Lifelong Learning
Erasmus
University of Ruse

Subsidiary
of the University of Ruse
in Razgrad

UNIVERSITY OF RUSE

SUBSIDIARY
OF THE UNIVERSITY OF RUSE
IN RAZGRAD

Erasmus ECTS
Information Package

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GENERAL INTRODUCTION

THE ECTS SYSTEM

The Information Package provides a description of the University of Ruse, of the Subsidiary of the University of Ruse in Razgrad and the courses offered by the Subsidiary in order to help prospective ECTS students to prepare their study period at this institution.

What is ECTS?

ECTS, **The European Community Course Credit Transfer System,** was developed by the Commission of the European Communities in order to provide common procedures to guarantee academic recognition of studies abroad. It provides a way of measuring and comparing learning achievements and transferring them from one institution to another. The European Commission promotes the system and the international cooperation between universities as a means of improving the quality of education bringing benefits both to students and higher education itself. In this respect, student exchange is the basic element in university cooperation. Recognition of education and diplomas is the necessary condition for establishing an open European higher education space where students and lecturers can "move" with no restriction.

ECTS provides **transparency** through the following means:

- **ECTS credits** which are a numerical value allocated to course units to describe the student workload required to complete them;
- **The Information Package** which supplies written information to students and staff on institutions, departments/faculties/subsidiaries, the organization and structure of studies and course units;
- **The Transcript of Records** which shows students' learning achievements in a way which is comprehensive, commonly understood and easily transferable from one institution to another;
- **The Learning Agreement** covering the programme of study to be taken and the ECTS credits to be awarded for their satisfactory completion, committing both home and host institutions, as well as the student.

The ECTS Credits

ECTS credits are allocated units to describe the **student workload** required to complete them. They reflect the **quantity** of work each course requires **in relation to** the total quantity of work required to complete a full year of academic study at the institution, i.e. lectures, practical work, seminars, self-study –in a library or at home- and exams or other assessment activities. ECTS credits express a **relative value**.

In ECTS, **60 credits** represent the workload of a year of study; normally **30 credits** are given for a semester and **20 credits** for a term. It is important that no special courses are set up for ECTS purposes, but that all ECTS courses are mainstream courses of the participating institutions, as followed by the home students under normal regulations.

Credits are awarded only when the course has been completed and all required examinations or other assessment activities have been successfully passed. Detailed information about disciplines (short description of course contents, teaching methods, types of assessment, etc.) is given in the information package of each degree programme.

ECTS Students

Students participating in ECTS receive full credit for all academic work successfully carried out at any of the ECTS partner institutions. These credits are transferred to the home university and fully replace the annual/semester workload including exams and other forms of assessment. In this way students can study abroad for a certain period of time and when they come back, they are able to continue their education without any loss of semesters and exams. Some students may also decide to graduate from the host university, and permission for that is given by the academic authorities based upon the student's transcript of credit points and his/her performance at the home university.

DATA ABOUT BULGARIA

The Republic of Bulgaria is a country situated in South-East Europe. In the north it borders the Republic of Romania, in the east it ranges to the Black Sea, in the south it neighbours the Republic of Turkey and the Republic of Greece, and in the west it borders (Former Yugoslavian) Republic of Macedonia and Republic of Serbia.

Area: 110,993.6 sq km

Population: 7,262, 675

Capital city: Sofia

Official language: Bulgarian

Alphabet: Cyrillic

Religion: There is freedom of religious confessions. Traditional religion in the Republic of Bulgaria is Eastern Orthodox Christianity

National holiday: March 3, the Day of the Liberation of Bulgaria from Ottoman domination (1878)

Public (non-working) holidays:

3 March – Liberation Day (national holiday)

1 January – New Year

Easter (Resurrection of Christ) – two days (Easter Sunday and Easter Monday)

1 May – Labour Day (the Day of International Working Class Solidarity)

6 May - Day of Bravery and Bulgarian Army, Gergyovden (St. George's Day)

24 May – Day of Bulgarian Education and Culture, and of the Slavonic Alphabet

6 September - Unification Day

22 September - Independence Day

1 November – Day of the National Revival Leaders

24 December – Christmas Eve

25 and 26 December - Christmas

Monetary unit: the Bulgarian Lev

Administrative division: 28 regions, named after their respective regional centres

State system: a parliamentary republic with a one-chamber parliament (National Assembly), consisting of 240 national representatives, elected for a four-year term of service. The head of state of the republic is the President, elected for a five-year term of service. The Council of Ministers is the main body of executive power.

Climate: moderate continental with Black Sea influence in the east and Mediterranean in the south

Waters: rivers (main rivers are the Danube, Maritsa, Mesta, Strouma, Iskar, and Yantra); warm and cold mineral springs (more than 600)

Transport: railway, automobile, air and water

International automobile sign: BG

International telephone code: +359 ……..

International telephone code for Ruse: +359 82 ……..

Official Symbols of Bulgaria

The national flag of the Republic of Bulgaria is in three colours: white, green and red bands, following horizontally from top to bottom.

A legend associates the origin of these three colours with the colour symbols of the Old Bulgarian Army. Its left wing was set apart by white strips on the spears, the right one by red, while arranged in the centre were the elite troops with a green strip, the traditional colour of the ruler. The three-colour flag had first been used by the First Bulgarian Legion of Georgi Rakovski (1861). By force of the Turnovo Constitution (1879), the three-colour flag - white, green and red, was confirmed as Bulgaria's national flag.

The coat-of-arms of the Republic of Bulgaria is a rampant gold crowned lion against a dark-red background in the form of a shield. Above the shield there is a big crown, whose original shape was that of the crowns of medieval Bulgarian rulers, with five crosses and one other cross, separately, over the crown itself. The shield is supported by two golden crowned rampant lions, facing the shield from the left and right heraldic side. They are standing on two crossed oak tree twigs with acorns. Inscribed in golden letters onto a white strip with a three-colour edging, placed under the shield across the ends of the oak twigs, is ***Union is Strength***.

The Bulgarian Landmarks in the UNESCO List of the World Natural and Cultural Heritage

Kazanluk Tomb
A Thracian tomb, dated to the late 4th-early 3rdcentury B.C. The murals in the burial chamber and in the corridor are of exclusive artistic value. The tomb is located in the Tyulbeto Hill near the town of Kazanluk.

Ivanovo Rock Churches
A rock monastery compound of the Holy Archangel Michael, with partially preserved churches. The murals in the Church of the Holy Virgin have been described as some of the most significant achievements of 14th century Bulgarian medieval art. The churches are located about 20 km away from the city of Ruse, east of the village of Ivanovo, in the rocks of the Rusenski Lom Nature Park.

Boyana Church
It has unique murals from 1259, considered among the masterpieces of medieval European painting. It is at a distance of about 8 km from the centre of the city of Sofia (in the Boyana residential district), in the foothills of Mount Vitosha.

Madara Horseman
A rock relief, cut into the Madara rocks on the northern slope of the Provadiisko Plateau at a height of 23 m. This is the most significant monumental piece of art from the early Middle Ages, unique of its kind in European cultural history. It is close to the village of Madara, about 16 km away from the city of Shumen.

Rila Monastery
The most impressive monastery compound in Bulgaria of exceptional architectural and artistic merits. Founded in the 10th century, rebuilt in the 13th-14th century, a literary centre in the 15th century and completed in its present-day striking appearance during the 19thcentury. A spiritual centre of the Bulgarian people, it is located in the northwest part of the Rila Mountain, about 20 km from the town of Rila and about 120 km from Sofia.

Nessebur, the old part of the town
An architectural, historical and archaeological reserve at the Black Sea coast with valuable archaeological relics from different periods, original churches from the 5th to the 17th century and authentic National Revival Period houses.

Sveshtari Tomb
A Thracian tomb from the first half of the 3rd century B.C. The central burial chamber has exceptionally lavish decoration and impressive caryatides in high relief. It is located close to the village of Sveshtari, 7 km northwest of the town of Isperih.

Sreburna Reserve
A biosphere reserve in the valley of the Danube, including the Sreburna Lake and its surroundings. It has been established for the preservation of rare plant and animal species. It is 16 km west of the town of Silistra.

Pirin National Park
It is part of the scenic Pirin Mountain. Located in the high parts of the Northern Mount Pirin, it is characterized by a specific relief and an inimitable plant and animal world. It also incorporates the Bayuvi Dupki - Dzhindzhiritsa Biosphere Reserve and the Yulen Reserve.

INFORMATION
ON
THE CITY
AND
THE UNIVERSITY

THE CITY OF RUSE

Welcome to Ruse

" ... All that I experienced afterwards had already been in Roustchouk"
Elias Canetti

Ruse is the biggest Bulgarian port town on the bank of the river Danube. After the opening of the Rhein - Main - Danube canal which covers 3,500 km and connects thirteen European countries with the Near and Far East via the Black Sea, the river becomes the longest inland waterway on the planet.

This key position has determined the nineteen century long co-existence of town, river, and people, carrying the unique atmosphere of history as a precious heritage, and of future as an open road full of promises. The Romans were the first to build the fort which they called Sexaginta Prista (the port of sixty ships). Then came others, from Europe, leaving their indelible imprint in this intersection of material and spiritual culture, followed by the imbued with the zeal of drive and enterprise Bulgarians, who gradually turned the place into a centre of the Bulgarian national revival. The very name Ruse became a synonym of economic growth and cultural rebirth.

The nineteenth century saw here the opening of the first Bulgarian printing house, the first model farm, the first Bulgarian railroad connecting Ruse with Varna, the first Bulgarian weather service, the first technical school and technical society, the first professional teachers' club, the first insurance agency, the first chamber of commerce and industry, the first inland navigation service on the Danube, the first teletel, the first moving picture show, the first Bulgarian newspaper, the first geography map.

