Erasmus+ project CHEMTRY III

Stredná odborná škola chemická Bratislava

Grant Agreement No. 2020-1-SK01-KA116-078069

Co-funded by the Erasmus+ Programme of the European Union

Project details

Project information

- Key Action: KA1 - Learning Mobility of Individuals
- Action Type : KA116 - VET learner and staff mobility with VET mobility cha
- Project Title : Zručnosti pre chemický priemysel III (Skills for Chemical Industry III)
- Project Acronym : CHEMTRY III
- Start of Project : 15.12.2020
- Project Duration (months) : 24
- End of Project : 14.12.2022

Project goals

- develop professional (chemical analysis, physico-chemical measurements, molecular and cellular biology), language (in English, German and Spanish) and other key competences of pupils (in the field of mathematics, science and technology, digital, learning to learn, social and civic, sense of initiative and entrepreneurship, cultural awareness and expression, think logically and draw conclusions),
- develop professional (chemical analysis, organic synthesis, material chemistry, chemical technology), language (in English, German and Spanish), intercultural, social and pedagogical competences (motivation of pupils to learn, development of key competences in pupils) of job-shadowers,
- to develop language and pedagogical skill of accompanying persons,

Developing key competences for life long leraning

- 1. Literacy competence
- 2. Multilingual competence
- 3. Mathematical competence and competence in science, technology and engineering
- 4. Digital competence
- 5. Personal, social and learning to learn competence
- 6. Citizenship competence
- 7. Entrepreneurship competence
- 8. Cultural awareness and expression competence

- Detailed information: https://op.europa.eu/en/publication-detail/-/publication/297a33c8-a1f3-11e9-9d01-01aa75ed71a1/language-en

Project goals

- developing partnerships with schools and businesses,
- make mobility management more efficient,
- make mobility management more efficient,
- to improve the image of the organization for the professional public, elementary students. schools and their parents and increase the school's competitiveness.

Activities

- short-term mobility of 42 VET students lasting 14 days in 4 schools and 3 companies,
- intercultural, linguistic and pedagogical preparation of students for mobility,
- professional training of 6 employees lasting 7 days in 3 schools,
- monitoring of mobility participants by the project coordinator,
- assessment of mobilities,
- overall evaluation of the success of the project,
- dissemination activities at internal, regional, national and international levels,
- mobility management with the respect to obstacles caused by covid-19.

