30 |
| | **Individual research work:** 60 |

**Teaching methods:**

Study-research work

**Grading system:**

Seminar: 70 points; written exam: 30 points

| University of Belgrade<br>Faculty of Pharmacy | **DOCTORAL ACADEMIC STUDIES** | |
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**Course title:** Food Chemistry I

**Teachers:** Šobajić S. Slađana, Stanković M. Ivan, Đordjević I. Brižita

**Course status:** Mandatory modules, module: Bromatology

| **Semester:** I | **Year of studies:** I |
|---|---|
| **ECTS points:** 10 | **Course code:** ДБР1ОМ1 |

**Requirements:** no

**Course aims:**

Course provides students with knowledge on the chemical constituents of food, their chemical structure and physiological function

**Course outcomes:**

Student will be able to indipendently evaluate nutritive end energy value of foods and their roles within daily diet or specific dietary regimen

**Course contents:**

Food Chemitry as a science, connections with other scientific disciplines; Definitions of diet, food, nutrients. Factors that have effect on food choice; Energy value of foods; Macro- and micronutrients - chemistry and basic physiological roles; Dietary reference Intakes, adequate intake, safe upper level of nutrients; Role of food and food groups in daily diet

**Recommended literature:**

1. Introduction to Human Nutrition. Second Edition. Editors Michael J. Gibney, Susan A. Lanham-New, Aedin Cassidy, Hester H. Vorster. Willey Blackwell Publ., 2009; 2. Belitz HD, Grosch W, Scieberle P. Food Chemistry. Springer, 2004

| **The total of active learning classes** | **Lectures:** 60 |
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| | **Individual research work:** 60 |

**Teaching methods:**

Lectures; consultations; laboratory work; an individual written report on selected topics; quiz tests; preparing individual Power point presentation on selected topics

**Grading system:**

Continuous assessments: 30; Final exam: 70

| University of Belgrade<br>Faculty of Pharmacy | **DOCTORAL ACADEMIC STUDIES** | |
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**Course title:** Food Analysis

**Teachers:** Šobajić S. Slađana, Stanković M. Ivan, Đordjević I. Brižita

**Course status:** Mandatory modules, module: Bromatology

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| **Semester:** I | **Year of studies:** I |
| **ECTS points:** 5 | **Course code:** ДБР1ОМ2 |

**Requirements:** no

**Course aims:**

Course provides students with knowledge on the basic methods and techniques used in food analysis.

**Course outcomes:**

Student will be able to indipendently analyse food composition and use methods in determination of certain food characteristics.

**Course contents:**

Theoretical and practical priciples of basic laboratory techniques used in food analyses (gravimetry, volumetry, spectrophotometry, refractometry, polarimetry, gas chromatography, thin-layer chromatography, HPLC etc); Principles of method validation; Basic food analysis: water, proteins, fats, carbohydrates, vitamins, minerals, food additives.

**Recommended literature:**

1. AOAC Methods; 2. Handbookof Food Analytical Chemistry. Editors RE Wrostland, TE Acree, EA Decker i sar., Wiley&Sons Inc., New Jersey, 2005

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| **The total of active learning classes** | **Lectures:** 30 |
| | **Individual research work:** 30 |

**Teaching methods:**

Lectures; consultations; laboratory work; an individual written report on selected topics.

**Grading system:**

Continuous assessments: 50; Final exam: 50

| University of Belgrade<br>Faculty of Pharmacy | DOCTORAL ACADEMIC STUDIES | |
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**Course title:** Food Chemistry II

**Teachers:** Šobajić S. Slađana, Stanković M. Ivan, Đordjević I. Brižita

**Course status:** Mandatory modules, module: Bromatology

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| **Semester:** II | **Year of studies:** I |
| **ECTS points:** 10 | **Course code:** ДБР1ОМ3 |

**Requirements:** no

**Course aims:**

Course provides students with knowledge on the chemical constituents of food, their chemical structure and their physiological function or function in foods

**Course outcomes:**

Student will be able to indipendently evaluate biological value of foods and their role within specific dietary regimen, as well as to evaluate quality and composition of water

**Course contents:**

Biologically active non-nutritive food compounds and their role in helath and disease; Water as part of regular diet and as a product; interactions of nutrients, Interactions of nutrients and drugs; Information on food labels

**Recommended literature:**

1. Belitz HD, Grosch W, Scieberle P. Food Chemistry. Springer, 2004; WHO Guidelines for Drinkig Water Quality. Geneve, 2011; 3. Handbook of Food-Drug Interactions. Editors BJ McCabe, EH frankel, JJ Wolfe. CRC Press, London. 2003.