New industries sprang up, banks and trade agencies were founded and European shipping agencies, as well as 17 foreign consulates were established. A large number of Bulgarian, Austrian, Italian, and Swiss men of arts created the wealth of architectural forms and styles characteristic of the period in Europe: Neoclassicism, Neo-baroque, Neo-gothic style, Art Nouveau, and Fin du siecle.

The town hosted a vast variety of multinational ethnic groups, which the Nobel writer Elias Canetti defined as a microcosmos of two dozen nationalities. French, German, Italian, Jewish, Armenian, Turkish, and other schools, boarding houses and churches, reading clubs, theatres and music halls, museums and bookshops, opened their doors to help diversify the cultural life of the city in its steady march towards enlightenment. In this completed picture of social life, today the town is still rediscovering its true face, spanning a bridge across cultures in the new context of integrated Europe.

THE UNIVERSITY OF RUSE

On **12 November 1945** the first out-of-capital higher education institution was founded in Ruse. Its three departments were specialized in Engineering for the purposes of the agricultural sector. On **13 June 1966**, as a result of its intensive growth, the Minister of Education issued an Order No. 2583 to set up a Higher Institute of Mechanical Engineering, Mechanization and Electrification of Agriculture. On **9 April 1981,** due to the widened scope of its engineering provision, including the sectors of transport, electronics and computing, it was transformed into 'Angel Kanchev' Technical University by a Decree No. 584 of the Council of Ministers. On **1 August 1995** a Decision of the National Assembly was made to establish "Angel Kanchev" University of Ruse, thus recognizing its academic expertise not only in the engineering fields, but also in natural sciences, education, law, public health and healthcare, business and management, which were introduced as a response to the societal changes.

Its mission and goals are based on commitments for:

Quality assurance of all its degree programmes

Excellence in fundamental and applied research

Internationalization of staff and student communities

National leadership in the European Union exchange programmes

Constant widening of lifelong learning opportunities

Building successful lives and careers for students and graduates

Proactive and reactive approach to societal needs and business demands

Attractive and creative environment for personal development

ACADEMIC CALENDAR

The academic year at the University of Ruse starts in September and is divided into two semesters – Fall and Spring. Each semester consists of:

- 15 weeks of classes;
- 4 weeks of regular examination session;
- 1 week for supplementary examination and 1 vacation week after the fall semester;
- Summer holidays (4-8 weeks) start after the end of the examination session and last till the beginning of the new academic year or till the beginning of the annual supplementary examination session in September for those students who have to resit exams left from the previous year.

The organisation of the training process is realised in the framework of the *Academic Calendar*, which is adopted each year by a resolution of the University's Academic Council.

BUSINESS CARD of the University of Ruse (UR)

Name of higher education institution	**"Angel Kanchev" University of Ruse**
Type of higher education institution	**State University**
Location and address	**8, Studentska Street, Ruse 7017, Bulgaria**

Rector Prof. Hristo Beloev, MEng, PhD

Number of students for the academic year 2008-09: 9200

Number of international students: 487 from **17** countries

Number of PhD students for the period 2000-2008: 270

Full-time personnel: 709

of which faculty **450**

full and associate professors **203**

Number of degree programmes offered:

41 in **6** of the **10** major fields of study (education, humanities, economics and management, mathematics and natural sciences, health care, engineering and technology)

The University of Ruse is the only university in the present and former Ruse region (with a population of approximately 1 million), which complies with the international index "one higher education institution per one million people".

The University of Ruse ranks 13th among the largest higher education institutions comparing indexes, such as: number of state-approved vacancies for admission, overall number of students, number of doctoral study students, size of state subsidy, applicants versus approved vacancies ratio, etc.

The University of Ruse is the only Bulgarian higher education institution, which is a regular member of the European Association of the Universities from the Danube Countries.

The University of Ruse was accredited on 26th January 2006 by the National Evaluation and Accreditation Agency for a six–year period with the highest grade – "very good".

International collaboration and admission of foreign students

International collaboration

The University of Ruse develops its international cooperation through:

- Participation in the scientific EC programmes NATO, SIXTH and SEVENTH FRAMEWORK PROGRAMMEs, PHARE
- Participation in the academic programmes CEEPUS, ERASMUS, LEONARDO DA VINCI, COMENIUS
- Participation in bilateral collaboration with traditional and new partners

The University of Ruse is one of the first Bulgarian universities which got involved in the ERASMUS programme. There are 80 Bilateral agreements signed with 24 European countries. At least 70 undergraduate, post-graduate and PhD-students are annually involved in all EU exchange programmes. The University of Ruse is the only university in Bulgaria which coordinates three thematic networks of about 70 participants each. It has contributed to the establishment of the first cross-border higher education centre in SEE – Bulgarian-Romanian Interuniversity Europe Centre (BRIE), which has been accredited in Germany and in Romania.

Admission of foreign students

Terms of study:

- ***For a Bachelor's degree*** - 4 years;
- ***For a Master's degree*** – 1 or 1,5 years following a Bachelor's degree programme;
- ***For a Doctoral degree*** – a minimum of 3 years

Degree programmes at the University of Ruse

Faculty of Agricultural and Industrial Engineering:

- Agricultural Machinery and Technologies
- Ecology and Environmental Protection
- Industrial Design
- Hydraulic and Pneumatic Equipment
- Agricultural Engineering
- Equipment Maintenance and Management

Faculty of Mechanical and Manufacturing Engineering:

- Machine Building Equipment and Technologies
- Computer-aided Design in Manufacturing Engineering
- Industrial Engineering
- Materials Science and Engineering

Faculty of Electrical Engineering, Electronic and Automation:

- Electrical Power Engineering
- Electronics
- Automatics, Information and Control Engineering
- Computer Systems and Technologies
- Communications and Communications Technologies

Faculty of Transport Engineering:

- Transport Engineering

- Transportation Technologies and Management

Faculty of Natural Sciences and Education:
- Mathematics and Informatics
- Informatics and Information Technologies
- Bulgarian Language and History
- Pre-school and Primary School Education
- Primary School Education and a Foreign Language

Faculty of Business and Management:
- Marketing
- International Economic Relations
- European Studies
- Business Administration
- Industrial Management

Bulgarian-Romanian Interuniversity Europe Centre (BRIE):
- European Studies (in German and English)
- European Public Administration (in English)

Faculty of Law:
- Law

Public Health and Health Care:
- Kinesitherapy
- Occupational Therapy

Silistra Branch:
- Bulgarian Language and Foreign Language
- Physics and Informatics
- Transportation Technologies and Management
- Electrical Power Engineering
- Automatics, Information and Control Engineering

Razgrad Branch:
- Biotechnologies
- Chemical Technologies
- Food Processing Technologies.

Other University Units and Services

- Quality of Education and Accreditation Directorate
- Public Relations Directorate
- Foreign Students Directorate
- Student Admissions and University Registrar
- Scientific Research Sector
- University Computing and Information Services Center (UCISC)
- Center for Distance Learning
- Center for European Integration, International Cooperation and Mobility
- Center for Continuing Education
- Center for Career Development
- University Library

The language of instruction for students in Bachelor and Master Degrees is Bulgarian.
For international students, who wish to study at the University of Ruse under the ERASMUS programme, selected courses are offered in English. The list of these courses can be found on the university WEB site.

Application Procedures

General Conditions and Documents for Admission of Foreign Students

Foreigners, who hold a higher school diploma, giving them access to universities in the country issuing this diploma, are eligible for admittance into the University of Ruse.

Preparatory Training

During the first year of their studies foreign students study Bulgarian in a 10-month intensive course. The course is organised by the Foreign Students Department.

Tuition Fees

Foreign citizens, studying at RU, pay tuition fees. The fees are paid in two installments: at the beginning of the academic year and at the beginning of the second (Spring) semester.

For sending applications and for more detailed information foreign applicants can address:

Foreign Students Department
University of Ruse
8 Studentska Street
7017 Ruse
Bulgaria
tel: +359 82 888 281
e-mail: chs@ru.acad.bg

Conditions and documents for admission of foreign students under Programmes of the European Union

Application, admission and forms of training of foreign students under different programmes of the European Union are settled in compliance with the individual bilateral or international agreements. For sending application forms under ERASMUS and for more detailed information foreign applicants can address the Centre for European Integration and International Cooperation:

Centre for European Integration, International Cooperation and Mobility
University of Ruse
8 Studentska Str.
Ruse 7017
Bulgaria
tel/fax: +359 82 888 650
e-mail: cicm@ru.acad.bg

The Application form can be obtained at:
http://cicm.ru.acad.bg/

General Information

Visa Requirements

According to the Law for Foreigners' Stay in the Republic of Bulgaria, each foreigner may enter the country with a valid passport (or other ID document) and an entry visa for Bulgaria. Entry visas are issued in all Embassies or Consulates of Bulgaria abroad. *No visas are required* for citizens of the countries of the European Union and of a number of other countries as well. On arrival in Bulgaria every foreigner, if not accommodated in a hotel, should, within 24 hours, register his/her address with the Passport Service for Foreigners. Foreigners who are admitted as students at the University of Ruse should present their

documents for admission issued by the University. This will allow them to get permission for longer stay in the country after their entry visas expire.

Traveling to Ruse

The distance from Ruse to Sofia (the capital of Bulgaria) is 315 km.

The distance from Ruse to Bucharest (the capital of Romania) is 60 km.

Travel to both capitals is by train and by bus.

There are also provisions for quick and easy transport to various parts of the city and other regions of the country.

After arriving at the University you are welcome to contact the office of the Vice Rector for International Relations and European Integration:

Living Expenses

The optimum amount of living expenses is connected with a balanced budget, including subsistence costs, accommodation costs, medical services, public transport, food and public services, tuition costs and other expenses. Minimum living costs are achieved through the use of the refectory and through modest expenses for transport and other public services. Under these conditions, the average living expenses amount to 150 – 250 Euro per month.

