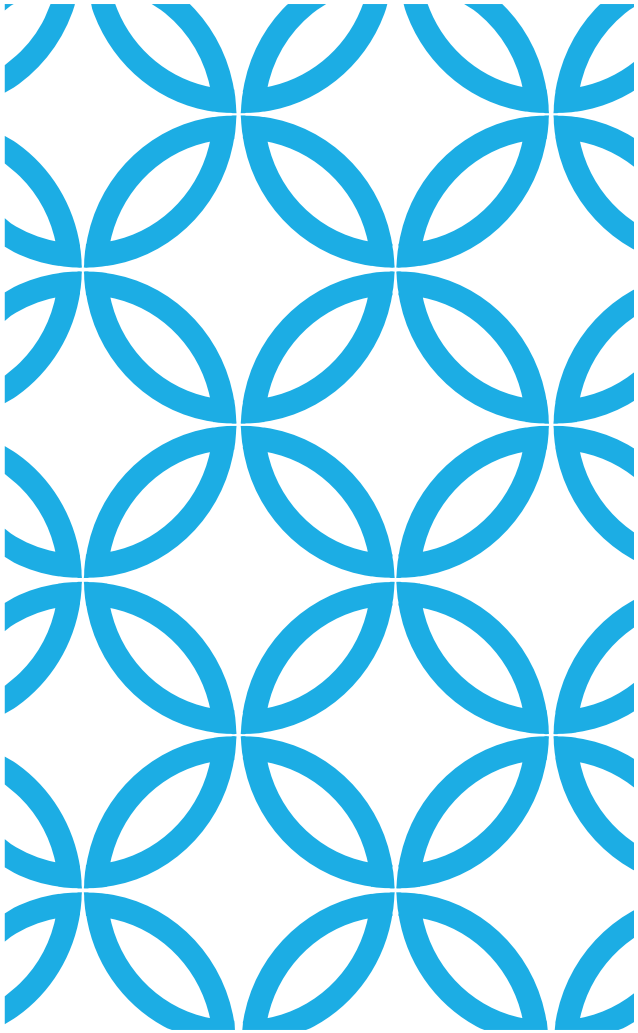
STREDNÁ ODBORNÁ ŠKOLA CHEMICKÁ (SECONDARY VOCATIONAL SCHOOL OF CHEMISTRY)

Vlčie hrdlo 50, Bratislava, Slovakia



STUDY PROGRAMS

BIOTECHNOLOGY AND PHARMACOLOGY

TECHNOLOGY OF COSMETICS AND PHARMACEUTICAL PRODUCTS

ANALYTICAL CONTROL METHODS

TECHNICAL LYCÉE - BILINGUAL STUDIES

STUDY PROGRAMS

STUDY PROGRAMS IN SLOVAK

Study programs:

- Biotechnology and Pharmacology
- Technology of cosmetics and pharmaceutical products
- Analytical control methods

State educational programme: Group of professional disciplines 28 Technical and applied chemistry

Age of students: 15 – 19

Length of study: 4 years

EQF: 4

Exams: final exam (maturita) at the end of studies (Slovak language, English language, Professional subjects)

Certificates / Qualification: Maturita exam certificate

BILINGUAL SLOVAK-ENGLISH STUDY PROGRAM

Study program: Technical lycée - bilingual studies

State educational programme: 39 Special technical disciplines

Age of students: 14 – 20

Length of study: 5 years

EQF: 4

Exams: final exam (maturita) in 4th (Slovak language) and 5th year (English language, professional subjects)

Certificates / Qualification: Maturita exam certificate

SCHOLARSHIP

Scholarship for students in fields of study and apprenticeship with insufficient number of graduates for the needs of the labour market

School year 2023/2024

Study programmes of Group 28 Technical and Applied Chemistry:

- Technology of cosmetics and pharmaceutical products (Bratislava self-governing region)
- Biotechnology and pharmacology (Trnava self-governing region)
- Rubber and plastics production operator (Trenčín self-governing region)
- Technology of environmental protection and treatment (Žilina self-governing region)

BASIC INFORMATION ON STUDY PROGRAMMES

Study program flyers:

- Profiling subjects
- Professional development
- Graduate careers

Google drive:
https://drive.google.com/drive/folders/1q5fhxvrqzXEiPCvk1OAQPQoIKoTttW5A?usp=sharing

DISCUSSION

What chemistry or pharmacy related study programs does your school have?