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| **The total of active learning classes** | **Lectures:** 60 |
| | **Individual research work:** 60 |

**Teaching methods:**

Lectures; consultations; laboratory work; an individual written report on selected topics; quiz tests; preparing individual Power point presentation on selected topics

**Grading system:**

Continuous assessments: 30; Final exam: 70

| University of Belgrade<br>Faculty of Pharmacy | **DOCTORAL ACADEMIC STUDIES** | |
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**Course title:** Dietetics

**Teachers:** Šobajić S. Slađana, Stanković M. Ivan, Đordjević I. Brižita

**Course status:** Mandatory modules, module: Bromatology

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| **Semester:** II | **Year of studies:** I |
| **ECTS points:** 5 | **Course code:** ДБР1ОМ4 |

**Requirements:** no

**Course aims:**

Course provides students with knowledge for applying the principles of optimal nutrition.

**Course outcomes:**

Student will be able to implement principles of rational and optimal nutrition in health and disease.

**Course contents:**

Basic principles of rational and optimal nutrition, and role of nutrition in health and disease; Methods for the evaluation of nutritive status; Nutrition throughout life cycle; Dietary products and dietary supplements; Basic principles of enteral and parenteral nutrition; Nutrition in prevention and risk management in chronic diseases; Food-drug interactions; Food allergies and food intolerances.

**Recommended literature:**

1. Mahan LK, Escott-Stump S. Krause's Food & Nutrition Therapy. Elsevier, St. Louis, 2008.; 2. Mery E. Barasi. Human Nutrition – A health perspective. 2003. Hodder Arnold Publ.; 3. Introduction to Human Nutrition. Second Edition. Editors Michael J. Gibney, Susan A. Lanham-New, Aedin Cassidy, Hester H. Vorster. Willey Blackwell Publ., 2009

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| **The total of active learning classes** | **Lectures:** 30 |
| | **Individual research work:** 30 |

**Teaching methods:**

Lectures; consultations; laboratory work; an individual written report on selected topics, quiz tests; preparing individual Power point presentation on selected topics

**Grading system:**

Continuous assessments: 30; Final exam: 70

| University of Belgrade<br>Faculty of Pharmacy | **DOCTORAL ACADEMIC STUDIES** | |
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**Course title:** Food Safety

**Teachers:** Šobajić S. Slađana, Stanković M. Ivan, Đordjević I. Brižita

**Course status:** Mandatory modules, module: Bromatology

| **Semester:** III | **Year of studies:** II |
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| **ECTS points:** 10 | **Course code:** ДБР2ОМ1 |

**Requirements:** no

**Course aims:**

Course provides students with knowledge on the principles of food safety and food risk analysis, as well as the characteristics of major food hazards.

**Course outcomes:**

Student will be able to understand the risk of food constituents (nutrients, contaminants, additives) and to indipendently analyse their presence in food and water.

**Course contents:**

Definitions and principles of food risk analysis (hazard identification, risk assessment, risk communication, risk management); International legislative on food safety; Food additives; Natural food toxins; Residues of chemical contaminants in food and water; Effects of food thermal processing; Materials in contact with foods.

**Recommended literature:**

1. Food toxicology, editori W. Helferich, C.K. Winter, CRC Press, London, 2001.; 2. Food Additives. Editori A. Larry Branen; P. Michael Davidson. CRC Press, Boca Raton, 2001.; 3. Chemical Migration and Food Contact Materials. Editors KA Barnes, CR Sinclair, DH Watson. Woodhead Publishing Limited, Cambridge, 2007.

| **The total of active learning classes** | **Lectures:** 60 |
|---|---|
| | **Individual research work:** 60 |

**Teaching methods:**

Lectures; consultations; laboratory work; an individual written report on selected topics, quiz tests; preparing individual Power point presentation on selected topics

**Grading system:**

Continuous assessments: 30; Final exam: 70

| University of Belgrade<br>Faculty of Pharmacy | **DOCTORAL ACADEMIC STUDIES** | |
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**Course title:** Selected chapters of Organic Chemistry

**Teachers:** Savić M. Vladimir, Tokić-Vujošević N. Zorana

**Course status:** elective, module: Bromatology

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| **Semester:** II | **Year of studies:** I |
| **ECTS points:** 2,5 | **Course code:** ДБР1И1 |

**Requirements:** no

**Course aims:**

Understanding the properties and reactivity of biomolecules at the molecular level, learning about the impact of stereochemical properties of biomolecules and their function

**Course outcomes:**

Understanding and predicting the chemical properties of biomolecules, understanding of the stereochemical features and their importance in the function of biomolecules.