Accommodation and on-campus facilities

Accommodation can be found in several sectors:

In one of the many hotels in Ruse. The approximate price for a single room is about 40 – 80 Euro per night.

In one of the cheaper hotels. Offering less comfort, or in single rooms in hotel chains at prices about 15–25 Euro per night.

Renting a flat. The rent for such a flat (1 to 3 rooms) varies from 60 to 250 Euro per month depending on the degree of comfort, furniture and location. Rents exclude expenses for electricity, hot water, central heating and telephone, which may cost about 50–100 Euro per month.

The University of Ruse offers very good on-campus accommodation for 2400 students at rents of about 35 Euro per month. There are eight student hostels, two of which are for families.

The University of Ruse on-campus facilities offer excellent opportunities for study, research, recreation and sport. The student hostels, the refectory, the medical centre, the post office, the sports facilities and the student culture club are all situated on the campus, which is surrounded by green parkland and is within easy reach of the city parks, the river Danube and the city centre.

The University of Ruse offers on-campus sports facilities for volleyball, basketball, table tennis, bodybuilding, football, field and track events and other sports. The sports teams and clubs for football, athletics, volleyball, basketball, handball, aerobics and calisthenics are the responsibility of qualified teachers, which explains why they often win first prizes at various competitions.

There is a variety of amateur clubs, forming the Student Cultural Club Society, which was established in 1954. Examples are the Folk Dance Society, the Artists Club, the Pantomime Studio, the Drama Society, the Photographer's club, the Literature Club, the Modern Dance Society, and the folk dance theatre. Their guidance is entrusted to distinguished performers, artists and musicians.

The Tourist Society ACADEMIC unites a variety of clubs: for mountain climbing, water sports, skiing, cycling, rock climbing, mountaineering, speleology and cross-country walking. They attract large numbers of students, faculty members and administrative staff, who can take holidays in the university resort centres on the Black Sea coast, in the Balkan mountains, or along the bank of the Danube.

Medical Services and Insurance

There are many clinics, hospitals and private medical offices where you may ask for qualified medical help paying cash at quite reasonable rates. You may also get medical insurance in one of the numerous insurance companies in Bulgaria.

Other Useful Information

Public Transport: Trams, buses and trolley buses are the main public transport in Bulgaria. Tickets are sold at bus stations (bus stops), at newspaper stands or in some cases by drivers. Tickets should be perforated in the vehicle. There are also season travel cards for one day, one week or one month. The price of the ticket for public transport is 1.00 Lv. (about 0.50 Euro).

Taxi: There are many taxis in Ruse, provided mostly by private firms. Information about the firm and charge rates (day and night) can be seen on stickers on the front or rear windows of the car. Charge rates for 1 kilometre are between 0.70 and 0.90 Lv. (about 0.35–0.45 Euro).

Money Exchange: Popular currencies in Bulgaria are the USD and EURO. Open hours of the banks are usually between 9.00 a.m. and 4.00 p.m. There are also a lot of foreign exchange offices.

Food Stores. Restaurants: All food stores work usually till 7.00 or 8.00 p.m., but there are also 24-hour open stores and stores that work on Saturdays and Sundays. Most foodstuffs, vegetables and fruit are sold at prices, similar to those in Western Europe. Restaurants offer highly varied prices depending on their category. In some small and inexpensive restaurants the price of a meal is about 10 Euro.

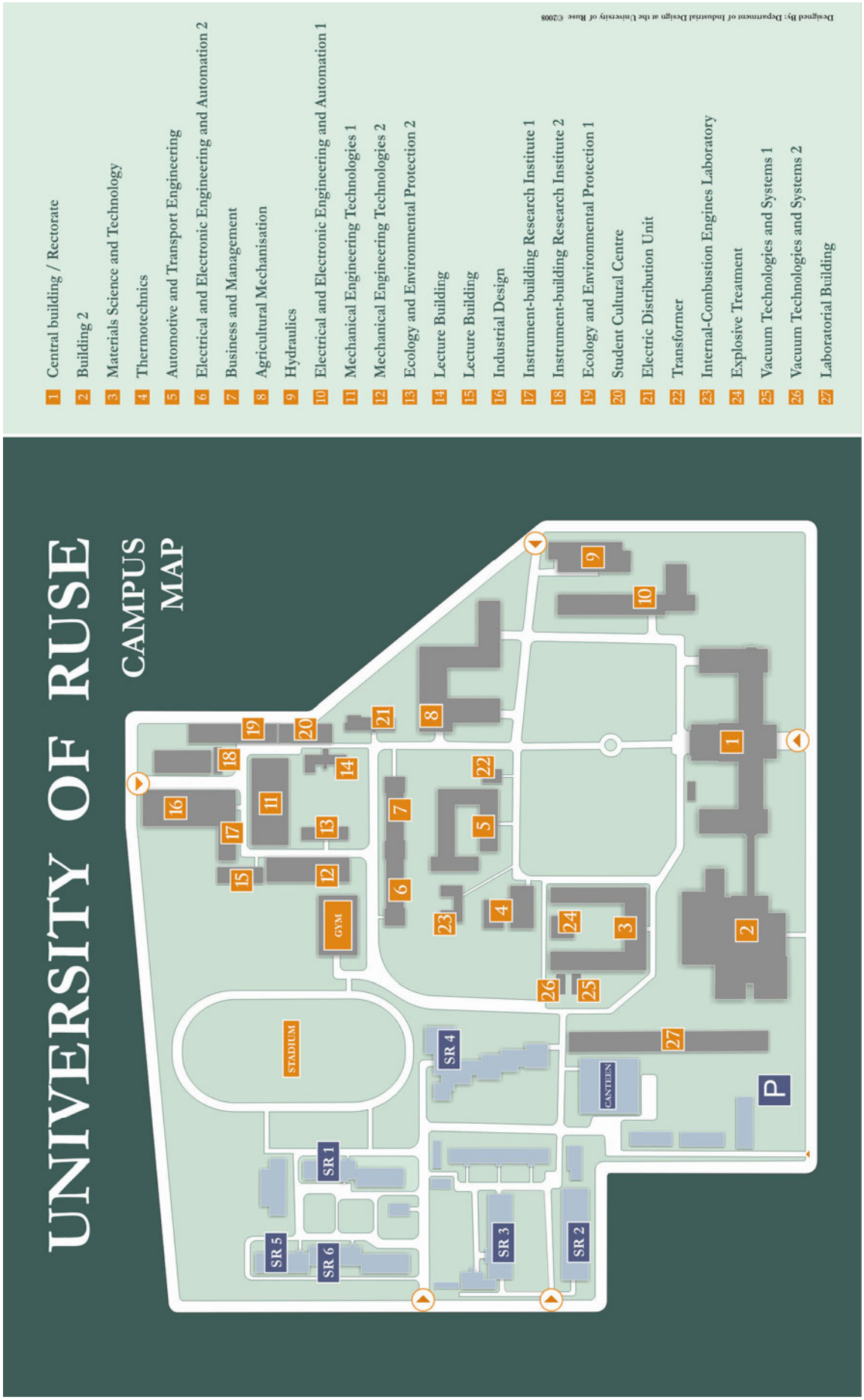
Phone Services: Street phones can be used with a phone card (either "Bulfon" or "Betkom"). Phone cards are available at post offices, stations of the public transport or news-stands. For international calls you may use the above phone cards or phones in post offices. There are 3 large mobile network operators on the territory of Bulgaria and these are M-Tel, GloBul and Vivatel.

Book Shops and Photocopying Services: Copy services, books, textbooks, manuals and other training aids are offered in the University bookshop and stationery shop.

Student Organisations

The Student Council is a body which protects the interests of the students. It is elected by full-time bachelor, master and doctoral students and includes student representatives in the General Assembly of the University. The Student Council at the University of Ruse maintains an information centre, located on the first floor of the Central Building.

Campus Map of the University of Ruse



INFORMATION
ON
THE SUBSIDIARY
OF
THE UNIVERSITY OF RUSE
IN RAZGRAD

Subsidiary of the University of Ruse in Razgrad

Teaching students in Razgrad started in 1986 when a Technical School for Biotechnology was founded with a Decree № 24 of the Council of Ministers. The school was a vocational one and its main objective was to train students who had completed their secondary education. It was also affiliated to the University of Chemical Technology and Metallurgy – Sofia. In 1989 with a Decree of the Council of Ministers № 52 the school was renamed and became an Institute of Chemical Technologies and Biotechnology which was also affiliated to the University of Chemical Technology and Metallurgy – Sofia. A Decree of the Council of Ministers, № 16 from 21.01.1997 transformed the Institute into a Technological College within the structure of Ruse University "Angel Kanchev".
On 08.02.2008 with a Decree № 17 of the Council of Ministers the Technological College became a Subsidiary of Ruse University and since then it has offered degree courses in the professional fields 5.10 Chemical Technologies, 5.11 Biotechnology, 5.12 Food Technologies.