How many students compared to a total number of students do you have in these study programs?

In case of Grammar school, do you have classes with a science specialization?

Are the profiling subjects and graduate careers of these study programs similar to any of study programs of SOŠCH?

- Biotechnology and pharmacology
- Technology of cosmetics and pharmaceutical substances
- Control analytical methods
- Technical lycee – bilingual study

BIOTECHNOLOGY AND PHARMACOLOGY

Study the science of the future

VOCATIONAL EDUCATION AND TRAINING

BIOTECHNOLOGY AND PHARMACOLOGY

Profiling subjects

- Biotechnology
- Biochemistry
- Microbiology
- Pharmaceutical chemistry
- Technology of dosage forms
- Analytical chemistry
- Professional practice
- Applied biology

BIOTECHNOLOGY AND PHARMACOLOGY

Graduate careers

- chemical, biochemical and microbiological laboratories
- chemical, pharmaceutical and food production
- university studies: natural sciences, technical chemistry, pharmacy, medicine

Professional development

- Erasmus+ international traineeships
- Professional practice in chemical, biochemical and microbiological laboratories, pharmacies

TECHNOLOGY OF COSMETICS AND PHARMACEUTICAL PRODUCTS

Study skin and healthcare

TECHNOLOGY OF COSMETICS AND PHARMACEUTICAL PRODUCTS

Profiling subjects

- Cosmetic chemistry
- Cosmetic technology
- Biochemistry
- Pharmaceutical Chemistry
- Technology of dosage forms
- Analytical chemistry
- Professional practice
- Applied Biology

TECHNOLOGY OF COSMETICS AND PHARMACEUTICAL PRODUCTS

Graduate careers

- chemical, biochemical, testing and cosmetics development laboratories
- chemical, cosmetic and pharmaceutical production
- University studies: natural sciences, technical chemistry, pharmacy, medicine

Professional development

- Erasmus+ international traineeships
- Professional practice in chemical, cosmetic and biochemical laboratories, pharmacies

ANALYTICAL CONTROL METHODS

Study clinical biochemistry

ANALYTICAL CONTROL METHODS

Profiling subjects

- Analytical chemistry
- Biochemistry
- Microbiology
- Molecular Biology
- Clinical Chemistry and Analysis
- Professional Practice
- Applied Biology
- Applied Informatics

ANALYTICAL CONTROL METHODS

Graduate careers

- clinical, chemical, biochemical, chemical and microbiological laboratories
- University studies: laboratory methods in health care, natural sciences, pharmacy, medicine

Professional development

- Erasmus+ international traineeships
- Professional practice in clinical, biochemical, chemical and microbiological laboratories

TECHNICAL LYCÉE – BILINGUAL STUDIES

Study chemistry and economics in English

VOCATIONAL EDUCATION AND TRAINING

TECHNICAL LYCÉE – BILINGUAL STUDIES

Profiling subjects

- Applied Chemistry
- Analytical Chemistry
- Chemical laboratory exercises
- Economics
- Accounting
- Technical and economic exercises
- Software applications
- Technical and Technological Education