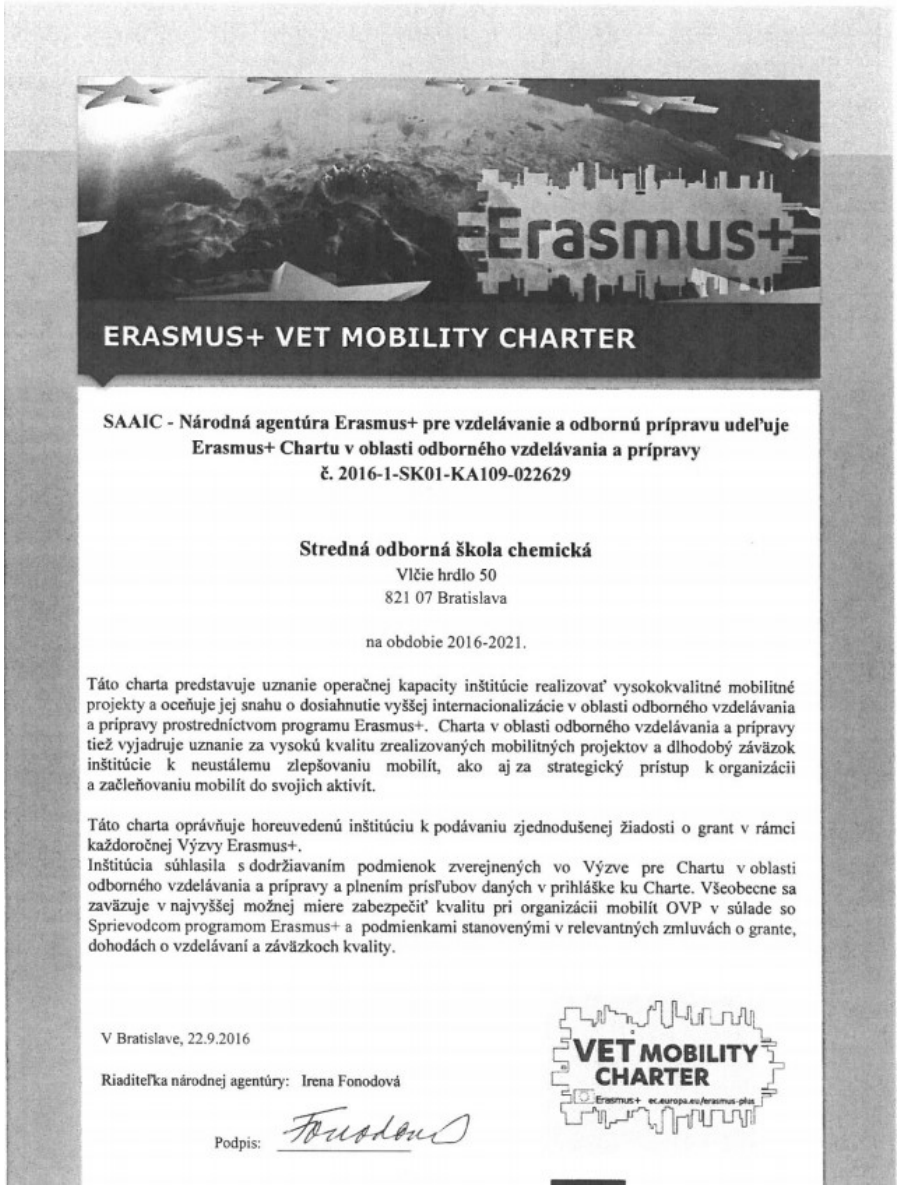
Results

- Tangible results:
  - revised and new educational units in the field of chemistry,
  - student reports (inspiration and source of measured data, images),
  - language and intercultural training materials used in foreign language lessons and other projects,

Results

- Intangible results:
  - increasing students' knowledge and skills in the field of chemical analysis, physico-chemical measurements, molecular and cellular biology,
  - improvement of their language competences in English, German and Spanish,
  - improvement of their key competences,
  - improvement of professional knowledge and skills of job-shadowers in the field of chemical analysis, organic synthesis, material chemistry, chemical technology,
  - improving their pedagogical skills, language skills in English, German and Spanish,
  - improvement of their social and intercultural competences,
  - improving the attitude of participants towards lifelong learning,
  - transfer of knowledge, skills and experience to other students and teachers as part of dissemination,
  - higher quality of cooperation with partners,
  - greater efficiency of project management,
  - improving the image of the organization,
  - increasing interest in Erasmus+ mobility among participants in dissemination activities.

Erasmus+ VET MOBILITY CHARTER



ERASMUS+ VET MOBILITY CHARTER

SAAIC - Národná agentúra Erasmus+ pre vzdelávanie a odbornú prípravu udeľuje Erasmus+ Chartu v oblasti odborného vzdelávania a prípravy
č. 2016-1-SK01-KA109-022629

Stredná odborná škola chemická
Vlčie hrdlo 50
821 07 Bratislava

na obdobie 2016-2021.

Táto charta predstavuje uznanie operačnej kapacity inštitúcie realizovať vysokokvalitné mobilitné projekty a oceňuje jej snahu o dosiahnutie vyššej internacionalizácie v oblasti odborného vzdelávania a prípravy prostredníctvom programu Erasmus+. Charta v oblasti odborného vzdelávania a prípravy tiež vyjadruje uznanie za vysokú kvalitu zrealizovaných mobilitných projektov a dlhodobý záväzok inštitúcie k neustálemu zlepšovaniu mobilít, ako aj za strategický prístup k organizácii a začleňovaniu mobilít do svojich aktivít.

Táto charta oprávňuje horeuvedenú inštitúciu k podávaniu zjednodušenej žiadosti o grant v rámci každoročnej Výzvy Erasmus+.
Inštitúcia súhlasila s dodržiavaním podmienok zverejnených vo Výzve pre Chartu v oblasti odborného vzdelávania a prípravy a plnením prísľubov daných v prihláške ku Charte. Všeobecne sa zaväzuje v najvyššej možnej miere zabezpečiť kvalitu pri organizácii mobilít OVP v súlade so Sprievodcom programom Erasmus+ a podmienkami stanovenými v relevantných zmluvách o grante, dohodách o vzdelávaní a záväzkoch kvality.