**Course contents:**

The structure and reactivity of biomolecules, basic stereochemical terms, stereochemical aspects of the properties of biomolecules.

**Recommended literature:**

1. Organic Chemistry: Structure and function, 5th edition, K.P.Vollhardt and Neil E. Shore
2. Essentials of Organic Chemistry P. M. Dewick
3. original scientific research papers

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| **The total of active learning classes** | **Lectures:** 15 |
| | **Individual research work:** 15 |

**Teaching methods:**

Consultations, seminars.

**Grading system:**

commitments before the exam - seminar: 50 points; exam: 50 points.

| University of Belgrade<br>Faculty of Pharmacy | **DOCTORAL ACADEMIC STUDIES** | |
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| **Course title:** Physiology - Selected chapters | |
| **Teachers:** Bosiljka A. Plećaš-Solarović, Vesna R. Pešić | |
| **Course status:** elective, module: Bromatology | |
| **Semester:** II | **Year of studies:** I |
| **ECTS points:** 2,5 | **Course code:** ДБР1И2 |
| **Requirements:** no | |
| **Course aims:**<br>Introduction to physiological processes necessary for understanding the study program. | |
| **Course outcomes:**<br>Acquaintance with medical terminology; Basic knowledge of organ, system and whole body function. | |
| **Course contents:**<br>Homeostasis, Blood, Cardiovascular system, Respiratory system, Digesttive system, Urinary system, Endocrine sistem. | |
| **Recommended literature:**<br>B. Plećaš: Physiology Lectures | |
| **The total of active learning classes** | **Lectures:** 15 |
| | **Individual research work:** 15 |
| **Teaching methods:**<br>Consultations and individual study | |
| **Grading system:**<br>pre-exam: 30 poens; oral exam: 70 poens. | |

| University of Belgrade<br>Faculty of Pharmacy | **DOCTORAL ACADEMIC STUDIES** | |
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**Course title:** Selected Instrumental Methods

**Teachers:** Vesna S. Kuntić, Slavica M. Blagojević

**Course status:** elective, module: Bromatology

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| **Semester:** II | **Year of studies:** I |
| **ECTS points:** 2,5 | **Course code:** ДБР1И3 |

**Requirements:** no

**Course aims:**

To acquire knowledge about basic principles of spectrophotometric and chromatographic methods widely applied in food analysis , as well as basic principles of mass spectrometry. Through this course, student will complete his/her theoretical knowledge for instrumental analysis and he/she will be trained to apply these method for required task in research.

**Course outcomes:**

Student grasps the concept of theoretical principals of optical and chromatographic methods and comprehends fundamentals of mass spectroscopy. Student is capable to apply particularly instrumental method in his/her own scientific research for food analysis.

**Course contents:**

Selected spectroscopic methods. UV-VIS spectroscopy: theoretical principles, UV-VIS spectrophotometer, spectra of proteins. Atomic absorption spectrophotometry: theoretical principles, AAS instrument, techniques with and without flame-graphite furnace technique, preparation (digestion) of the sample.

Selected chromatographic techniques. Liquid chromatography, RP-HPLC, selection of mobile and stationary phase. HPLC in protein analysis. Gas chromatography, detectors in gas chromatography. Application of GC in food analysis.

Fundamentals of mass spectroscopy. Ionisation modes: electron impact, chemical ionisation, fast atom bombardment, plasma desorption ionisation, electrospray ionisation, ion spray ionisation, matrix-assisted laser desorption ionisation. Mass analyser: magnetic sector field, quadrupole, ion trap, time-of-flight. Ion detectors. Mass spectrum. Mass spectroscopy in food analysis.

**Recommended literature:**

Lawrence A. Kaplan, Amadeo J.Pesce, Clinical chemistry: theory, analysis, correlation, 1996.

Skoog, D., Holler, F., Nieman, T.: Principles of Instrumental Analysis, Saunders College Publishing, Philadelphia 1998.