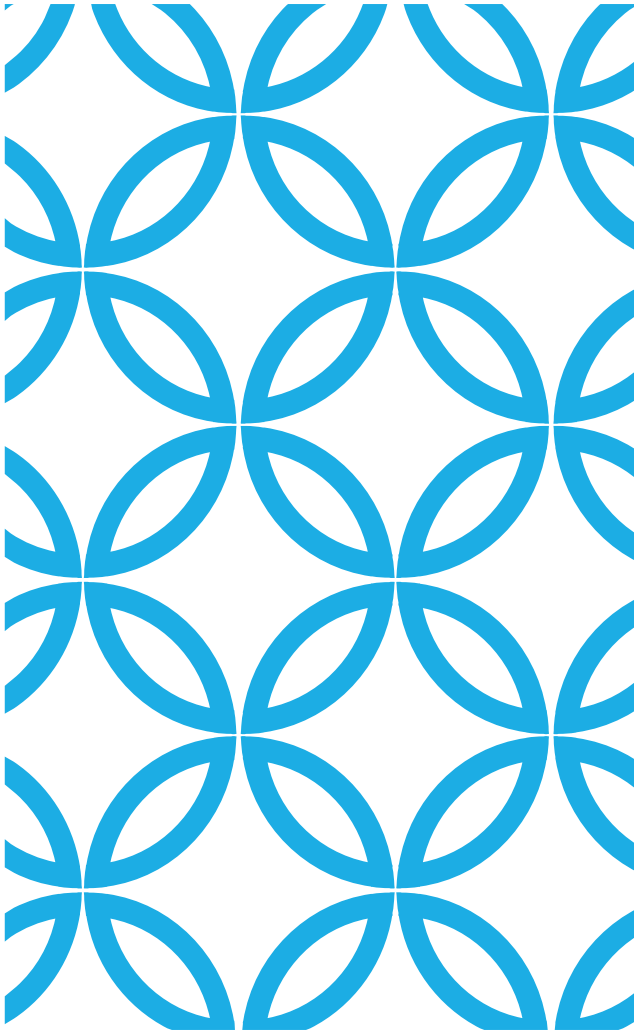
TECHNICAL LYCÉE – BILINGUAL STUDIES

Graduate careers

- Administrative work in various sectors
- Technical work in chemical production
- University studies: natural sciences, technical chemistry, economics, management

Professional development

- Erasmus+ international traineeships
- Professional practice in administrative activities in various sectors, chemical laboratories and companies



STATE AND SCHOOL EDUCATIONAL PROGRAMMES

STATE EDUCATIONAL PROGRAM

State educational program - Group of professional disciplines *28 Technical and applied chemistry*

Appendixs to the State educational program

Website: https://siov.sk/en/vzdelavanie/odborne-vzdelavanie-a-priprava/skupina-odborov-28/

State educational program - Group of professional disciplines *39 Special technical disciplines*

Appendixs to the State educational program

Website: https://siov.sk/en/vzdelavanie/odborne-vzdelavanie-a-priprava/skupina-odborov-39/

Google Drive: https://drive.google.com/drive/folders/1tULs1eTnBEd5x2XBR5ZUz6JlswgHhiNj?usp=sharing

GENERAL VS PROFESSIONAL EDUCATION

State educational program – Group of professional disciplines *28 Technical and applied chemistry*

General education: 50 (minimum)

Professional education: 68 (minimum)

Applicable lessons: 14

State educational program – Group of professional disciplines *39 Special technical disciplines*

Study program is in experimental testing from 1.9.2021 to 30.6.2026

General education: 86

Professional education: 58

Applicable lessons: 21

PROFESSIONAL EDUCATION – AREAS OF LEARNING

State educational program – Group of professional disciplines *28 Technical and applied chemistry*

State educational program – Group of professional disciplines *39 Special technical disciplines*

CONTENT STANDARDS AND PERFORMANCE STANDARDS

Content standards – Group of professional disciplines *28 Technical and applied chemistry* + *Biotechnology and pharmacology*

State educational program – Group of professional disciplines *39 Special technical disciplines* + *Technical lycée*

DISCUSSION

What is the ratio of lesons of

- general education and professional education,
- theoretical and practical professional education

in your chemistry or pharmaceutical related study programs?

In case of Grammar school, how many laboratory exercises do you have in a chemistry subject curriculum?

MATERIAL, TECHNICAL AND SPATIAL STANDARDS

Specify the **requirements for basic teaching spaces** and the **requirements for basic equipment** of teaching spaces for theoretical teaching and practical teaching.

Includes **recommended teaching spaces** and **recommended material and equipment** (their purpose is to ensure a higher quality of the teaching process in relation to the requirements of the labour market in a given field).

A school or employer may also meet the standard by **using space, material and equipment owned by another individual or legal entity** with which the school or employer has signed a written agreement on cooperation

They are **compulsory** for a given field of study or training, in particular raw materials, consumables, small inventories, etc., which the school or employer must have at its disposal.

MATERIAL, TECHNICAL AND SPATIAL STANDARDS

Material, technical and spatial standards – Group of professional disciplines *28 Technical and applied chemistry* + *Biotechnology and pharmacology*

Material, technical and spatial standards – Group of professional disciplines *39 Special technical disciplines* + *Technical lycée*

DISCUSSION

Are the material, technical and spatial standards for practical education in BiH similar?

What are the differences?

SCHOOL EDUCATIONAL PROGRAMME

Curriculum of all study programmes of SOŠCH

State educational programme of study program *Biotechnology and pharmacology*

DISCUSSION

Which subjects in your curriculum represent the:

- chemical and pharmaceutical fundamentals
- specialization

In case of Grammar school, which areas of chemistry are covered in Chemistry?