V Bratislave, 22.9.2016

Riaditeľka národnej agentúry: Irena Fonodová

Podpis:

VET MOBILITY CHARTER
Erasmus+ ec.europa.eu/erasmus-plus

Short-term mobility

7 partners

4 countries

Schools

- Sächsische Bildungsgesellschaft für Umweltschutz und Chemieberufe Dresden mbH Dresden
- Istituto di Istruzione Superiore Pietro Scalcerle Padova
- ITT Michelangelo Buonarroti Trento
- Střední prumyslová škola chemická Pardubice

Enterprises

- IBIMA Málaga
- Caves Campelo Barcelos
- Farmácia Brito Barcelos

Job shadowing

3 partners

2 countries

Schools

- Sächsische Bildungsgesellschaft für Umweltschutz und Chemieberufe Dresden mbH Dresden
- Istituto di Istruzione Superiore Pietro Scalcerle Padova
- ITT Michelangelo Buonarroti Trento

Short-term mobilities

Activity 1

Short-term mobility in partner organisations

Details on mobilities

- Presentations of groups of trainees on Google Drive

Short-term mobility in SBG Dresden

7.11.2021 – 20.11.2021 (1st turn)

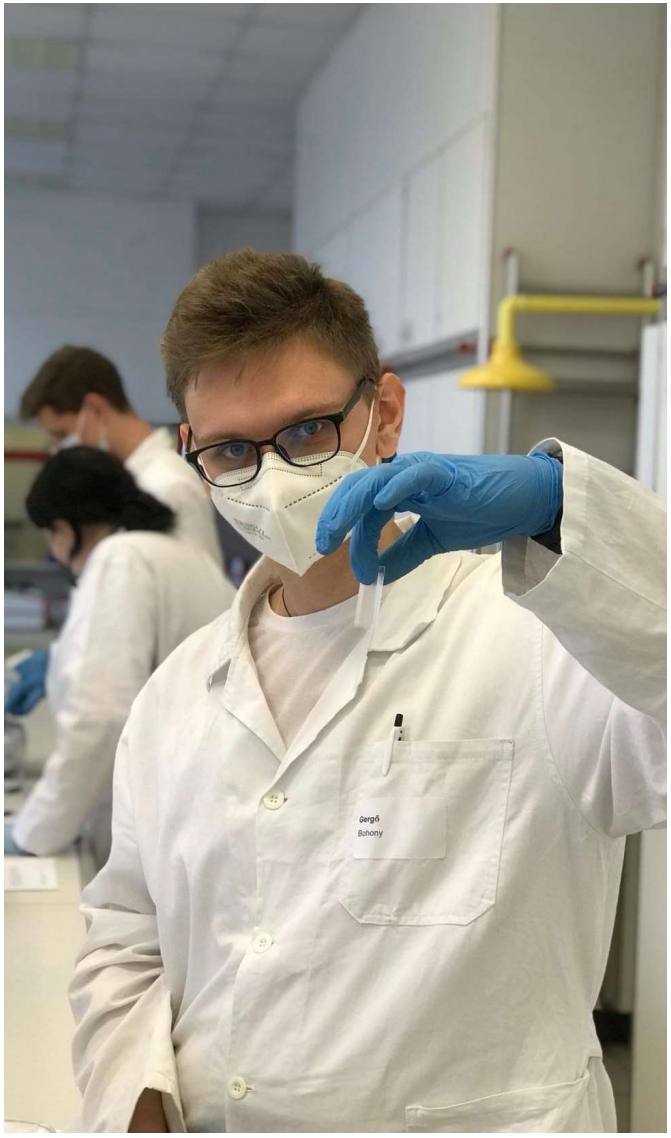
Sächsische Bildungsgesellschaft für Umweltschutz und Chemieberufe Dresden mbH