The Subsidiary in Razgrad is the only Higher School of Education in North Bulgaria which prepares and qualifies specialists with contemporary professional knowledge for the needs of the biotechnological, food-processing, and chemical industries.
120 full – time students are trained in the course programs 5.10.1 Chemical Technologies, 5.11.1 Biotechnology and 5.12.1 Food Technology. The students who complete their studies receive an educational degree **"Bachelor"** and a professional qualification Engineer in the respective field. Students can continue their studies and receive a Master's degree.
The teaching in the Subsidiary in Razgrad is done at modern lecture halls, seminar rooms and research laboratories. The academic staff is highly qualified and the lectured material they teach meets all national requirements for high standards of education. The students acquire knowledge and skills about the application of new chemical, physiochemical, biochemical, and microbiological methods for analysis of raw materials, products and finished goods. Students have practical seminars both in the Subsidiary and in companies or factories from the region with which the Subsidiary has signed contracts for long-term cooperation.
Two departments operate within the Subsidiary – "Biotechnology and Food Technologies" and "Chemistry and Chemical Technologies". The organization of the Subsidiary is managed through the decisions taken by the General Meeting and the Council of the Subsidiary. The management bodies of the Subsidiary are the Subsidiary Assembly, the Subsidiary Council, and the departments are managed by Departmental Councils and the Heads of departments**.** In the department of

"Biotechnology and Food Technologies" there are 9 pay-roll lecturers – 4 associate professors, 3 principal assistant professors, 2 senior assistant professors and 1 technical assistant. In the department of "Chemistry and Chemical Technologies' there are 9 pay-roll lecturers - 3 associate professors, 2 doctors, 4 principal assistant professors a 1 technical assistant.
Research work and the improvement of the professional qualification of academic staff is an important aspect of the work of the Subsidiary in Razgrad. 9 lecturers wrote and defended their Ph.D. theses in the Subsidiary and 7 became lecturers attained the academic rank of an associate professor. Every year the academic staff develops research projects that are funded by the Scientific Research Fund, form teams that solve theoretical and practical problems, and participate in various conferences.
The main research topics of the lecturers from the Subsidiary are in the fields of biologically active substances, organic synthesis, organic and inorganic chemical technologies, microbiology, biotechnology, enzyme studies, food technologies, aromatic products, ecology, mathematic modeling and management of the technological processes. The academic staff publishes regularly in respected specialized scientific journals and presents the findings of their research work at conferences in Bulgaria and abroad. Students can also participate in the research projects of their lecturers and work in collaboration with them to acquire additional knowledge and enhance their skills in particular fields.
The Subsidiary maintains contacts with a number of universities from Bulgaria - Sofia University "St. Kliment Ohridski", the University of Chemical Technology and Metallurgy – Sofia, Burgas University "Prof. Assen Zlatarov", University of Food Technology – Plovdiv, institutes within the Bulgarian Academy of Sciences – with which it works closely on various research projects and exchanges academic staff.
The Subsidiary has a wide range of information facilities it can offer to its academic staff and students. The library has a rich collection of books, textbooks, and specialized journals. It works according to the rules and regulations of the University library and is a member of the Common Library System in Bulgaria.
There are 2 computer labs in the Subsidiary which provide free Internet access. Work stations with computers for research and administration purposes are also provided.
There are also a student hostel, canteen and a café.
The academic and administrative staff at the Subsidiary in Razgrad work enthusiastically to provide high quality training to its students so that they can acquire knowledge and practical skills that will help them achieve professional realization by meeting the demands of society and market economy.

ECTS
Coordinators

ECTS Coordinator of the Subsidiary:

Assoc. Prof. Stanka Todorova Damyanova
tel.: + 359 84 611 012, e-mail: SDamianova@ru.acad.bg

Departmental ECTS Coordinators:

Department of Biotechnology and Food Technologies
Assoc. Prof. Nastya Vasileva Ivanova
tel.: + 359 84 611 012, e-mail: NIvanova@ru.acad.bg

Department of Chemistry and Chemical Technologies
Assoc. Prof. Neiko Marinov Stoyanov
tel.: + 359 84 611 016, e-mail: NStoianov@ru.acad.bg

DEPARTMENTS
IN
THE SUBSIDIARY
OF
THE UNIVERSITY OF RUSE
IN RAZGRAD

DEPARTMENT OF BIOTECHNOLOGY AND FOOD TECHNOLOGIES

BUSINESS CARD of the Department

The **Department of BIOTECHNOLOGY and FOOD TECHNOLOGIES** was created in 1999. It consists of 9 academic staff of which 4 are associate professors, 3 principal assistant professors, 2 senior lecturers and 1 supporting staff member.

The Department is accredited to teach students in two major areas **5.11 Biotechnology** and **5.12 Food Technology**, **BACHELOR** degree.

The Department carries out research in the following fields:

- Biologically active substances
- Enzymology
- Microbiology
- Essential oils
- Food products
- Simulation of processes

A variety of teaching methods is used to develop students' knowledge and skills. Teaching is focused around a lecture programme supported by seminars and the extensive use of practical laboratory classes. In addition, students have the opportunity to take an active part in research activities done in the department thus obtaining knowledge and skills in various fields. The Department is committed to the highest standards of teaching and research. It is the avowed goal of the Department to unlock the wealth of potential in its students and launch its graduates with an education and qualifications that allow them to take on the challenges of the future and lead fulfilling and rewarding careers.

The Biotechnology and Food Technology degree courses provide students with high value skills for many areas of research, food production and the expanding pharmaceutical and biotechnological sectors.

A range of well equipped modern laboratories are available for use by Biotechnology and Food Technologies students. Students are taught to apply modern chemical, physico-chemical, biochemical and microbiological

The Biotechnology degree course focuses on the basics of biotechnological production, enzyme-catalyst reactions, application of free enzymes and immobilized systems in technological processes, methods of isolation and preservation of pure cultures of microorganisms, technological equipment and machinery, automatic control of technological processes, contemporary methods of isolation, purification, separation and analysis of the composition and the quality of bioproducts and on recent developments in biotechnology. methods of analysis of raw materials and products and gain a wide range of laboratory – based skills and techniques which both provide the practical basis for their studies and a useful portfolio of employability skills.

The Food Technology degree course focuses on the basics and peculiarities of food technologies, canning and food refrigeration, technological equipment, contemporary methods of analysis of the quality of food and automatic control of processes.

DEPARTMENT OF CHEMISTRY AND CHEMICAL TECHNOLOGIES

BUSINESS CARD of the Department

The Department of Chemistry and Chemical Technologies was set up in 1991.

The Department has 9 regular staff members – 3 associate professors and 6 principal assistant professors, 2 of which hold the PhD degree.

The Department is accredited to teach students in the **BACHELOR** degree**.**

The Department carries out research in the following areas:

- Synthesis of biologically active substances based on cyclic 1-, 3-diketones.
- Obtaining complex compounds based on spirohidantoins and transition elements.
- Obtaining powders and coatings using the method of zol-gel technologies and their characteristic features.
- Obtaining selenites and selenides of d- and f- elements to be used as materials in semiconductors and optoelectronics.
- Analysis of corrosion deposits on steel in an organic medium.
- Concentration of minerals.
- Utilization of waste products in the chemical industry.
- Mathematical modelling of heat and mass exchange in thermal processing of products in the chemical industry.

Students can take an active part in the research carried out in the department thus acquiring useful skills in various areas. Members of staff participate in projects managed by the Scientific Research Fund in the University of Ruse as well as the National Science Fund. Staff is committed to the highest standards in teaching and research and curricula have been regularly updated and improved so that they comply with national and international standards.

Students can specialize in two major fields:

- Technology of silicate materials.
- Technology of pharmaceutical and cosmetic products and perfumes.

The department has modern, well-equipped laboratories that support the research and the undergraduate studies in it.
Students following The Chemical Technologies degree course gain profound

Students are offered the following courses:

Inorganic synthesis. Inorganic chemical technologies. Minerals as raw materials. Thermal processes and equipment in silicate technology. Thermal synthesis. Technology of ceramics. Technology of glass. Technology of inorganic binder substances. Inorganic pigments. Organic synthesis. Organic chemical technologies. Technology of pharmaceutical products. Technology of

knowledge and acquire a wide range of skills that they can apply in their future jobs. Graduates will be able to work in mineral processing and extractive metallurgy, in chemical companies and in companies that use chemicals.

aromatic products. Pest control. Technology of cosmetic products. Technology of surface active substances. Organic additives.

UNDERGRADUATE PROGRAMS

UNDERGRADUATE STUDIES IN BIOTECHNOLOGY

PROFESSIONAL STANDARDS
OF A BACHELOR IN

BIOTECHNOLOGY

Degree programme: **Biotechnology**
Educational Degree: **Bachelor**
Professional Qualification: **Engineer in Biotechnology**
Length of programme: **4 years (8 semesters)**

Field of Study: The **Biotechnology** degree programme aims at preparing highly qualified Bachelor of Engineering professionals whose skills and knowledge could be applied in a wide range of professional settings.

Professional Qualifications: The Bachelor of Engineering degree course is designed for students who seek comprehensive education in biotechnology and prepares professionals for scientific and practical work in the area. Graduates will be able to do research work, develop new products and manage production in companies that use biotechnology.

Bachelor of Engineering graduates will complete the programme acquiring a high level of theoretical and practical understanding of biotechnology, microbiology, ecology, engineering and management and marketing. Foreign language knowledge and understanding of the cultural peculiarities of doing business in a global setting are other assets to this programme.

The academic programme is built around the following cornerstones:

- **Professional preparation** - builds upon the foundations of chemistry, mathematics, physics, physical chemistry, basic processes and apparatuses, electrical engineering, IT, environmental science, and foreign languages.
- **Specialized preparation** - focuses on the basis and peculiarities of biotechnological production, the mechanism and kinetics of enzyme-catalyst reactions, the application of free enzymes and immobilized systems in technological processes, the methods of isolation and preservation of pure cultures of microorganisms, the technological equipment and machinery, the automatic control of technological processes, the contemporary methods of isolation, purification, separation and analysis of the composition and the quality of bioproducts and the use of service and production forms and records and technical documentation in general.

The Bachelor of **Biotechnology** graduates will be able to:

- Creatively apply their knowledge of biotechnology and continuously update it according to the emergence of new technologies and practices.
- Be competent IT users.
- Apply modern chemical, physicochemical, biochemical and microbiological methods of analysis to raw materials and finished products.
- Use up-to-date laboratory equipment.
- Systematically approach and implement up-to-date methods and new materials to reach optimal solutions to complex technological problems.
- Responsibly manage safety, implement wasteless technologies and uphold ecological standards.

Employment prospects: The applied nature of the course and the growing biotechnological sector should ensure good employment prospects for Biotechnology graduates. Career options include positions in biotech companies and research institutions. Good employment opportunities exist with small and medium-sized companies employing biotechnological methods.