MANDATORY COURSES

Practical environmental training course

Chemical hazard management course

MANDATORY COURSES

Course: **Practical environmental training course**

The course is aimed at training the practical skills needed for field work related to monitoring, protection and management of the environment.

The school may organise the course on a **stay** or **attendance** basis, in the **first** or **second** year of study.

The planned duration of the course is **28 hours**.

The student will receive a **certificate** of attendance indicating the skills practised.

MANDATORY COURSES

Course: **Chemical hazard management course**

The aim of the course is to provide students with the knowledge to be able to face the risks of using chemicals, to know their ecological impact, measures to prevent their uncontrolled penetration into the environment and work environment.

The content of the course consists of **theoretical** training and **practical** training with a total of **28 hours** of study, while pupils should complete a minimum of **14 hours** of exercises.

DISCUSSION

Do you have similar mandatory courses in BiH?

How many hours do these courses take?

SCHEDULE

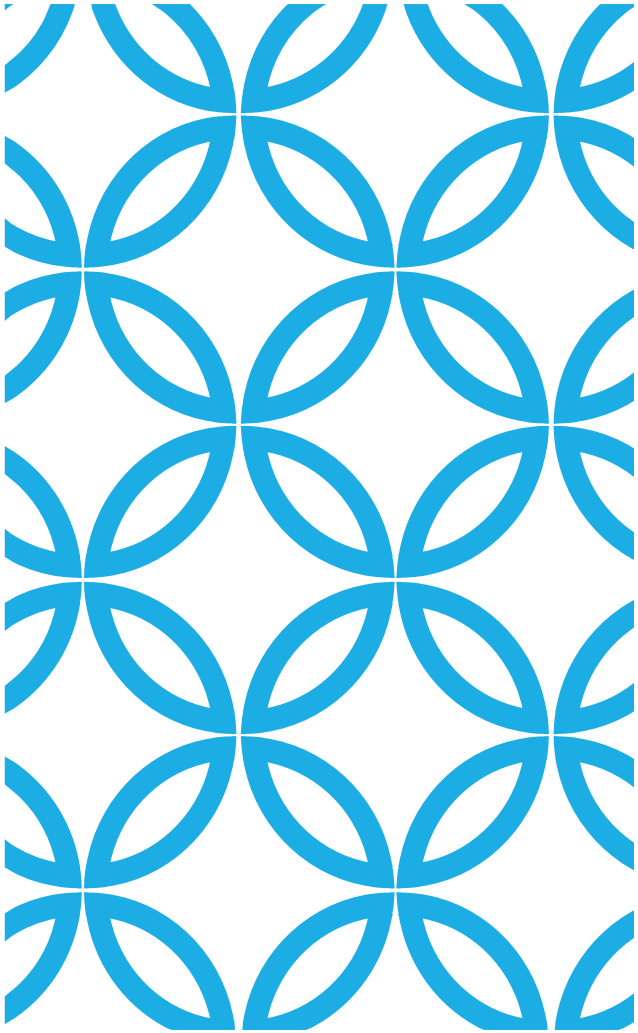
Usually ***7* lessons** per day (32 – 35 lessons per week)

45 minutes lessons

5 – 30 minutes break between the lessons

Classes start usually at **8:00** (sometimes at 7:10) and finish at **14:35** (sometimes at 15:15)

Multi-hour laboratory exercises (3 lessons) are usually combined into units without a break



SCHOOL-LEAVING EXAMINATION AND FINAL EXAM

SCHOOL-LEAVING EXAMINATION

School leaving exam - "**Maturita**"

School leaving exam comprises of 2 parts: External and Internal.

The external part and the written section of the internal part are prepared by the ***National Institute for Certified Educational Measurements (NUCEM).***

SCHOOL-LEAVING EXAMINATION

External part

- Slovak or Hungarian language,
- foreign language,
- mathematics (Grammar School only)

Internal part

- For national and foreign language, the internal part is split up into **written** and **oral sections**.
- The written section of the internal part is an essay in foreign or mother/native language. The essay topics are announced by NUCEM.
- The schools along with the regional school authorities provide oral section of the internal part of Maturita exam.

Levels of Maturita

Students get to select a level of matura for the foreign language.

- Level B1
- Level B2
- Level C1(Technical lycée)

FINAL EXAMINATION

The final examination verifies pupils' knowledge and skills through a **question/topic drawn by pupils**.

The final examination is comprised of a **theoretical** and **practical part**.