Gutenbergstraße, 01307 Dresden, Germany

Web: https://www.sbg-dresden.de/

Learning units

Separation methods	Gaschromatographische Untersuchungen Quantifizierung in der Gaschromatographie mit Autosampler
Optical methods	Photometrische Bestimmung von Cu^{2+}
	Prüfungsvorbereitung PHL – Photometrische Bestimmung von Salicylsäure als Tris-Salicylat-Eisen(III)-Komplex
	Qualitätssicherheit pharmazeutischer Produkte
	Semiquantitative Bestimmung von Acetanilid in einer Mischung bestehend aus Acetanilid und Paracetamol
	Einführung in die IR-Spektroskopie. Transmissionsmessung an Folien und ATR-Messung an Flussigkeiten
	Photometrische Bestimmung von Benzoesäure


Gergő
Bohony


Neumann

Theoretical background

IR spectroscopy

Deetrmination of salicylic acid

VIS spectrometry

Working on lab reports

Short-term mobility in SBG Dresden

30.10.2022 – 12.11.2022 (2nd turn)

Learning units

Field	
Separation methods	Separation of substances by thin layer chromatography (paraacetamol, glutamic acid, antracene)
	Separation of aminoacids by thin layer chromatography
	Determination of hexan-1-ol in hexane by gas chromatography
Electrochemical methods	Determination of copper by electrogravimetry
	Determination of malic acid by potentiometric ttiration (by automatic titrator) Titrierautomaten Gehaltsbestimmung von Säuren
	Determinatin of iron by potentioetric titration
Optical methods	Determination of iron by spectrophotometry (2,2-bipyridine method)
	Determination of sucrose by polariemtry
	Sample preparation and sources of error in UV/VIS spectroscopy (quiniline yellow, patent blue, ethanol, titanium oxide)
	Identification of polymers by infrared spectroscopy

Short-term mobility in IIS P. S. Padova

8.5.2022 – 21.5.2022

Istituto di Istruzione Superiore P. Scalcerle

Via Cave, 174, 35136 Padova PD, Italy

Web: http://www.istituto-scalcerle.it/

Learning units

Separation methods	Determination of nitrate by UV spectrometry Determination of iron by UV spectrometry Determination of copper in wine by atomic absorption spectrometry Determination of zinc in hair by atomic absorption spectrometry
Optical methods	Determination of methanol and ethanol in an alcoholic beverage by gas chromatography Determination of caffeine in non-alcoholic beverages by high performance liquid chromatography Determination of adulterants in saffron by thin layer chromatography

Short-term mobility in CAVES CAMPELO Barcelos and FARMÁCIA BRITO Braga

9.10.2022 – 22.10.2022

CAVES CAMPELO

Rua Joaquim Miranda Campelo 586,
4755-326 Moure, Portugal

Web: https://campelo.pt

Learning units

Field	
CAVES CAMPELO Wine analysis	Taking sample Bottle weighting Degassing the wine sample Determination of wine pH Determination of total acidity content Determination of sulfur dioxide (total, free) Determination of turbidity Working with Oenofoss analyser (glucose, fructose, glucose + fructose, pH, ethanol, density, volatile acids, malic acid, lactic acid)

FARMÁCIA BRITO

Av. da Liberdade 777, 4700-328
Braga, Portugal

Web: -

Learning units

Field	
Farmácia Brito Pharmacy practice	counting medicines and adding them to the pharmacy system working with CNP codes separating medicines into brand, generic and free market organising medicines processing orders working on the front desk

Short-term mobility in IBIMA Málaga

13.11.2022 – 26.11.2022

IBIMA

C. Severo Ochoa, 35, 29590 Málaga, Spain

Web: -https://www.ibima.eu

Learning units

Molecular and cell biology (student 1, 2)	Cell culture techniques: Human cell cultures from immortalized lines. Human cell cultures from skin biopsies or blood mononuclear cell extraction. Cell analysis by microscopy. Cell biology: Flow cytometry. Molecular biology: Protein analysis (Western Blot). Nucleic acid analysis (qPCR).
Molecular and cell biology (student 3)	Management and organization of databases (preclinical and clinical data) Statistical analysis of results Preparation of protocols for processing of samples and biochemical determinations Development of main techniques in molecular biology (real-time PCR and immunoassays)
Molecular and cell biology (student 4)	Different immunostainings with several fluorochromes on both fixed cells and fixed spinal cords to analyze the metabolic characteristics of the oligodendrocyte lineage along their differentiation in vitro and in vivo. Observe their visualization in an inverted confocal microscopy SPX8. Isolation and cell culture of human and mouse oligodendrocytes. Assay different metabolic conditions to test their capability to enhance their differentiation. Western blot assay of different myelin and metabolic proteins of oligodendrocyte samples to complete the characterization of the metabolic features during their differentiation.

