***Course name:*** **PLANT PROTEINS**

| | |
|---|---|
| ECTS | 4 |
| Course status | directional - optional (available for the learning path) |
| Course final assessment /evaluation of outcomes | graded pass |
| Prerequisite | no prerequisites |

***Main field of study*: *Food Technology***

| | |
|---|---|
| Educational profile | General academic |
| Code of studies and education level | Master |
| Semester of studies | summer |
| Language of instruction | English |

**Course offered by**:

| | |
|---|---|
| Name of faculty offering the course | Faculty of Food Technology |
| Name of department offering the course | Department of Carbohydrate Technology and Cereal Processing |
| Course coordinator | dr hab. inż. Rafał Ziobro, prof. URK, dr hab. inż. Dorota Gumul, prof. URK |

**Learning outcomes**:

| Symbol of outcome | Description of the learning outcome | Reference to main field of study outcomes | Area symbol* |
|---|---|---|---|
| KNOWLEDGE – student knows and understands | | | |
| PP_W1 | unit operations and technological processes used in the isolation, separation and modification of plant proteins. Knows and understands the types and sources of raw materials and the considerations for the selection of raw material for the production of food safe for the consumer. | TŻ1_W02 | RT |
| PP_W2 | the complexity of the problem of variation in the quantitative and qualitative composition of protein and the theoretical and practical aspects of these issues in the context of standardization of the quality of raw materials for the production of protein rich products | TŻ1_W03 | RT |
| PP_W3 | the role of plant proteins in nutrition and prevention of diet-related diseases | TŻ1_W08 | RT |
| SKILLS – student is able to | | | |
| PP_U1 | apply analytical methods and operate analytical equipment allowing for qualitative evaluation of plant raw material, its standardization and refinement | TŻ1_U07 | RT |
| PP_U2 | use subject, methodological and experimental knowledge to independently plan, conduct, analyze and describe a research or design task in the field related to the field of study, formulate conclusions, conduct a critical analysis of the experiment | TŻ1_U04 | RT |
| SOCIAL COMPETENCIES – student is ready to: | | | |
| PP_K1 | assess the risks arising from the use of inappropriate raw materials and technologies | TŻ1_K04 | RT |
| PP_K2 | creatively search for ways to use new raw materials and technologies in plant processing | TŻ1_K01 | RT |

**Teaching contents**

| | |
|---|---|
| Lectures | 15 hours |
| Topics | Structure and composition of plant proteins and their consequences on nutritional value |
| | Physical properties of plant proteins. Impact on processing. |
| | Wheat gluten. Properties and applications<br>Other cereal proteins. Production, quality and use.<br>Pseudo-cereals as the source of gluten-free proteins. Technology and analysis.<br>Potato protein and legume proteins.<br>Comparison of nutritional value and pro-health properties of plant proteins.<br>Protein concentrates and isolates. Milk and meat substitutes of plant origin. |
| Accomplished learning outcomes | *PP_W1; PP_W2; PP_W3;* |
| Means of verification, rules and criteria of assessment | *written test; 60% correct answers for positive outcome. Weight- 50%.* |
| Classes: | 15 hours |
| Topics | Production and evaluation of milk substitute based on oats.<br>Isolation and assessment of vital gluten, seitan preparation.<br>Evaluation and applications of plant-protein concentrates. Culinary uses of aquafaba. |
| Accomplished learning outcomes | *PP_U1; PP_U2; PP_K1; PP_K2* |
| Means of verification, rules and criteria of assessment | *Students are assessed through demonstration of practical skills (40% of final grade)* |

**References**:

| | |
|---|---|
| Basic | *1 Elke K. Arendt, Gluten-Free Cereal Products and Beverages Elsevier 2008, https://doi.org/10.1016/B978-0-12-373739-7.X5001-1*<br>*2. R. H. Yada, Proteins in food processing, Woodhead Publishing Ltd., Abington 2004*<br>*3. Annamalai Manickavasagan, Loong-Tak Lim, Amanat Ali, Plant Protein Foods, Springer 2022* |
| Supplementary | |

**Structure of learning outcomes**

| | | |
|---|---|---|
| Area of academic study: R – Agricultural, forestry and veterinary sciences | | ECTS ** |
| Area of academic study: T – technological sciences | 4 | ECTS** |

**Structure of student activity**

| | | | | | |
|---|---|---|---|---|---|
| Contact hours | | 32 | hrs. | 1,7 | ECTS** |
| Including: | lectures | 15 | hrs. | | |
| | classes and seminars | 15 | hrs. | | |
| | consultations | 1 | hrs. | | |
| | participation in research | 0 | hrs. | | |
| | obligatory traineeships | 0 | hrs. | | |
| | participation in examination | 1 | hrs. | | |
| e-learning | | 0 | hrs. | 0 | ECTS** |
| student own work | | 68 | hrs. | 2,3 | ECTS** |

*Areas of academic study in the fields of: H- humanities; S - social studies; P – biological sciences; T – technological sciences; M- medical, sport and health sciences; R – Agricultural, forestry and veterinary sciences; A – the arts

** stated with an accuracy to 0.1 ECTS, where 1 ECTS = 25 - 30 hours of classes