The final examination is organised by the **examination commission**. The examination commission members include the *chairman*, *vice-chairman*, and the *class teacher*.

The chairman and vice-chairman can be only those pedagogical employees who meet the qualification requirements to teach the respective subject. The examination commission chairman for the final examination cannot be appointed from pedagogical employees of the secondary school where the final examination is held.

Other commission members can include the *head of vocational training*, *teacher of theoretical vocational subjects* or *teacher of vocational practice*, and *examiner representing professional associations or employers*.

Schools must publish the final exam assignments **7 days before the oral examination**. The assignments are just the titles of the topics.

THEORETICAL PART OF FINAL EXAMINATION

The theoretical part of the final examination has **25 topics** (each with 3 sub-topics) and takes **30 minutes**.

Pupils have between **30 minutes** to prepare for the theoretical part.

The theoretical part of the final examination is in **May**.

PRACTICAL PART OF FINAL EXAMINATION

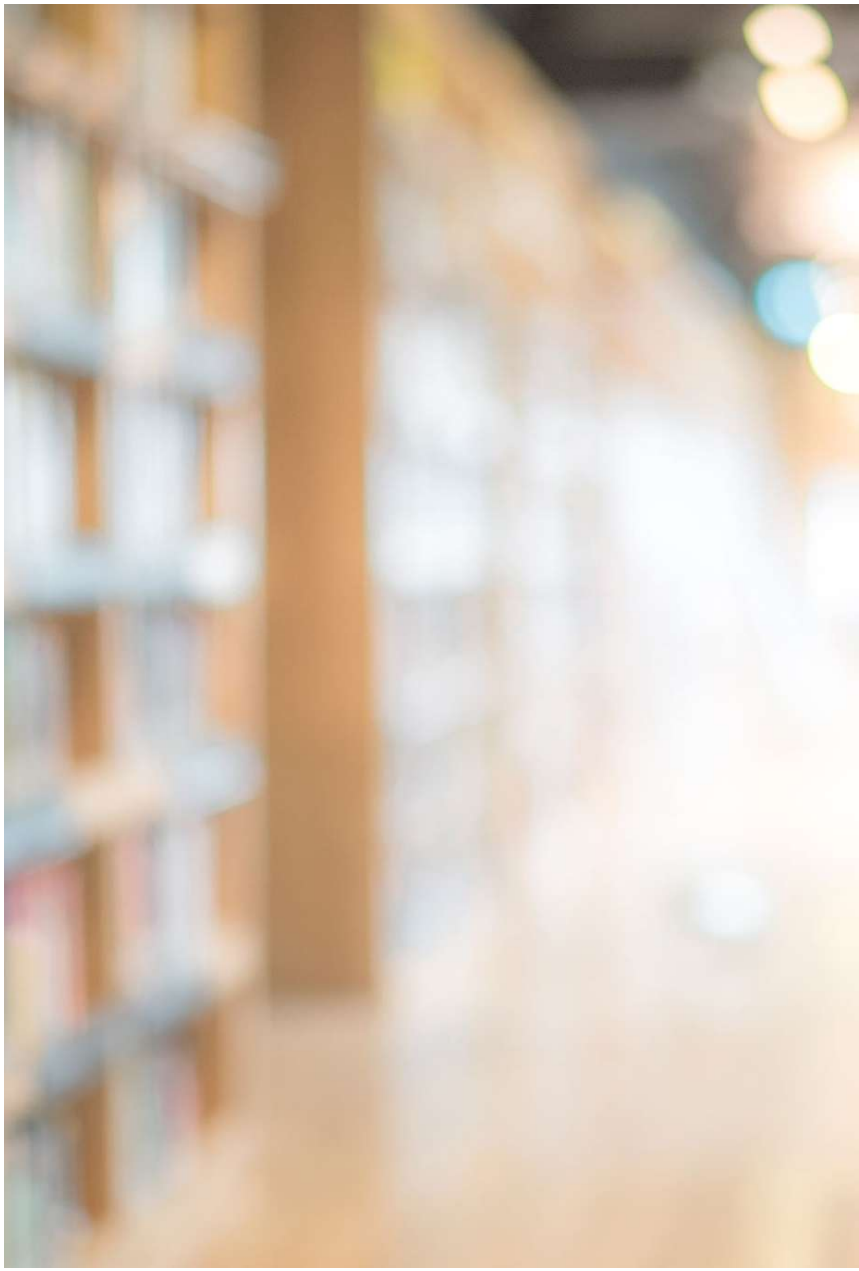
The practical part of the final examination is held before the theoretical part of the final examination – in **April**.