Learning units

Molecular and cell biology (student 5)	Process and storage of blood samples (serum, plasma, isolation of PBMC). Molecular biology and genetic techniques, cell cultures, bioassays and techniques for the determination and characterization of proteins (Elisa, IFI).
Molecular and cell biology (student 6)	Introduction to the animal cell culture and work under sterile conditions. Search and preparation of reagents and materials required for the maintenance of cell cultures. Manipulation of different endothelial and tumor cells. Carry out in vitro assays to evaluate cell survival, proliferation, migration and invasion. Get familiar with the routine followed for the maintenance of cell cultures in vitro. Perform different experimental approaches to evaluate cellular biological properties.

Short-term mobility in SPŠCH Pardubice

27.11.2022 – 10.12.2022

Střední průmyslová škola chemická Pardubice

Poděbradská 94, 530 09 Pardubice II, Česká republika

Web: https://www.spsch.cz/

Learning units

Field	
Electrochemical analysis methods	Determination of chloride and iodide by potentiometric titration
	Determination of phosphoric acid by potentiometric titration
Optical analysis methods	Bradford Protein Assay
	Determination of heavy metals by X-ray fluorescence spectroscopy
	Determination of iron by spectrophotometry
	Determination of lead in soil by atomic absorption spectrometry
	Raman spectrometry
Organic chemistry	Isolation of betuline
Physicochemical measurement	Determination of coefficient of thermal conductivity
	Determination of molar mass according to Meyer
	Determination of viscosity by falling ball viscometer and Ubbelohde viscometer. Determination of surface tension by stalagmometric method. Determination of density by pycnometric method.
	Reaction kinetics of reaction of magnesium and hydrochloric acid
	Rectification of toluene-chlorobenzene mixture
Volumetric analysis methods	Determination of acetic acid in vinegar by alkalimetric titration
	Determination of ibuprophen by alkalimetric titration
	Determination of saccharine by argentometric titration

Short-term mobility in ITT Buonarroti Trento

27.11.2022 – 10.12.2022

ITT M. Buonarroti di Trento

Via Brigata Acqui, 15 38122 Trento
Web:
https://www.buonarroti.tn.it/

Learning units

Field	
Material chemistry	Determination of tensile strength of glues
	Measurement of the tensile strength of polycyanoacrylate glues upon different surface treatments and in different environments
	Measurement of the combustion heat of substances with a Berthelot-Mahler bomb
	Excursion to Coatings and Corrosion Lab of University of Trento
Chemical analysis	Qualitative test of functional groups
	Determination of acetic acid by alkalimetric titration
	Determination of copper by atomic absorption spectroscopy
Applied biology	Testing polylactic acid as a disinfecting agent
	Human tissue anatomy (observing human tissues with microscope)
	Preparation of an orchid culture media
Organic chemistry	Preparation of starch-based biopolymer and nylon
	Distillation of alcohols
Inorganic chemistry	Preparation of calcium carbonate
	Preparation of hydrogen

Short-term mobility in SOŠCH Bratislava

Short-term mobilities in SOŠCH Bratislava

SOŠCH Bratislava as receiving organisation

Sending organisations

- Mobilities from 1.9.2021 until 10.2.2023
  - IIS P. S. Padova (2 turns, 10 students)
  - SBG Dresden (3 students)
  - SPŠCH Pardubice (2 turns, 8 students)
  - VOŠZ a SZŠ Praha (2 turns, 12 students)

Learning units

Volumetric methods

- Determination of ibuprofen in a tablet by alkalimetric titration
- Determination of pectin in Pectogel by alkalimetric titration
- Determination of chlorides in meat products by argentometric titration (Volhard method)
- Determination of sulphur dioxide in wine by iodometric titration
- Isolation of catalase enzyme from the plant material.
  Determination of catalase activity by permanganometric titration