CURRICULUM

of the degree course in

BIOTECHNOLOGY

First year

Code	*First semester*	*ECTS*	*Code*	*Second semester*	*ECTS*
0200	Mathematics part 1	5	0210	Informatics part 2	4
0201	Engineering Graphics	5	0211	Mathematics part 2	5
0202	Informatics part 1	6	0212	Physics	7
0203	Basic and inorganic chemistry	6	0213	Analytical chemistry	7
0204	Stoichiometric computations	3	0214	Organic chemistry	7
	Foreign language	5			
0205	English 1				
0206	German 1				
0207	French 1				
0208	Russian 1				
	Total Credits for the semester:	***30***		**Total Credits for the semester:**	***30***

Second year

Code	*Trird semester*	*ECTS*	*Code*	*Fourth semester*	*ECTS*
0216	Physical chemistry	6	0222	Microbiology	7
0217	Heat Engineering	6	0224	Biochemistry part 1	7
0218	Mechanics	6	0225	Processes and apparatuses part 1	8
0219	Colloidal chemistry	2	0226	Technical safety	3
0220	Electrical and Electronic Engineering	5	0227	Economics	5
0221	Machine elements	5			
	Total Credits for the semester:	***30***		**Total Credits for the semester:**	***30***

Work placement 2 credits

Third year

Code	*Fifth semester*	*ECTS*	*Code*	*Sixth semester*	*ECTS*
0228	Processes and apparatuses part 2	6	0252	Molecular biology	6
0229	Automation	6	0253	Low molecular biologically active substances	8
0230	Instrumental methods of analysis	4	0254	Enzymology	7
0251	Chemistry and technology of growth media of microorganisms	5	0255	Technology of foodstuffs and fermented products	6
0232	Refrigerating and drying engineering	3	0248	Marketing and management of a company	3
0233	Biochemistry part 2	6	0252	Molecular biology	6
	Total Credits for the semester:	***30***		**Total Credits for the semester:**	***30***

Industrial placement 2 credits

Fourth year

Code	*Seventh semester*	*ECTS*	*Code*	*Eighth semester*	*ECTS*
0256	Industrial microbiology	6	0261	Biotechnology of agrobiological products	5
0257	Technological equipment	7	0262	Standardization of bioproducts	4
0258	Technology of microbial protein products	6	0249	Industrial ecology	4
0259	Technology of antibiotics	8	0250	Reliability of machines	4
0260	Genetics	3		Self preparation for the Bachelor thesis	3
	Total Credits for the semester:	**30**		Bachelor thesis	10
				Total Credits for the semester:	**30**

Total for the training course of study: 240 ECTS credits

0200 Mathematics part 1

ECTS credits: 5
Weekly workload: 2lec+2sem+ca
Assessment: exam
Type of exam: written
Department involved:
Department of Algebra and Geometry
Faculty of Natural Sciences and Education
Lecturers:
Assoc. Prof. Ivanka Mitkova Jeleva, PhD, Subsidiary of the University of Ruse in Razgrad
E-mail: vzh@abv.bg
Abstract:
The course is a basic one in engineering education. It uses the mathematical knowledge from secondary school and extends it on a higher level. It is a prerequisite for the next level mathematical subjects, Physics, Mechanics, general and special engineering courses.
Course content:
Sets. Real and complex numbers. Systems of linear equations and determinants. Matrix theory and determinants. Linear systems. Polynomials. Vector space. Linear dependence and independence of families of vectors. Dot (scalar) product. Coordinate systems Cross (vector) product. Lines and planes. Second order curves and surfaces.
Teaching and assessment:
The theoretical basis of the topics presented at lectures is enhanced at seminars through solving problems; individual practicing and reinforcing is accomplished by weekly assignments. Two written tests are administered and students with grades above 4.50 are exempt from the exam and their mark is formed on the basis of an interview with the lecturer. Each student is required to do a course assignment. Its successful presentation at seminars and regular class attendance are a necessary prerequisite to have the semester validated.

0201 Engineering Graphics

ECTS credits: 5
Weekly workload: 1lec+0sem+0labs+3ps+ca
Assessment: continuous assessment
Type of exam: written
Department involved:
Department of Engeneering Drawing
Faculty of Automotive and Transport Engineering
Lecturers:
Assoc. Prof. Trifon Ivanov Trifonov, PhD, Department of Engeneering Drawing, tel.: 082 888437
Abstract:
Engineering graphics is a basic subject that studies design methods, standards and the rules of creating and using technical drawings, sketches and text documents. This subject is a base for further learning of other technical branches of science, especially when solving design problems and documenting them.
Course content:
Drawing of objects. Methods of orthographic and axonometric projection. Geometric modeling. View, cross section, front section. Documentation. Standards. Drawing a component. Documents that accompany technical drawings of an assembled unit.
Teaching and assessment:
The theory, presented at lectures by didactic means, provides the needed base for practical classes and course assignments. During the practical classes problems are solved, instructions are given, examples are considered. Each student is required to do a course assignment, which is submitted according to the lecturer's schedule. Two tests are administered. The final course mark is formed on the basis of the grades of the tests and the course assignment results. The requirements to have a term validated are regular class attendance and course assignment submission.

0202 Informatics part 1

ECTS credits: 6 **Weekly workload:** 2lec+0sem+0labs+3ps+ca
Assessment: exam **Type of exam:** written
Department involved:
Department of **Informatics** and Information Technologies
Faculty of Natural Science and Education.
Lecturers:
Assoc. Prof. Ivanka Mitkova Jeleva, PhD,E-mail: vzh@abv.bg
Abstract:
Informatics part 1 acquaints students with the computer as a technical means with its components and its arithmetic and logic basis. Basic algorithms are developed to enhance the logical thinking of students. Students are acquainted with PASCAL. Lectures comprise topics concerning the basic structures in algorithms: branching, loops and multiple choices. Various types of data are studied. The problems that students solve might be useful in their future jobs.
Course content:
History and classification of computers. Hardware. Operating systems. Application software. Number systems. Boolean algebra. Algorithms - basic concepts. Algorithms –branching, loops. Algorithms with one dimensional arrays. Structure of a program in PASCAL. Types of data in PASCAL. Input and output of data. Branch and multiple choice. Loop operators. Types of arrays. Work with arrays.
Teaching and assessment:
Lectures take place once a week. Practical classes are held in the computer laboratory under the supervision of an assistant professor .Practical classes start with an entry test or an oral quiz. Two tests are administered. Course assignments require students to work on their own, using the programming systems they have studied. Students are given marks for their course assignments as well. Students with an average grade exceeding 4.50 may be exempt from the written exam. The final grade is based on the mark of the exam and the average mark from the tests and the course assignments.

0203 Basic and inorganic chemistry

ECTS credits: 6 **Weekly workload:** 3lec+0sem+3labs+0ps+cp
Assessment: exam **Type of exam:** written
Department involved:
Department of Chemistry and Chemical Technology
Subsidiary of the Univrsity of Ruse in Razgrad
Lecturers:
Assoc. Prof. Miluvka Stancheva, MScEng, PhD, Department of Chemistry and Chemical Technology
Subsidiary of the Univrsity of Ruse in Razgrad, tel: 662 989,
Abstract:
Basic and inorganic chemistry deals with the theoretical basis of inorganic chemistry, the chemical processes and dispersion systems. Students are acquainted with the main chemical operations, the laboratory equipment and apparatuses and the basic rules concerning work in a chemical laboratory. Laboratory classes help students understand what they were taught at lectures and develop their skills so that they will be able to work in a chemical laboratory.
Course content:
Basic concepts and laws in chemistry. Structure of the atom. Rutherford planetary model. Contemporary theories about the structure of the atom. Structure of the nucleus. The Periodic law and The Periodic Table of the Chemical Elements. The Periodic Law and the structure of the atom. Recurring (periodic) chemical properties. Chemical bonding. Molecular orbital theory. Hydrogen bond. Valence and oxidation state. Dispersive systems. Types of dispersive systems. Characteristics of dissolution – heat effect. Solutions and electrolytes. Vapour pressure and temperature of boiling. Osmosis. The theory of electrolytic dissociation. Acidity of solutions. Neutralization and hydrolysis. Rough dispersions. Sorption.
Teaching and assessment:
Lectures deal with basic issues concerning the structure of the atom and chemical bonding, plain and complex substances and chemical processes. Visual aids such as posters, diagrams and overhead transparencies are used in lectures. Laboratory classes focus on developing skills to handle laboratory equipment, to master the basic operations in chemistry and learn about the properties of compounds. Students work in pairs.

0204 Stoichiometric computations

ECTS credits: 3
Weekly workload: 0lec+3sem+0ps+ca
Assessment: exam
Type of exam: written
Department involved:
Department of Chemistry and Chemical Technology
Subsidiary of the Univrsity of Ruse in Razgrad
Lecturers:
Assoc. Prof. Diana Vasileva Caneva, MScEng, PhD, Department of Materials & Manufacturing Engineering, tel: 082 888 307
Abstract:
Stoichiometric computations is in close connection with Basic and inorganic chemistry. It helps students acquire in-depth knowledge and link theory and practice.
Course content:
Basic concepts in chemistry. Laws in chemistry. Atomic-molecular theory. Symbols in chemistry. Chemical formulae. Nomenclature of inorganic compounds according to IUPAC. Basic computations in chemistry. Mass and mol parts as percentage. Composition of compounds. Defining the empirical and molecular formulae of compounds. Equivalent. The Law of equivalents.
Teaching and assessment:
Seminars comprise theory and solving stoichiometric problems. Three tests are administered. The final grade is based on the marks from the tests.