The practical part of the final examination

- is held in **chemical laboratory**
- of a dual education pupil is held at the **practical education workplace** (i.e at the employer's place where the pupil attended practical education).

With regard to the difficulty and specificities of the field of study, the practical part of the final examination has between **1 and 15 topics** that consider activities for the pursuit of which pupils are training.

The practical part takes **8 hours**.



PRACTICAL PART OF FINAL EXAMINATION

Topics for study program *Biotechnology and pharmacology*

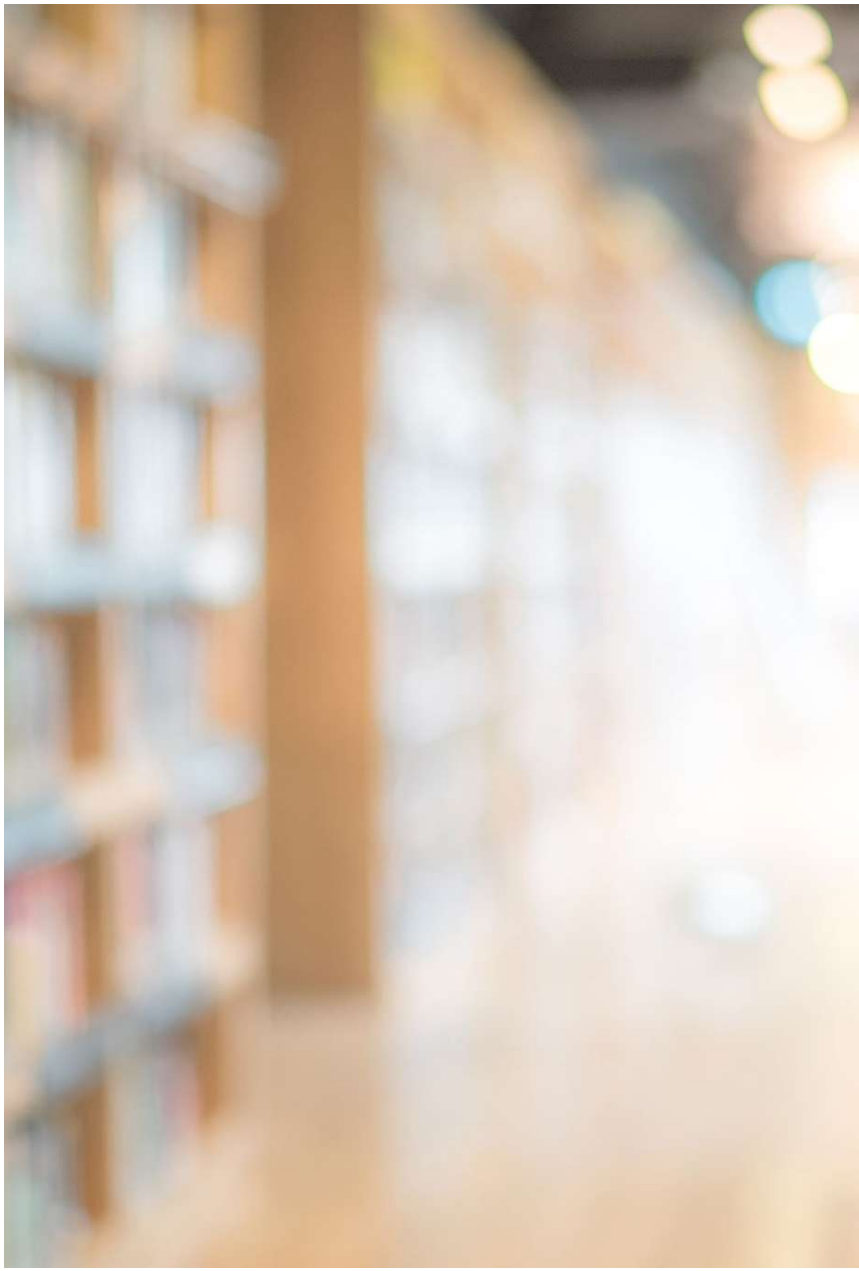
Fields of chemistry and biology included:

A basis common to all chemistry study prommes: Inorganic chemistry, Organic chemistry, Physical chemistry, Analytical chemistry, Biochemistry, Fundamentals of chemical technology