Learning units

Optical methods

- Determination of molar refractivity of alcohols -CH_2- group
- Determination of sodium chloride in cheese salt brine by refractometry
- Determination of manganese in alloys by spectrophotometry
- Determination of salicylic acid in Acylpyrin® by spectrophotometry
- Determination of sugars as glucose in a soft drink by spectrophotometry
- Determination of tannins in tea by spectrophotometry
- Determination of phosphates in surface water by spectrophotometry (molybdate method)
- Determination of dissociation constant of acid-base indicator by spectrophotometry

Learning units

Electrochemical methods

- Determination of malic acid in cider by potentiometric titration
- Determination of boric acid in boracic water by potentiometric titration
- Determination of a strong and weak acid in a mixture by conductometric titration
- Determination of chlorides by conductometric titration

Discovering the center of Bratislava

Students of IIS P. S. Padova in 2021

Determination of sucrose in an energy drink

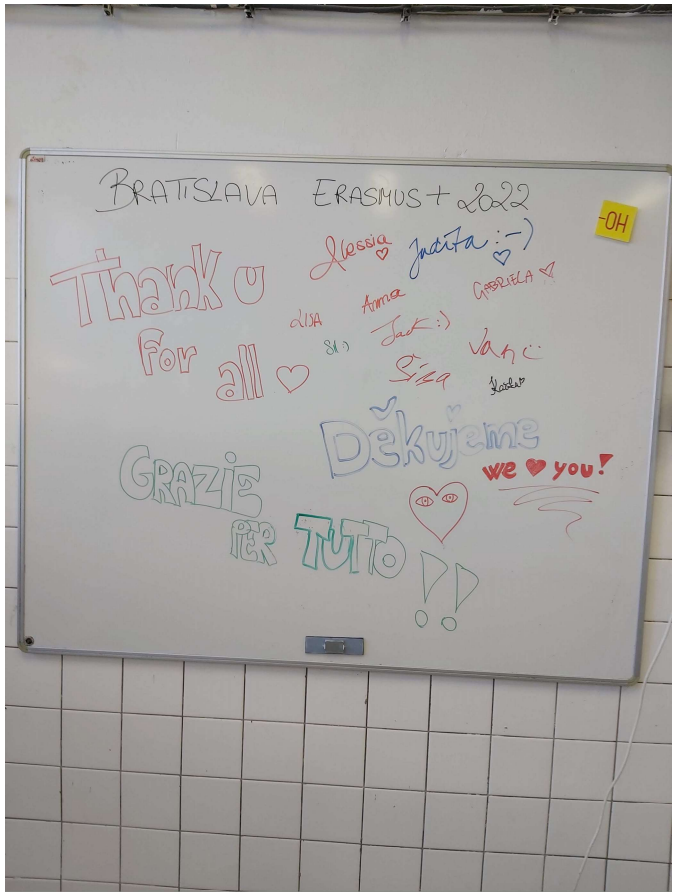
Students of IIS P. S. Padova and SPŠCH Pardubice in 2022

Group photo after lab excercises

Students of IIS P. S. Padova and SPŠCH Pardubice in 2022

Group photo after lab excercises

Students of IIS P. S. Padova and SPŠCH Pardubice in 2022



Job shadowing

Activity 2

Job shadowing in partner schools

SOŠCH Bratislava as sending organisation

Common goals

- Innovation of chemical laboratory practice teaching
- Building portfolio of attractive laboratory exercises
- New ideas for Student Research and Professional Activities

SBG Dresden (1st turn)

8.11.2021 – 11.11.2021

- Job shadowing in pharmaceutical technology lab, on analytical chemistry lab lessons
- Gaining professional skills in Pharmaceutical technology and Pharmaceutical analysis methods

SBG Dresden (2nd turn)

7.11.2022 – 11.11.2021

- Job shadowing on instrumental analytical chemistry lab lessons
- Gaining professional skills in Analysis of organic substances (UV-VIS spectrometry, IR spectroscopy, GC and HPLC)
- Building relations of analytical chemistry with organic chemistry and pharmaceutical chemistry