DavidSheehan: Physical Biochemistry: Principles and Applications, Wiley, 1997.

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| **The total of active learning classes** | **Lectures:** 15 |
| | **Individual research work:** 15 |

**Teaching methods:**

Individual lectures, literature survay.

**Grading system:**

Pre-examination activities (seminar): 50 points

Exame (oral): 50 points

| University of Belgrade<br>Faculty of Pharmacy | **DOCTORAL ACADEMIC STUDIES** | |
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**Course title:** Nutritional biochemistry

**Teachers:** Spasojević-Kalimanovska V. Vesna

**Course status:** elective, module: Bromatology

| **Semester:** II | **Year of studies:** I |
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| **ECTS points:** 2,5 | **Course code:** ДБР1И4 |

**Requirements:** no

**Course aims:**

The student has to accomplish, understand and comprehend the knowledge of basic anabolic and catabolic pathways in human organism and their regulation. Nutrition and metabolism in specific physiological and pathophisyological states.

**Course outcomes:**

After the course the student will be able to interprete the energy requirements and specific metabolism in various nutritional and hormonal states.

**Course contents:**

Basic principles of bioenergetic. Digestion and absorption of diet constitutes. Catabolism and anabolism of carbohydrates, lipids and nitrogen compounds. Metabolism in different physiology and pathophysiology states. Metabolic interrelationships and hormonal control. Metabolism in starvation, digestion and absorption disorders. Metabolism and vitamin and microelement deficiency. Effect of diet on lipoprotein metabolism and atherogenic risk. Metabolic pathways in adipose tissue. Insulin resistance and obesity. Aerobic and anaerobic exercise and specific metabolism in skeletal muscle. Metabolic changes in different diets.

**Recommended literature:**

1. Devlin, T.M. Textbook of Biochemistry with clinical correlation. John Wiley#Sons. 2011. 2. Nelson DL, Cox MM. Lehninger Principles of Biochemistry 5th Edition, W.H. Freeman & Company, 2008.

3. Broddy T. Nutritional biochemistry, Second edition, Academic Press, 1999.

4. Rozenthal MD, Glew RH. Medical Biochemistry. Human metabolism in health and disease. John Wiley & Sons, New York, 2009.

| **The total of active learning classes** | **Lectures:** 15 |
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| | **Individual research work:** 15 |

**Teaching methods:**

Interactive theoretical lectures; student practical work, seminars; case problem study e-learning.

**Grading system:**

60 poens pre-exam; final exam: 40 poens

| University of Belgrade<br>Faculty of Pharmacy | **DOCTORAL ACADEMIC STUDIES** | |
|---|---|---|

**Course title:** Biologically Active Food Compounds

**Teachers:** Sobajić S. Slađana, Stankovic M. Ivan, Đordjević I. Brižita

**Course status:** elective, module: Bromatology

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| **Semester:** III | **Year of studies:** II |
| **ECTS points:** 2,5 | **Course code:** ДБР2И1 |

**Requirements:** no

**Course aims:**

Course provides students with knowledge of biological non-nutritive functions of certain food constituents.

**Course outcomes:**

Student will be able to understand the possibilites of selected food compounds in health protection and nutrition therapy.

**Course contents:**

Categories of food active compounds; Nutritive and non-nutritive food active compounds; Phytonutrients; Microorganism cultures; Dietary sources; Fortified foods; Dietary supplements; Dietary interventions with active food compounds; Helath claims and food labelling.

**Recommended literature:**

1. Phytochemicals in Health and Disease edited by:Yong Ping Bao, Roger Fenwick, Marcel Dekker, Inc.New York, Basel, 2004.; 2. Preventive Nutrition. The Comprehensive Guide For Health Professionals. Third Edition. Byadrianne Bendich, Richard J.Deckelbaum, Humana Press, New Jersey, 2005.

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| **The total of active learning classes** | **Lectures:** 15 |
| | **Individual research work:** 15 |

**Teaching methods:**

Lectures; consultations; an individual written report on selected topics, quiz tests; preparing individual Power point presentation on selected topics

**Grading system:**

Continuous assessments: 50; Final exam: 50

| University of Belgrade<br>Faculty of Pharmacy | **DOCTORAL ACADEMIC STUDIES** | |
|---|---|---|

**Course title:** Food intolerances and nutritive metabolic disordrs

**Teachers:** Šobajić S. Slađana, Stanković M. Ivan, Đordjević I. Brižita, Miletić D. Ivanka

**Course status:** elective, module: Bromatology

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|---|---|
| **Semester:** III | **Year of studies:** II |
| **ECTS points:** 2,5 | **Course code:** ДБР2И2 |

**Requirements:** no

**Course aims:**

Course provides students with knowledge of major nutritive metabolic disorders and food intolerances and nutritive strategies in their therapy.