Foreign language
0205 English, 0206 German, 0207 French, 0208 Russian

ECTS credits: 5
Weekly workload: 0lec+0sem+0labs+4ps+ca
Assessment: continuous assessment
Type of exam: written and oral
Department involved:
Department of Foreign Languages
Faculty of Business and Management.
Lecturers:
Sr. Assist. Prof. Iliana Gancheva Benina, MA, Department of Foreign Languages,
E-mail: lbenina@ecs.ru.acad.bg
Sr. Assist. Prof. Tsvetelina Amdreeva Nedelcheva, MA, Department of Foreign Languages,
E-mail: tandreeva@ecs.ru.acad.bg
Sr. Assist. Prof. Tinka Angelova Karaivanova, MA, Department of Foreign Languages, tel.: 888 824,
E-mail: tkaraivanova@ecs.ru.acad.bg
Sr. Assist. Prof. Rumiana Ivanova Milanova, MA, Department of Foreign Languages,
E-mail: rmivanova@ecs.ru.acad.bg
Sr. Assist. Prof. Iliana Gancheva Benina, MA, Department of Foreign Languages,
E-mail: lbenina@ecs.ru.acad.bg
Sr. Assist. Prof. Katalina Peicheva Boqnowska, MA, Department of Biotechnology and food technology
Subsidiary of the University of Ruse in Razgrad, tel..: 084 620 090
Abstract:
The foreign language course is aimed at achieving communicative competence in the area of the subject specialist and the future job. The teaching objectives comprise the development of reading comprehension skills to handle specialist texts and the acquisition of communication skills to interact successfully in professional settings and everyday situations.
Course content:
Meetings and introductions, giving personal details, describing things and places, writing a CV. propositions, plans, comparisons, linking facts and ideas, searching for special information, reading strategies, applying for work
Teaching and assessment:
A wide range of authentic and specially constructed texts (i. e. articles, diagrams and tables, brochures, catalogues, manuals, etc.) as well as audio, video, and multimedia materials are used to acquire the necessary knowledge and skills in using the language as a means of communication. Students are offered lessons in computer laboratories, in which multimedia learning packages and on-line materials are used in line with the latest trends in foreign language teaching. The final grade is based on written tests and oral quizzes. An active and regular participation in the learning process is required for semester passing approval as well as course assignment submission and defense.

0210 Informatics part 2

ECTS credits: 4
Weekly workload: 1lec+0sem+0labs+3ps+ca
Assessment: continuous assessment
Type of exam: written
Department involved:
Department of **Informatics** and Information Technologies
Faculty of Natural Science and Education.
Lecturers:
Assoc. Prof. Ivanka Mitkova Jeleva, PhD, Subsidiary of the Univrsity of Ruse in Razgrad
E-mail: : vzh@abv.bg
Abstract:
Informatics part 2 aims at teaching students how to use the most widely spread programming systems Microsoft Windows, word processors – such as WORD and spreadsheets – EXCEL. This is meant to help the students do their course assignments and perform various tasks in their future jobs.
Course content:
The WINDOWS Operating System. Word processors. WORD. Spreadsheets. EXCEL.
Teaching and assessment:
Lectures give the theoretical basis and acquaint students with existing operating systems word processors and spreadsheets. The Microsoft products are studied in detail. There are three practical classes a week. Two tests are administered and students are asked to do a course assignment. The final course mark is formed on the basis of the tests and the course assignment.

0211 Mathematics part 2

ECTS credits: 5
Weekly workload: 2lec+2sem+cw
Assessment: exam
Type of exam: written
Department involved:
Department of **Mathematical** Analysis
Faculty of Natural Science and Education
Lecturers:
Assoc. Prof. Ivanka Mitkova Jeleva, PhD, Subsidiary of the Univrsity of Ruse in Razgrad
E-mail: izheleva@ru.acad.bg
Abstract:
The subject acquaints students with basic notions of mathematical analysis, necessary for further study of Mechanics, Physics, theoretical basis of Electrical Engineering, Processes and apparatuses, etc.
Course content:
Basic topics: Functions of more than one variable. Differential calculus. Integral calculus. Ordinary differential equations.
Teaching and assessment:
At lectures students are introduced to main theoretical issues, logically presented and illustrated with appropriate examples. The theoretical basis of the topics presented at lectures is acquired at seminars through solving problems, having theoretical and application character. Two written tests are administered during the semester and the students are required to do a course project. . Students with an average grade exceeding 4.50 may be exempt from the written exam. In this case the final grade is based on the average mark from the tests and the course project. If students are to sit for the examination, final assessment is based on the written exam consisting of problems to be solved and theoretical questions to be answered. The marks from the tests are also taken into consideration. The requirement to have the semester validated is regular seminar attendance.

0212 Physics

ECTS credits: 7
Weekly workload: 3lec+0sem+3labs+0ps+cp
Assessment: exam
Type of exam: written and oral
Department involved:
Department of Physics
Faculty of Electrical Engineering, Electronics and Automation
Lecturers:
Assoc. Prof. Tamara Grigorievna Pencheva, PhD, tel.: 082888218; mobile: 0887716785
Abstract:
The course aims at acquainting the students with the physical character of processes and phenomena in nature and the methods for their investigation, with the general properties of matter and the material objects. The laboratory exercises aim at creating skills for experimental investigation of physical phenomena and solving of physical problems. It is meant to serve as a basis for further studies in biotechnology, chemical technology and food technology, as well as other engineering subjects.
Course content:
Measuring physical quantities. Kinematics and dynamics of material point and rigid body. Interaction in nature. Inertial and inenertial reference frames. Inertia forces. Gravitational theory Work and energy. Mechanical preservation laws. Vibrations and waves. Basics of acoustics. Molecular physics and thermodynamics. Phenomena and transfer. Surface phenomena. Electric field and electric current. Magnetic field and magnetic forces. Electromagnetic waves. Light.
Teaching and assessment:
Lectures give the main theoretical material, supported by some demonstrations of physical phenomena and processes using multimedia and video. At the laboratory classes the students work independently and investigate particular physical phenomena. The knowledge of lecture material and laboratory classes is tested regularly. If the results of this assessment are good, the students are allowed to take the exam. An entry test or an oral quiz lasting 15 minutes is administered at the beginning of each laboratory class. Students are given 2 points for passing each test or quiz. At the end of the laboratory class a report is to be defended. A validated report accounts for further 2 points. The final assessment is formed after a discussion with the student. At the exam the students answer two theoretic questions and do a laboratory exercise.

0213 Analytical chemistry

ECTS credits: 7
Weekly workload: 3lec+0sem+3labs+0ps+ca
Assessment: exam
Type of exam: written
Department involved:
Department of Chemistry and Chemical Technology
Subsidiary of the Univrsity of Ruse in Razgrad, tel.: 611 016
Lecturers:
Assoc. Prof. Diana Vasileva Caneva, Department of Materials and Manufacturing Engineering, tel.: 082 888 307
Abstract:
Analytical chemistry is studied in the first year and it examines the application of the Theory of chemical equilibrium in analysis. It gives students knowledge and develops their skills in quality and quantity analysis and eye detection of analytical signals.
Course content:
Basics of analytical chemistry. Classification of analytical methods. Analytical properties of substances. Analytical signal. Basic computations in chemical analysis. Solutions, preparations and standardization. Photolytic equilibrium. Sediment equilibrium. Complex equilibrium. Reduction-oxidation equilibrium. Fraction quality analysis. Gravimetry. Protolytemetry. Complexometry. Sediment titremetry. Titration curves and choice of indicator. Verification of analysis results.
Teaching and assessment:
There are lectures and laboratory classes in this subject. Students are acquainted with the theory and practice of chemical analysis. Four tests are administered at regular intervals during the semester. Each test comprises three tasks accounting for 2, 3 and 5 points respectively. The maximum number of points that students can collect from the tests is 40. The course assignment accounts for 20 points. And finally the examination accounts for 40 points.

0214 Organic chemistry

ECTS credits: 7 **Weekly workload:** 3lec+0sem+3labs+0ps
Assessment: exam **Type of exam:** written
Department involved:
Department of Chemistry and Chemical Technology, tel.: 611 016
Subsidiary of the Univrsity of Ruse in Razgrad
Lecturers:
Assoc. Prof.Neiko Marinov Stoqnov, Department of Chemistry and Chemical Technology, tel: 084 611016
Abstract:
Organic chemistry acquaints students with basic types of organic compounds (acids, peptides, proteins and enzymes, nucleic acids, carbohydrates, steroids, etc.) which are very important for specialists in biotechnology and food technology.
Course content:
Introduction to organic chemistry. Physicochemical methods of analyzing the structure of organic compounds. Hydrocarbons. Types of isomerism. Basic types of organic reactions. Orientation in aromatic compounds. Halogen hydroxyl derivatives. Carbonyl compounds. Nitrogen organic compounds. Carboxylic acids and their derivatives. Lipids. Isoprenoid. Heterocyclic compounds. Nucleic acids. Alkaloids. Carbohydrates. Peptides, proteins and enzymes.
Teaching and assessment:
Students are taught the theoretical basis at lectures and they carry out experiments in laboratory classes. An overhead projector is used to show various models of organic compounds. Two tests are administered and students may be given up to 120 points for them. Attendance at lectures brings one point and laboratory classes bring two points. The maximum number of points for attendance is 45. Thus the total number of points is 285. To have the semester validated the student is required to have at least 100 points. The final grade is based on the written exam.