IIS P. S. Padova

9.5.2022 – 13.5.2022

- Job shadowing on instrumental analytical chemistry lab lessons
- Gaining professional skills in Optical methods (Flame photometry, Atomic absorption spectrometry, UV-VIS spectrometry, IR spectroscopy)
- Preparation for Control analytical methods study program
- Developing language skills for implementation of CLIL

IIS P. S. Padova

16.5.2022 – 20.5.2022

- Job shadowing on instrumental analytical chemistry lab lessons
- Gaining professional skills in Separation methods (High performance liquid chromatography, Gas chromatography, Thin layer chromatography)
- Preparation for Control analytical methods study program
- Innovation of chemical laboratory practice teaching
- Job shadowing on CLIL lesson (connected with KA2 CLIL in Education project)

ITT Buonarroti Trento

28.11.2022 – 2.12.2022

- Job shadowing on organic chemistry lab lessons
- Gaining professional skills in Organic synthesis
- Preparation for organisation of Chemistry Olympiad preparation courses
- Developing language skills for implementation of CLIL

ITT Buonarroti Trento

5.12.2022 – 9.12.2022

- Job shadowing on Material chemistry lab lessons, Chemical technology lessons
- Gaining professional skills in Material chemistry and Chemical technology
- Developing language skills for implementation of CLIL

Job shadowing in SOŠCH Bratislava

SOŠCH Bratislava as receiving organisation

Job shadowed lessons

14.11.2022 - -18.11.2022

22.11.2022 – 25.11.2022

30.1.2023 – 3.2.2023

- SPŠCH Pardubice (2 teachers in 2 turns)
- Practical education:
  - Analytical chemistry
  - Physicochemical measurements
- VOŠZ a SZŠ Praha (2 teachers)
- Inclusion of students with mother language different from Slovak language

Job shadowing in SOŠCH

Teachers of VOŠZ a SZŠ Praha at professional training

Dissemination

Erasmus Days 2022

- Dissemination on Erasmus Days, 3 days of celebration of Erasmus+ programme
- Dissemination at local level and international level
- Activities:
  - Workshop Erasmus stories of students
  - Workshop Erasmus stories of teachers