Specialized areas: Biotechnology, Microbiology, Pharmacology, Technology of dosage forms

Applied biology

Economics



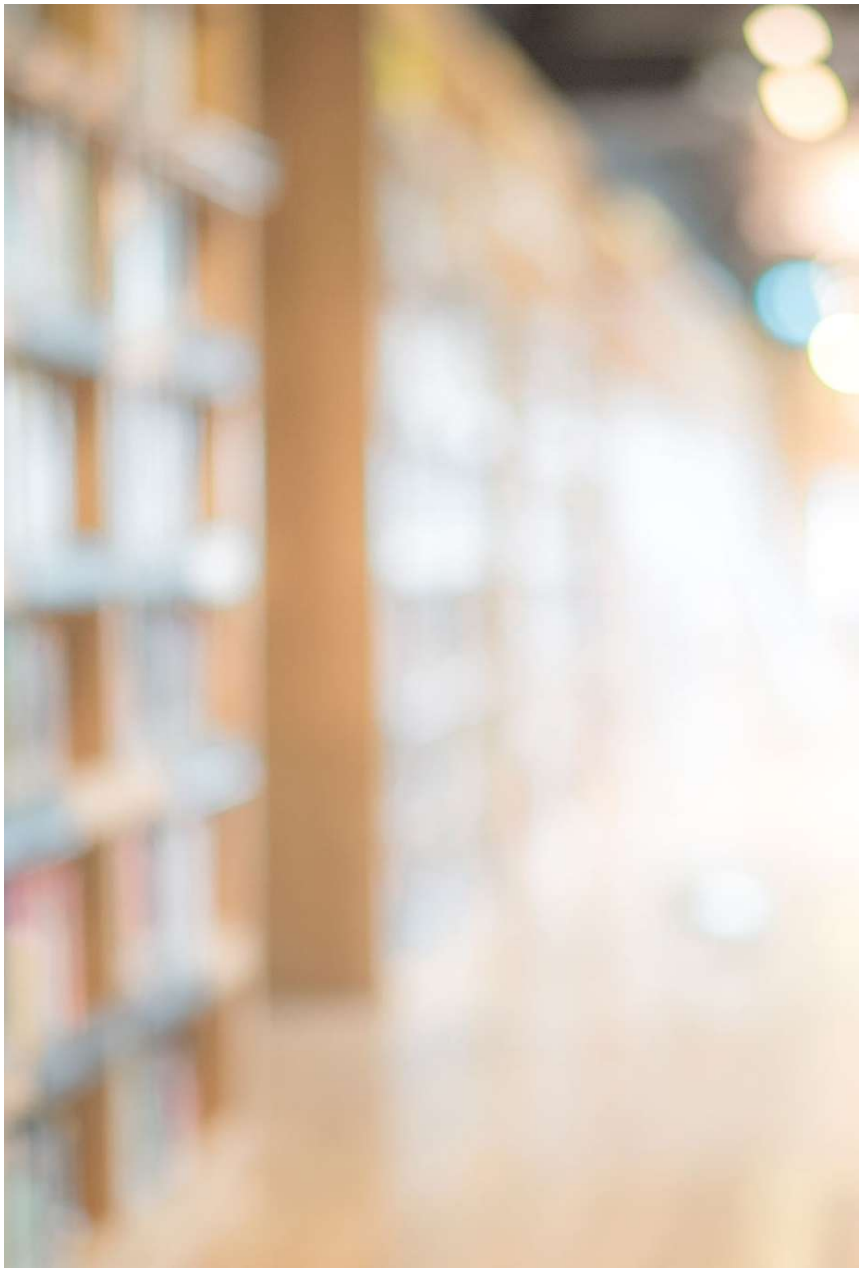
PRACTICAL PART OF FINAL EXAMINATION

Topics for study program *Biotechnology and pharmacology*

Sample: Biotechnology

Pharmaceutical biotechnology

- define the terms - antibiotic, antibiosis
- classify antibiotics
- characterise antibiotic resistance and explain its origin
- give the technological process for the production of lactam antibiotics
- give the principle of production of residual antibiotics



DISCUSSION

1. How is the school-leaving examination in secondary vocational schools and gymnasiums in Bosnia and Herzegovina conducted?
2. Are the theoretical and practical exam topics published?
3. How many topics does the theoretical part of the final exam have?
4. How long does the theoretical exam take?
5. What is the distribution of topics - fundamentals of chemistry and specialization on the theoretical exam? (Give an example how many topics represent 2 selected fields of chemistry.)
6. How many topics are there in the practical part of the final exam?
7. How long does the practical exam last?
8. Where does the practical part of the exam take place?

