

5 Päätösasia/Decision item: Maisteriohjelmien portfolio uudistustyö: neljän maisterikoulutusohjelman ohjelmason osaamistavoitteet / Master's programme portfolio renewal: programme level intended learning outcomes for four master programmes (Pauliina Ketola)

Perustelut/Justification

Portfolio uudistustyön seurauksena ehdotetaan, että neljän maisterikoulutusohjelman ohjelmason osaamistavoitteet hyväksytään liitteen 2 mukaisesti.

It is proposed that as a result of the portfolio renewal programme level intended learning outcomes for four master programmes will be confirmed according to the attachment 2.

Liitteet/Appendices

Liite/attachment 2 Portfolio renewal: intended learning outcomes

Päätösesitys/Decision proposal

Vahvistetaan neljän maisterikoulutusohjelman ohjelmason osaamistavoitteet Koulutusneuvoston esityksen (liite 2) mukaisesti.

Programme level intended learning outcomes for four master programmes will be confirmed according to the proposal by the Degree Programme Committee (attachment 2).

Kokouskäsitely/Handling of the matter

Esille nostettiin ohjelmason osaamistavoitteiden yhdenmukainen esitystapa. Osaamistavoitteet on listattu liitteessä 2, huomiota kiinnitettiin erityisesti kahden ohjelman osaamistavoitteeseen "Knowledge on sustainability-related challenges and their systemic nature. Ability to contribute with one's field specific expertise for sustainable future solutions" jonka muotoilu poikkeaa muista osaamistavoitteista. Todettiin, että ohjelmat voivat muokata kyseisen kohdan sanamuotoja yhdenmukaiseksi muiden osaamistavoitteiden kanssa. Osaamistavoitteen täytyy pysyä kuitenkin sisällöllisesti samana.

Unified way of presenting intended learning outcomes was discussed. Intended learning outcomes are listed in the attachment 2, attention was paid especially on the intended learning outcome shared with two programmes "Knowledge on sustainability-related challenges and their systemic nature. Ability to contribute

with one's field specific expertise for sustainable future solutions" because the formulation of the text differs from the other intended learning outcomes. It was noted that the programmes can modify the wording of the intended learning outcome in question so that it matches with the others. However, the content of the intended learning outcome must stay the same.

Päätös/Decision

Päätettiin esityksen mukaisesti huomioiden osaamistavoitteiden yhdenmukainen esittämistapa. / *The motion was passed as proposed, taking into account the unified way of presenting the intended learning outcomes.*

Maisteriohjelmien portfoliouudistustyö: neljän maisterikoulutusohjelman ohjelmason osaamistavoitteet

Master's programme portfolio renewal: programme level intended learning outcomes for four master programmes

Master's programme in Bioproducts engineering

A graduate is able to:

- Describe value chains in a circular bioeconomy: from raw materials to end products and further to recycling/biodegradation
- Identify and analyse the principles for transitioning to a circular bioeconomy
- Apply sustainable development tools in the engineering of bioeconomy value chain products and processes
- Master the hierarchical structure of plant cells and understand its relevance in bio-based raw material processing and application
- Select and apply analytical techniques for characterizing biomass, fibres, polymers and other relevant raw materials and end products
- Apply models on processes relevant to the forest products and broader bio-based industries
- Design, execute, and report on a scientific or research and development project to address academic, industrial, and societal problems.
- Identify challenges, ideate, experiment and implement feasible solutions, and has capability and perseverance for acting in an environment of risks and uncertainty.
- Engage in scientific discussions in fields of science, engineering and technology and communicate the findings in oral and written form
- Follow development of one's field and acquire and process new scientific, technological, and societal information
- Act and communicate as an expert in multidisciplinary teams on multi-dimensional problems, and being able to reflect, present and justify decision making in such teams
- Assess sustainability-related challenges and contribute with one's field specific expertise for sustainable future solutions.

Master's programme in Biotechnology

A graduate is able to:

- Evaluate and explain the impact and potential of biotechnology for society and industry
- Describe the molecular basis of living systems in the context of biotechnology
- Apply experimental and computational methods to analyze problems in a systematic manner and ideate and implement biotechnology-based solutions that support sustainable development
- Devise genetic engineering strategies to modify proteins, metabolic pathways and cellular functions leading to improved productivity or to novel or improved products
- Describe the bioreactor environment and explain how it influences cells or enzymes and thereby the bioprocess outcome
- Differentiate the suitability of different raw materials and recommend the most suitable bioprocessing approach
- Apply mechanistic and data-driven modelling approaches to predict biological and biophysical phenomena
- Design, execute, and report on a scientific or research and development project to address academic, industrial, and societal problems.
- Have capability and perseverance for acting in an environment of risks and uncertainty.
- Engage in scientific discussions in fields of science, engineering and technology and communicate the findings in oral and written form
- Follow development of one's field and acquire and process new scientific, technological, and societal information
- Act and communicate as an expert in multidisciplinary teams on multi-dimensional problems, and being able to reflect, present and justify decision making in such teams

Master's programme in Chemical and Metallurgical Engineering

A graduate is able to:

- Apply engineering, natural sciences, and mathematics to solve complex problems in a chemical engineering or metallurgical engineering context
- Design sustainable industrial-scale processes
- Select and design unit operations and unit processes for industrial applications
- Aid the transition towards use and production of renewable and recyclable resources
- Make decisions based on raw materials' criticality and availability
- Demonstrate critical thinking skills in multidisciplinary groups to design economically feasible, safe, and ecological industrial processes
- Use computer-aided tools for process modelling, simulation, and control
- Follow development of field, acquire and process new scientific, technological, and societal information
- Devise and communicate strategic outcomes that meet academic, industrial, and societal requirements

Master's programme in Chemistry and Materials Science

A graduate is able to:

- Design, synthesize, characterize, and apply molecules and materials
- Describe structure and properties of molecules and materials using fundamental principles across different length-scales: from atoms to molecules; from molecules to nano; from nano to surface and bulk
- Work independently in research and development laboratories
- Model molecules and materials with computational methods
- Identify and address sustainability needs when creating molecules and materials
- Apply one's knowledge of materials and molecules in academia, industry, and society
- Design, execute, and report on a scientific or research and development project to address academic, industrial, and societal problems.
- Identify challenges, ideate, experiment and implement feasible solutions, and has capability and perseverance for acting in an environment of risks and uncertainty.
- Engage in scientific discussions in fields of science, engineering and technology and communicate the findings in oral and written form
- Follow development of one's field and acquire and process new scientific, technological, and societal information
- Act and communicate as an expert in multidisciplinary teams on multi-dimensional problems, and being able to reflect, present and justify decision making in such teams
- Assess sustainability-related challenges and contribute with one's field specific expertise for sustainable future solutions.