Workshop Erasmus stories of students

SBG Dresden 1st turn

Workshop Erasmus stories of students

IIS P. S. Padova

Workshop Erasmus stories of students

IIS P. S. Padova

Workshop Erasmus stories of students

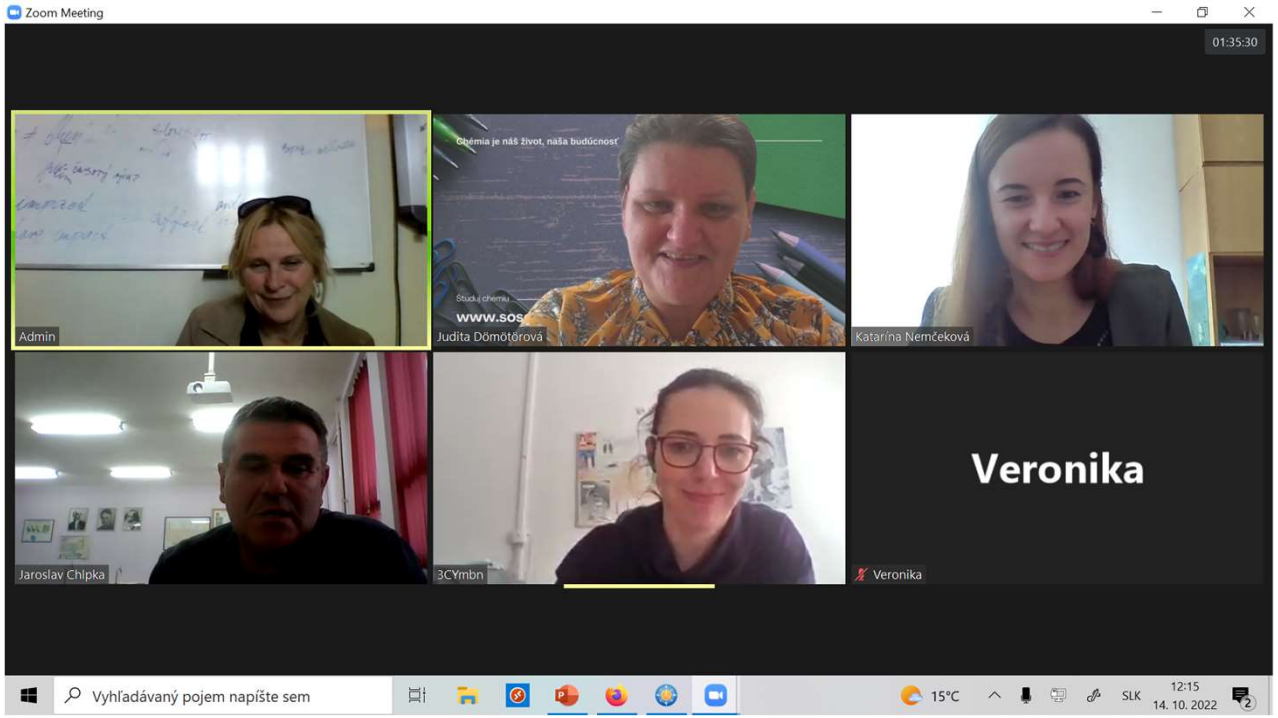
Live stream from Barcelos

Workshop Erasmus stories of teachers

On the traces of Erasmus (Po stopách Erasmus)

Workshop for partners on the frame of ChemIQSoc project

SOSČH Presented experieces from CHEMTRY 3 project



How does Erasmus taste? (Ako chutí Erasmus?)

Cooking a typical meal of a Serbian and Czech partner from project ChemIQSoc

Disscussion on Erasmus mobility in IIS P. S. Padova and planning mobility in ITT Buonarroti Trento and SPŠCH Pardubice

Christmas Erasmus+ Marathon

- Dissemination on a special all-day event Christmas Erasmus+ Marathon
- Discussion with teachers and students
- Developed key competences: Mathematical competence and competence in science, technology and engineering, Cultural awareness and expression competence

Christmas Erasmus+ Marathon

SBG Dresden 2nd turn

Christmas Erasmus+ Marathon

CAVES CAMPELO Barcelos,
Farmácia Brito Braga

Christmas Erasmus+ Marathon

IBIMA Máalaga

Christmas Erasmus+ Marathon

SPŠCH Pardubice

Christmas Erasmus+ Marathon

ITT Buonarroti Trento

English language lessons

- Dissemination on English language lessons
- Discussion with teacher and students
- Developed key competences: Multilingual competence, Cultural awareness and expression competence

Dissemination on English language lessons

ITT Buonarroti Trento

Dissemination within other KA1 Erasmus+ projects

- SPŠCH Pardubice
- VOŠZ a SZŠ Praha
- IIS P. S. Padova
- ITT Buonarroti Trento
- SBG Dresden

Dissemination within KA2 Erasmus+ projects

- Střední průmyslová škola chemická Pardubice
- ISEN Formación Profesional Cartagena
- Istituto di Istruzione Superiore Pietro Scalcerle Padova
- ABİDİN PAK PAKMAYA ANADOLU LİSESİ Edremit
- Escuela F.P. Salesianos Juan XXIII Alcoi
- Valgamaa Kutseõppekeskus Valga
- Slovenská technická univerzita v Bratislave
- Katolícka univerzita v Ružomberku
- Stredná priemyselná škola Samuela Mikovíniho Banská Štiavnica
- Gymnazija „Jan Kollar" sa domom učenika u Bačkom Petrovcu
- Medicinska skola „7. april" Novi sad

Dissemination of Erasmus+ projects implemented by foreing trainees in SOŠCH

- Střední průmyslová škola chemická Pardubice
- Istituto di Istruzione Superiore Pietro Scalcerle Padova
- Vyšší odborná škola zdravotnická a Střední zdravotnická škola Praha
- Sächsische Bildungsgesellschaft für Umweltschutz und Chemieberufe Dresden mbH Dresden

Dissemination of Erasmus+ projects implemented by trainees from IIS P. S. Padova and SPŠCH Pardubice in SOŠCH