University of Maribor

FRAMEWORK PROGRAMME OF EARLY STAGE RESEARCHER TRAINING[1]

1. BASIC DATA

Mentor's name and surname	**Maša Knez Marevci**	Mentor's register number at ARIS (SICRIS):	**30021**
Mentor's e-mail:	masa.knez@um.si	Mentor's tel. no.:	041324551
Research programme (RP) leader's name and surname:	prof. dr. Željko Knez	RP leader's register number at ARIS (SICRIS):	02619
Title of research programme:	Separation Processes and Product Design	RP's Register number at ARIS (SICRIS):	P2-0046
Research organisation (RO) of University of Maribor, where training shall be conducted:	University of Maribor, Faculty of Chemistry and Chemical Engineering	RO Register number at ARIS (SICRIS):	0794
Research field according to ARIS classification:	2.02 Chemical Engineering	Research field according to EURAXESS classification	**15.5 Chemical Engineering**

2. DEFINITION OF RESEARCH PROBLEM AND GOALS OF DOCTORAL RESEARCH[2]

Starting point of research task of the early stage researcher and its position in the research programme, where the mentor is included, work hypothesis, research goals and foreseen result with emphasis on an original contribution to science:

Increasing demands for sustainable and natural alternatives to synthetic additives in industry are directing research toward the isolation of bioactive substances from plant sources. Subcritical and supercritical fluids represent an advanced technological platform for the selective separation of thermolabile compounds; however, their efficient application requires an in-depth understanding of the thermodynamic and transport properties of multicomponent systems at elevated pressures and temperatures. The research thesis is based on the hypothesis that the integration of experimentally determined phase equilibria, physicochemical properties, and thermodynamic modeling can significantly improve the selectivity, yield, and reproducibility of extraction processes using sub- and supercritical fluids, thereby enabling the development of industrially

[1] *Term early stage researcher (ESR) is written in male form and used as neutral for women and men.*

[2] *Research and study programme of training have to harmonise with contents of the research programme, where the mentor is a member.*

relevant and sustainable processes. The research is embedded within the research program P2-0046 Separation Processes and Product Design, which integrates fundamental studies of phase phenomena, mass transfer, and process engineering with the development of advanced separation technologies. The experimental work will be conducted in the Laboratory for Separation Processes and Product Design, which is equipped with appropriate high-pressure research infrastructure. The objectives include the experimental determination of phase equilibria of multicomponent systems under sub- and supercritical conditions, the investigation of transport and physicochemical properties (density, viscosity, surface tension), the development and validation of thermodynamic and empirical models, the optimization of extraction and formulation process parameters, the isolation and characterization of bioactive compounds, and the evaluation of their biological activity. The expected results comprise new experimental data on high-pressure systems, improved models for the description of phase equilibria, and developed processes for the isolation of high-value bioactive substances. The research will contribute to the advancement of knowledge in the field of thermodynamics and mass transfer in multiphase high-pressure systems, expand the understanding of sub- and supercritical extraction processes, and facilitate the transfer of fundamental scientific insights into sustainable industrial applications.

3. STUDY PROGRAMME

Foreseen study programme, to which early stage researcher shall be enrolled in academic year 2026/2027:

Chemical Engineering

4. DESCRIPTION OF WORK AND TASKS

- Executes scientific and research projects.
- Participates in the preparation and design of research programs.
- Collaborates professionally with clients of research assignments.
- Prepares reports, analyses, and studies on conducted research.
- Monitors and coordinates research activities in accordance with funding agreements.
- Ensures safe and healthy working conditions in laboratories and research environments.
- Organizes and instructs staff and students on the use of personal protective equipment and other safety measures.
- Performs other related tasks as instructed by supervisors.
- Participates in working and permanent committees of the University of Maribor and its members.
- Replaces colleagues and supervisors during their absence, as authorized.
- Participates in annual and other inventories.
- Carries out other related duties assigned by superiors.

5. REQUESTED LEVEL OF EDUCATION

Seventh level: Second-cycle higher education or equivalent / Second-cycle higher education and equivalent qualification.

6. REQUESTED FIELD OF EDUCATION

Technical, Natural Sciences

7. KLASIUS SRV

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8. KLASIUS P

4 – Natural Sciences, Mathematics and Computer Science
5 – Engineering, Manufacturing Technologies and Civil Engineering

9. REQUESTED KNOWLEDGE

Computer skills: MS Windows, Word, Excel, Internet, e-mail, e-business

10. REQUESTED SPECIAL REQUIREMENTS

/

11. REQUESTED LANGUAGES

English.

12. REQUESTED WORK EXPERIENCE

None.

13. FORESEEN POSTDOCTORAL TRAINING

By agreement.

Mentor's signature:

Maša Knez Marevci

Digitally signed by Maša Knez Marevci
Date: 2026.01.12 11:43:45 +01'00'

Research programme leader's signature:

Željko Knez

Digitally signed by Željko Knez
Date: 2026.01.12 12:56:29 +01'00'

Name and surname of Dean or authorised person[3]:

Kliknite ali tapnite tukaj, če želite vnesti besedilo.

Signature of dean or authorised person:

_____

E-žig ustvarjen za:
Zoran Novak
zoran.novak@um.si

Napredni e-žig s kvalificiranim potrdilom
Izmetnik potrdila: mSign
Datum e-žiga: 22.01.2026
Potek veljavnosti potrdila: 04.04.2030

Place and date:

Kliknite ali tapnite tukaj, če želite vnesti besedilo.

Kliknite ali tapnite tukaj, če želite vnesti datum.

Stamp:

[3] The training program is signed by the dean of the member where the ESR's employment and training will take place.