0216 Physical chemistry

ECTS credits: 6 **Weekly workload:** 3lec+0sem+3labs+0ps
Assessment: exam **Type of exam:** written and oral
Department involved:
Department of Chemistry and Chemical Technology
Subsidiary of the Univrsity of Ruse in Razgrad
Lecturers:
Pr. Assist. Prof. T. Haralanova,PhD, Department of Chemistry and Chemical Technology, tel: 084 611 016
Abstract:
Basic thermodynamic laws and their applications are studied. The equilibrium state of chemical compounds is examined. Details are given about its characteristics, criteria for recognition, conditions of its attaining as well as conditions of its shifting. The process of chemical reactions is studied by applying basic kinetic equations and taking into consideration the impact of various factors such as temperature catalysts, etc.
Course content:
Basic laws in physical chemistry, thermodynamic systems, phase transitions, chemical kinetics. Thermal and chemical reactions. Laws in thermal chemistry
Teaching and assessment:
There are lectures and laboratory classes in Physical Chemistry. Lectures examine basic phase diagrams and principles of control of chemical reactions and their applications. The equilibrium state of chemical compounds is examined. Details are given about its characteristics, criteria for recognition, conditions of its attaining as well as conditions of its shifting. The process of chemical reactions is studied by applying basic kinetic equations and taking into consideration the impact of various factors such as temperature catalysts, etc. To have the semester validated students are required to have collected a minimum of 20 points allocated for attendance of lectures and another set of 60 points allocated for the defense of laboratory reports. The final exam comprises 36 topics.

0217 Heat Engineering

ECTS credits: 6
Weekly workload: 3lec+0sem+0labs+2ps+cp
Assessment: exam
Type of exam: written oral and
Department involved:
Department of Heat Engineering, Hydraulic and Pneumatic Equipment
Faculty of Agricultural and Industrial Engineering**.**
Lecturers:
Assoc. Prof. Veselka Ivanova Kamburova, MScEng, PhD, tel: 084 611012, e-mail: veselkakamburova@dir.bg
Abstract:
The aim of this subject is to provide students with basic theoretical and practical knowledge of heat as a form of energy, its conversion into other types of energy and its distribution. The thermodynamic properties of various substances and materials, the main laws of thermodynamics and heat transfer as well as basic heat computations in heat exchange apparatuses are also examined. Finally, heat processes, apparatuses and machinery are studied.
Course content:
Basic thermodynamic concepts, thermodynamic processes with ideal gases. First and second law of thermodynamics. Carnot cycle. Steam processes. Gases. Humid air. Heat and mass exchange. Heat conduction. Convection heat exchange. Radiant heat exchange. Complex heat exchange and heat transfer. Types of heat exchange apparatuses. Heat computations. Applied thermodynamics.
Teaching and assessment:
Lectures provide students with theoretical knowledge. They are illustrated with multimedia materials. Some of the laboratory classes are carried out on laboratory installations, others on real industrial sites. For each laboratory class students work out a written report which includes processing and analysis of the experimental data. The assessment is done on the basis of students' performance during the laboratory classes and their written reports. Students are required to do a course assignment. The exam is in written form, followed by oral testing. It comprises theoretical questions and problems to be solved. The final mark is a complex one, based on the results of the exam, the course assignment and the students' performance at the laboratory classes.

0218 Mechanics

ECTS credits: 6
Workload per week: 2lec+0sem+0labs+3ps+ca
Assessment: exam
Type of exam: written
Department involved:
Department of Technical Mechanics
Faculty of Mechanical and Manufacturing Engineering.
Lecturers:
Assoc. Prof. Ivanka Mitkova Jeleva, PhD, tel.: 662332
Abstract:
The students are acquainted with the methods for investigation of various kinds of rigid body motion, for different force transformations, and for investigation of the mechanical interaction in rigid bodies in equilibrium. The subject provides a basis for modeling of structures, mechanisms, dynamic processes and gives engineering methods for practical problem solution. Previous knowledge of Mathematics and Physics is necessary for this course. The discipline is fundamental for the engineering courses dealing with the analysis and design of mechanical structures and machines.
Course content:
The subject comprises the following parts: Statics, Kinematics, Dynamics and Introduction to Materials science.
Teaching and assessment:
The theoretical basis of the topics is elucidated in lectures and it is illustrated by examples. The students solve problems in practical classes. They apply the learned methods in their course work, which is assigned individually to each student. The course assignment comprises either two problems concerning Statics, Kinematics and Dynamics respectively or two problems concerning Materials science. The course work is controlled and graded by means of a grading system and it is submitted according to schedule. The exam consists of several questions and some problems to solve. When the final grade for the semester is formed the students' participation in practical classes and the course assignment are also taken in consideration. Regular attendance of classes and course work submission are required for semester passing approval.

0219 Colloidal chemistry

ECTS credits: 2
Weekly workload: 1lec+0sem+1labs+0ps
Assessment: exam
Type of exam: written
Department involved:
Department of Chemistry and Chemical Technology
Subsidiary of the Univrsity of Ruse in Razgrad
Lecturers:
Pr. Assist. Prof. T. Haralanova,PhD, Department of Chemistry and Chemical Technology
Subsidiary of the Univrsity of Ruse in Razgrad, tel: 084 611 016
Abstract:
Dispersion systems are very important in technological processes in the chemical industry. Colloidal systems are common in chemical products. Colloidal chemistry studies the properties- electrical, optical, kinetic, palpitation, ageing, etc. as well as the structure of colloidal systems. Students are acquainted with some of the most important methods of production of colloidal systems
Course content:
Types of dispersion systems and properties of colloidal systems. Structure of colloidal particles.
Teaching and assessment:
Lectures acquaint students with dispersion systems and colloidal solutions and the properties- electrical, optical, kinetic, palpitation, ageing, etc. of colloidal systems. Laboratory classes start with an entry test and finish with a defense of the laboratory report. Students receive a mark for each laboratory class. When the final grade is decided the lecturer takes into consideration students' participation in laboratory classes and the assignments given during the semester. There are three assignments for the entire semester concerning the structure of colloidal particles and their properties. An end of term test is administered. At the end of the semester students are required to have at least 10 points showing they have attended the lectures and a minimum of 50 points showing they have submitted their assignments and defended the laboratory reports.

0220 Electrical and Electronic Engineering

ECTS credits: 5
Weekly workload: 2lec+0sem+0labs+2ps+ca
Assessment: exam
Type of exam: written and oral
Department involved:
Departmant of Biotechnology and Food Technology
Subsidiary of the Univrsity of Ruse in Razgrad
Lecturers:
Assoc. Prof. Radoslav Ivanov Kjuchukov, MScEng, PhD, Department of Electrical Power Supply and Equipment Faculty of Electrical and Electronic Engineering and Automation
Assoc. Prof. Veselka Ivanova Kamburova, MScEng, PhD, Departmant of Biotechnology and Food Technology, e-mail: veselkakamburova@dir.bg
Abstract:
The subject of Electrical and Electronic Engineering is part of the curriculum for the bachelor degree courses in Biotechnology, Chemical technology and Food technology. The aim of the subject is to introduce students to the basics of electrical engineering, the main electrical machines and apparatuses and some electronic devices.
Course content:
Electric and magnetic field. DC electric circuits. Ohm's law, Kirchhoff's law, Joule's law, Lenz's law. AC electric circuit. Three phase electric circuits. Electrical measurements. Transformers. Asynchronous machines. DC machines. Lighting. Electricity generation, electric power transmission, electric distribution and use. Semiconductor materials. Diodes, bipolar junction transistors and field effect transistors, thyristors. Electronic devices.
Teaching and assessment:
The teaching process is organized in lectures and practical classes. Two tests are administered. They consist of a questionnaire ad some problems to be solved. Student whose marks exceed 5.00 are exempt from the examination. The exam is in writing. It lasts 120 minutes and is held within the semester.

0221 Machine Elements

ECTS credits: 5
Weekly workload: 2lec+0sem+0labs+2ps+ca
Assessment: continuous assessment
Type of exam: written and oral
Department involved:
Department of Machine Science and Machine Elements
Faculty of Automotive and Transport Engineering.
Lecturers:
Assoc. Prof. Ognyan Lyubenov Alipiev, MScEng, PhD, Department of Theory of Mechanisms and Machines and Material Handling Engineering and Technologies, Faculty of Agricultural and Industrial Engineering, tel: 888 593, E-mail: oalipiev@ru.acad.bg.
Assoc. Prof. Ivan Georgiev Spasov, MScEng, PhD, Department of Machine Science and Machine Elements, Faculty of Automotive and Transport Eengineering tel.:888 235, E-mail: igs@ru.acad.bg
Assoc. Prof. Stoqn Borisov Stojkov, MScEng, PhD, Department of Theory of Mechanisms and Machines and Material Handling Engineering and Technologies, Faculty of Agricultural and Industrial Engineering, tel: 888 486, E-mail: sstoykov@ru.acad.bg
Abstract:
This subject aims at introducing students to basic approaches and laws in constructing mechanical systems, where mechanisms and machine elements are very important. Students gain knowledge in research and design of particular mechanisms and machine elements. Basic issues in the theory, practice and design of the mechanical part in mechanical systems are also examined.
Course content:
Basic concepts. Structure and classification of mechanisms. Analysis of leverage mechanism, cam mechanisms, gears and complex mechanisms. Involute gears – geometric theory, kinematics, computation of contact strength and bending strength. Types of coupling. Rotary motion elements: axes, shafts, bearings and clutches. Worm, sprocket rack and pinion gears. Dynamics of electromechanical systems. Balancing of mechanisms.
Teaching and assessment:
The theoretical issues presented at lectures are developed at practical classes and in the course assignment. Lectures and practical classes are illustrated with various kinematic models and models of genuine mechanisms and machine elements. Computer simulations of different processes as well as installations and stands are also used. For further reading students use paper based and electronic textbooks. Students make a test at the beginning of each practical class and there are several additional tests. The final grade is based either on the tests or the exam.

