| Course unit (module) title | Code |
|---|---|
| **Proteomics** | |

| Lecturer(s) | Department(s) where the course unit (module) is delivered |
|---|---|
| **Coordinator: Mindaugas Valius, Prof., PhD**<br><br>**Other(s):** | Life science Centre, Sauletekio al. 7, Vilnius LT10257 |

| Study cycle | Type of the course unit (module) |
|---|---|
| Second cycle | Compulsory |

| Mode of delivery | Period when the course unit (module) is delivered | Language(s) of instruction |
|---|---|---|
| Face-to-face, self-study<br>Lectures, seminars and practice | 3rd semester | English |

| Requirements for students | |
|---|---|
| Prerequisites: | Additional requirements (if any): |
| | |

| Course (module) volume in credits | Total student's workload | Contact hours | Self-study hours |
|---|---|---|---|
| 5 | 131 | 60 | 71 |

| Purpose of the course unit (module): programme competences to be developed |
|---|
| This course will focus on latest advances in proteome science including cutting-edge proteomic approaches and technologies. Students will acquire the basic and novel methods of sample preparation to proteomic analysis, top-down and bottom-up quantitative label-based and label-free differential proteomics, identification of post-translational modification and subcellular proteome analysis. Major emphasis will be given on proteomic application in basic science of cell biology and clinical research. Student will gain new knowledge in the field of proteome science and will learn how to apply it addressing practical issues of basic and applied science. |

| Learning outcomes of the course unit (module) | Teaching and learning methods | Assessment methods |
|---|---|---|
| 2.1. Be able select an appropriate modelling strategy for a given biological domain and problem | Lectures, debates, group discussion, journal club | Two presentations; Written examination. |
| 2.2. Be able to gather and analyse information on subjects related to proteomics with a critical approach, and to carry out a technological watch | Lectures, debates, group discussion, journal club | |
| 3.1 Be able to apply modern research methods in proteomics | Lectures, debates, group discussion | |
| 4.1. Design proteomic experiment to solve practical issues in basic and applied life science. | Debates, group discussion s | |
| 5.1 Be able to work autonomously and as a part of a multidisciplinary team; act honestly and according to ethical obligations | Lectures, debates, group discussion | |

| Content: breakdown of the topics | Contact hours | | | | | | | Self-study work: time and assignments | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | Lectures | Tutorials | Seminars | Exercises | Laboratory work | Internship/work | Contact hours | Self-study hours | Assignments |
| 1. Introduction to Proteomics | 2 | | | | | | **2** | **3** | Hon-Chiu Eastwood Leung; latest reviews |
| 2. Proteome and its complexity levels | 4 | | 6 | | | | **10** | **10** | Hon-Chiu Eastwood Leung; latest reviews |
| 3. Mass spectrometry and its application in high capacity in quantitative proteomics | 6 | | 12 | | | | **18** | **20** | Hon-Chiu Eastwood Leung; latest reviews |
| 4. Sample preparation for proteomic analysis | 2 | | 6 | | | | **8** | **10** | Hon-Chiu Eastwood Leung; latest reviews |
| 5. OMICs database and their use for bioinformatics data analysis | 2 | | 8 | | | | **10** | **12** | Hon-Chiu Eastwood Leung; latest reviews; IPA data analysis tool |
| 6. Proteomics in biomedical research | 2 | | 6 | | | | **8** | **10** | Hon-Chiu Eastwood Leung; latest reviews |
| 7. Recent advances in proteomic science | 2 | | 2 | | | | **4** | **6** | Hon-Chiu Eastwood Leung; latest reviews |
| **Total** | **20** | | **40** | | | | **60** | **71** | |

| Assessment strategy | Weight, % | Deadline | Assessment criteria |
| --- | --- | --- | --- |
| Presentation I | 15% | After topic 3 | Understanding of subject and ability to apply knowledge to solve real problems, total 15 points |
| Presentation II | 15% | At the end of the course | Understanding of subject and ability to apply knowledge to solve real problems, total 15 points |
| Exam | 70% | 3 working days after last lecture or seminar | Understanding of subject and ability to apply knowledge to solve real problems, total 70 points |

| Author | Year of publication | Title | Issue of a periodical or volume of a publication | Publishing place and house or web link |
| --- | --- | --- | --- | --- |
| **Compulsary reading** | | | | |
| Editor Hon-Chiu Eastwood Leung | 2012 | Integrative proteomics | | InTech, ISBN 978-953-51-0070-6 |
| Nature Reviews | 2000-present | NATURE REVIEWS CANCER; NATURE REVIEWS MOLECULAR CELL BIOLOGY; NATURE REVIEWS CLINICAL ONCOLOGY; NATURE REVIEWS DRUG DISCOVERY | ISSN: 1474-175X; ISSN: 1471-0072; ISSN: 1759-4774; ISSN: 1474-1776 | http://www.nature.com/reviews/index.html |
| **Optional reading** | | | | |

| John T. Hancock | 2010 | Cell Signalling (3rd edition) | ISBN-13: 978-0199232109 | OXFORDUNIVERSITY PRESS |
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