DEVELOPING KEY COMPETENCES IN PROFESSIONAL SUBJECTS

VOCATIONAL EDUCATION AND TRAINING

WAYS OF DEVELOPING KEY COMPETENCES IN VOCATIONAL SUBJECTS

Compulsory work experience at employers' workplaces

Professional projects

Promotional activities

Erasmus+ project

Specialised excursions

Expert lectures and discussions

PROFESSIONAL PROJECTS

Project School to school

Cooperation of 2 schools

Partner: Secondary Vocational School of Technology and Crafts in Bratislava (Stredná odborná škola technológií a remesiel, SOŠTaR)

School years: 2021/2022 - 2022/2023

SOŠCH: Students prepared cosmetic products: soaps, shampoos (solid, liquid), body lotions, creams.

SOŠTaR: Students painted rooms in the school, repaired small defects on the walls.

Budget: grant 800 EUR per school, 200 EUR cofinancing

SCHOOL TO SCHOOL

Preparation of cosmetics

VOCATIONAL EDUCATION AND TRAINING

SCHOOL TO SCHOOL

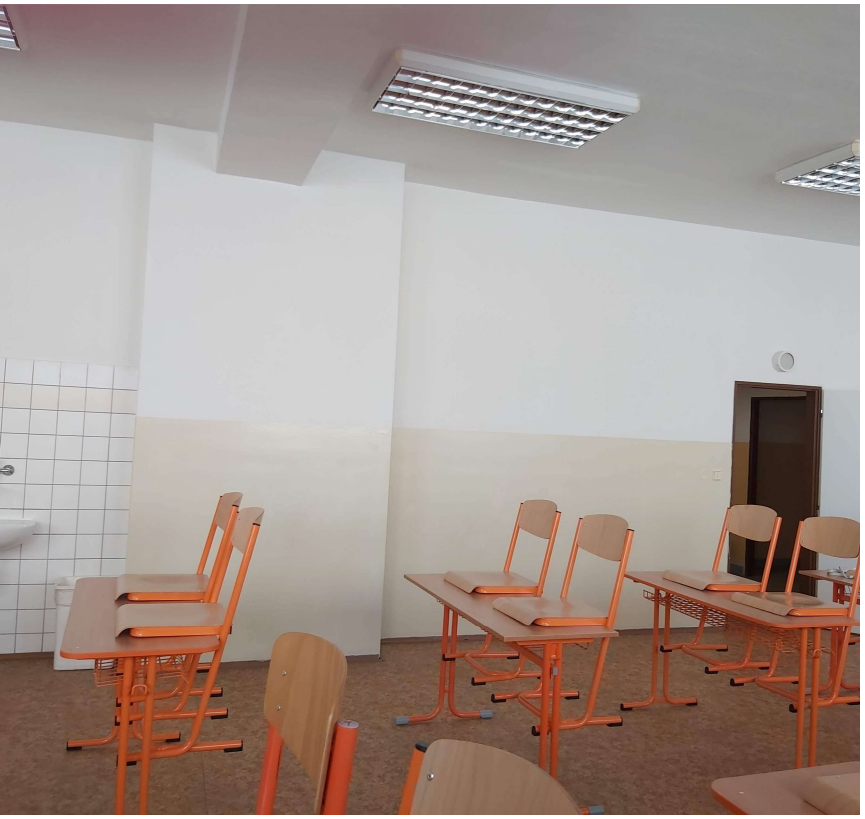
Ready and packed for use - for cleaning and protecting the skin of employees and pupils at SOŠTaR

VOCATIONAL EDUCATION AND TRAINING

SCHOOL TO SCHOOL

Hand disinfection according to WHO formula

VOCATIONAL EDUCATION AND TRAINING



SCHOOL TO SCHOOL

Painted classrooms

VOCATIONAL EDUCATION AND TRAINING

WAYS OF DEVELOPING KEY COMPETENCES IN VOCATIONAL SUBJECTS

The following topics will be discussed in related parts of the programme:

- Compulsory work experience at employers' workplaces
- Promotional activities
- Erasmus+ project

DISCUSSION

Have you implemented a project of mutual cooperation of vocational schools?

What professional projects developing key competences have you carried out?