**Course outcomes:**

Student will be able to undestand the possibilites of selected food compounds in triggering clinical symptoms and to implement dietary measures in prevention and therapy of these disorders.

**Course contents:**

Metabolic disorders; Food allergy; Food intolerances; The role of dietary products in the diet of population with these disorders; Safety of these products.

**Recommended literature:**

1. Food Allergy. Editori JM James, W Burks, PA Figenmann. Elsevier Inc., London, 2012.; 2. Food Allergy: Adverse reactions to foods and food additives. editori DD Metcalfe, HA Sampson, RA Simon. Blackwell

Publishing, malden, 2008.

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| **The total of active learning classes** | **Lectures:** 15 |
| | **Individual research work:** 15 |

**Teaching methods:**

Lectures; consultations; an individual written report on selected topics, quiz tests; preparing individual Power point presentation on selected topics

**Grading system:**

Continuous assessments: 50; Final exam: 50

| University of Belgrade<br>Faculty of Pharmacy | **DOCTORAL ACADEMIC STUDIES** | |
|---|---|---|

**Course title:** Food lipids

**Teachers:** Šobajić S. Slađana, Stanković M. Ivan, Đordjević I. Brižita, Miletić D. Ivanka

**Course status:** elective, module: Bromatology

| **Semester:** III | **Year of studies:** II |
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| **ECTS points:** 2,5 | **Course code:** ДБР2И3 |

**Requirements:** no

**Course aims:**

Course provides students with knowledge of the characteristics of food lipids and their role in foods and in nutrition.

**Course outcomes:**

Student will be able to analyse fatty acid composition of foods and to use lipids in dietary interventions and in designing fortified and functional foods.

**Course contents:**

Food lipids; Chemistry of food lipids; Dietary sources; Essential fatty acids; Omega-9, omega-6, and omega-3 fatty acids; Cholesterol and phytosterols; Lipid oxidation; Role of lipids in health and disease.

**Recommended literature:**

1. Gurr MI: Lipids in nutrition and health: A reappraisal., PJ Barnes&Associates, Bridgwater, 2009.; 2. Belitz HD, Grosch W, Schieberle P. Food Chemistry. Springer, 2004.

| **The total of active learning classes** | **Lectures:** 15 |
|---|---|
| | **Individual research work:** 15 |

**Teaching methods:**

Lectures; consultations; an individual written report on selected topics, quiz tests; preparing individual Power point presentation on selected topics

**Grading system:**

Continuous assessments: 50; Final exam: 50

| University of Belgrade<br>Faculty of Pharmacy | **DOCTORAL ACADEMIC STUDIES** | |
|---|---|---|

**Course title:** Effects of processing on food quality and safety

**Teachers:** Šobajić S. Slađana, Stanković M. Ivan, Đordjević I. Brižita, Miletić D. Ivanka

**Course status:** elective, module: Bromatology

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|---|---|
| **Semester:** III | **Year of studies:** II |
| **ECTS points:** 2,5 | **Course code:** ДБР2И4 |

**Requirements:** no

**Course aims:**

Course provides students with knowledge on the principles of the food thermal processing and the effects, positive and negative, of these processes.

**Course outcomes:**

Student will be able to understand the possibilities of food processing in improving food quality and safety, as well as the risks of food processing.

**Course contents:**

Food processing methods; Thermal food processing and its influence on nutrients and non-nutritive constituents; Toxicological risks of food processing: Maillard reaction.

**Recommended literature:**

1. Process-induced Food Toxicants. Editori RH Stadler, DR Lineback.Wiley^Sons Inc, New Jersey, 2009.; 2. Thermal Technologies in Food Processing. Editor P Richardson. Woodhead Publishing limited, Vambridge, 2011

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| **The total of active learning classes** | **Lectures:** 15 |
| | **Individual research work:** 15 |

**Teaching methods:**

Lectures; consultations; an individual written report on selected topics, quiz tests; preparing individual Power point presentation on selected topics

**Grading system:**

Continuous assessments: 50; Final exam: 50