0222 Microbiology

ECTS credits: 7
Weekly workload: 3lec+0sem+3labs+0ps+cp
Assessment: exam
Type of exam: written
Department involved:
Department of Biotechnology and Food Technology
Subsidiary of the Univrsity of Ruse in Razgrad
Lecturers:
Assoc. Prof. Todor Dimitrov Dimitrov, GSM 0896615457, Trakia University Stara Zagora
Abstract:
The aim of Microbiology is to provide students with basic knowledge about microorganisms, the favorable and unfavorable processes that they cause and the methods of studying them. The morphology, taxonomy, physiology, metabolism and genetics as well as ecology of basic types of microorganisms are examined. Infections, immunity and food poisoning are also studied.
Course content:
Morphology of microorganisms. Prokaryotes. Eukaryote. Physiology. Feeding. Types of feeding. Anaerobic metabolism of carbohydrates. Fermentation. Breathing. Metabolism of nitrogen compounds. Cultivation. Spread. Impact of external factors on the development of microorganisms. Genetics. Microbe synthesis. Microbiological and veterinary supervision.
Teaching and assessment:
Lectures provide a theoretical basis for laboratory classes. Visual aids are widely used. In laboratory classes students are required to write reports showing the results of the experiments. Four tests are administered during the semester and students can get maximum 40 points. The course paper that students have to write accounts for 3 points. The final grade is based on the written exam.

0224 Biochemistry part 1

ECTS credits: 7
Weekly workload: 3lec+0sem+2labs+0ps+cw
Assessment: exam
Type of exam: written
Department involved:
Department of Biotechnology and Food Technology
Subsidiary of the University of Ruse in Razgrad
Lecturers:
Assoc. Prof. Ivan Genov Pishtiiski, tel: 032 603 720, University of Food Technology Plovdiv
Abstract:
Biochemistry part 1 aims at acquainting students with the chemical composition of living matter and the properties and metabolism of substances that build it up. Special attention is paid to biochemical processes that are used in food technology and biotechnology such as catabolism of carbohydrates, proteins, amino acids, etc. A significant part of the course is dedicated to enzymes.
Course content:
Introduction to biochemistry. Static, dynamic and functional biochemistry. Application of biochemistry in food technologies. Carbohydrates. Monosaccharides. Disaccharides. Polysaccharides. Proteins. Chemical composition and classification of α-aminocarboxylic acids. Essential α-aminocarboxylic acids. Chemical properties. Structure of proteins. Enzymes. Nucleic acids. Biological significance, composition and structure.
Teaching and assessment:
There are lectures and laboratory classes in this subject. Various visual aids such as video, tables, diagrams and charts are used. Students are required to do a course assignment. To have the semester validated students have to defend the laboratory reports they have written. They have to submit and defend the course assignment and make a test. The final grade is based on a written exam.

0225 Processes and apparatuses part 1

ECTS credits: 8
Weekly workload: 3lec+0sem+3labs+0ps+cw
Assessment: exam
Type of exam: written
Department involved:
Department of Biotechnology and Food Technology
Subsidiary of the Univrsity of Ruse in Razgrad
Lecturers:
Assoc. Prof. Nastq Vasileva Ivanova,PhD, Department of Biotechnology and Food Technology, Subsidiary of the Univrsity of Ruse in Razgrad, E-mail: nivanova@ru.acad.bg
Assoc. Prof. Gencho Stoikov Popov,PhD, Department of Thermotehnics, Hydro- and Pneumotechnics, Faculty of Agricultural and Industrial Engineering
Abstract:
Biotechnological, food processing and chemical plants use various technological processes that transform raw materials into a finished product. Raw materials undergo chemical, physical and physicochemical changes. The structure, the composition and the properties of substances are changed. Nevertheless, a number of underlying processes may be considered as basic.
Course content:
This subject studies the theoretical basis of mechanical and hydraulic processes, the structure, operation and computations of machines that are involved in these processes. The types of mechanical processes are studied in detail. Special attention is paid to breaking into small pieces, grinding, sorting, sifting out, pressing and mixing as well as transportation of fluids, compression and rarefying of gases, separation of fluid and gas dispersion systems and mixing in fluids.
Teaching and assessment:
There are lectures and practical classes in this subject and students are required to do a course assignment. Two tests are administered according to schedule. The tests consist of problems to be solved. At the end of the semester students have to defend the reports they have written in laboratory classes. The final grade is based on a written exam lasting 3 hours. At the exam students answer two theoretical questions and solve one problem.

0226 Technical safety

ECTS credits: *3*
Weekly workload: 2lec+0sem+0labs+1ps+cw
Assessment: continuous assessment
Type of exam: written
Department involved:
Department of Ecology and Environmental Protection
Faculty of Agricultural and Industrial Engineering.
Lecturers:
Prof. Vladimir Tomov Vladimirov, Department of Ecology and Environmental Engineering, tel: 082 888 498
Abstract:
Safety rules are very important in contemporary production. Labour safety plays a major role in safeguarding the life and the health of employees and in addition it influences labour productivity and product quality. This in turn influences the economic results on production. That is why providing a safe work environment is a task of high priority of management.
Course content:
Industrial toxicology. Hermetic sealing of machinery. Measures concerning hazardous leak of toxic or flammable substances. Fire and explosion protection. Ergonomic work environment. Ventilation. Safety rules concerning work with pressure devices. Risks. Electrical safety. Protection against noise and vibrations. Lighting.
Teaching and assessment:
The lectures are made clear with visual aids such as posters, tables and diagrams an overhead projector, etc. Practical classes are held in the laboratory. At the beginning of each practical class student make a test. They defend their reports at the end of the class. Course work is assigned to each student individually. Three tests are administered each of them accounting for 20 points. The final grade is based on the results from the tests, the course assignment and the students' and participation in classes.

0227 Economics

ECTS credits: 5
Weekly workload: 3lec+2sem+0labs+0ps+ca
Assessment: exam
Type of exam: written
Department involved:
Department of Economics
Faculty of Business and Management.
Lecturers:
Assoc. Prof. Djanko Hristov Minchev, MEcon, PhD, Dept. of Economics, tel. 888 557,
E-mail: Dminchev@ru.acad.bg
Abstract:
The subject is concerned with the general problems, laws and categories of the contemporary market economy. Thus it creates a certain basis for the remaining economic subjects. It also gives general knowledge, which is expressed in alternative ways of economic viewing and which forms and creates abilities for independent and expert choice in economic surroundings. Course prerequisite is knowledge of mathematics and it is related to other branch and functional economic subjects.
Course content:
Introduction – the economic system and the fundamentals of economic theory. Main economic issues. Market mechanism. Demand and supply. Consumer demand and behavior. Manufacture, expenditure and revenue. Imperfect competition and supply. Price formation and incomes depending on production factors. Gross domestic product and economic growth. Economic cycles, unemployment and inflation. Fiscal and monetary policy of the state.
Teaching and assessment:
Material is taught in two ways – lectures and practical classes, which elucidate and develop further some of the issues discussed at lectures. Students are encouraged to do some further reading. They are required to do a course assignment. The final grade is based on the exam and the students' participation in classes is also taken into consideration.

0228 Processes and apparatuses part 2

ECTS credits: 6
Weekly workload: 2lec+0sem+0labs+2ps+cw
Assessment: exam
Type of exam: written
Department involved:
Department of Biotechnology and Food Technology
Subsidiary of the Univrsity of Ruse in Razgrad
Lecturers:
Assoc. Prof. Nastq Vasileva Ivanova,PhD, Department of Biotechnology and Food Technology, Subsidiary of the Univrsity of Ruse in Razgrad, tel.: 084 611 012
Abstract:
Biotechnological, food processing and chemical plants use various technological processes that transform raw materials into a finished product. Raw materials undergo chemical, physical and physicochemical changes. The structure, the composition and the properties of substances are changed. Processes and apparatuses part 2 is a continuation to Processes and apparatuses part 1 and serves as a link between fundamental and specialized subjects. It helps students gain knowledge about particular technologies and machinery.
Course content:
Processes and apparatuses part 2 deals with the theory of heat (heating, cooling, vapourization and condensation) and the mass exchange processes such as absorption, adsorption, distillation, rectification, extraction and drying. It also examines the operation and the computations of the machinery involved in these processes.
Teaching and assessment:
There are lectures and practical classes in this subject and students are required to do a course assignment. Two tests are administered according to schedule. The tests consist of problems to be solved. At the end of the semester students have to defend the reports they have written in laboratory classes. The final grade is based on a written exam lasting 3 hours. At the exam students answer two theoretical questions and solve one problem.

0229 Automation

ECTS credits: 6
Weekly workload: 2lec+0sem+0labs+2ps+cw
Assessment: exam
Type of exam: written and oral
Department involved:
Department of Biotechnology and Food Technology
Subsidiary of the University of Ruse in Razgrad
Lecturers:
Assoc. Prof. Veselka Ivanova Kamburova, MScEng, PhD, E-mail: veselkakamburova@dir.bg
Abstract:
Automation is the only subject that deals with automation systems. Students gain knowledge about automatic control systems, the primary transformers of technological variables, automatic controllers and actuating devices. Students are acquainted with major processes, technologies and apparatuses in biotechnology and food industry and they study how they can be automated and controlled. In practical classes students examine the elements of the system of automatic control and some closed systems.
Course content:
Basic concepts of automatic control systems. Mathematical background of linear continuous automatic control systems. Properties and identification of the objects to be controlled in the chemical industry. Analysis of automatic control systems. Automatic control of technological variables – temperature, pressure, consumption, level, pH, concentration, humidity, etc. Automatic controllers. Actuating devices and controls. Automatic control systems that adjust the temperature, the consumption, the quantity, the pressure, the level and pH.
Teaching and assessment:
Lectures acquaint students with the elements of automatic control systems in biotechnology and food processing industry. Block diagrams are shown on slides, overhead projector transparencies and photos. Practical classes are meant to extend and develop the material thought in lectures. They start with a short test or a quiz and finish with defense of reports written in class. The final grade is calculated according to the following formula: 70% from the exam and 30% from the course assignment.

0230 Instrumental methods of analysis

ECTS credits: 4 **Weekly workload:** 2lec+0sem+2labs+0ps+ca
Assessment: continuous assessment **Type of exam:** written
Department involved:
Department of Chemistry and Chemical Technology, tel.: 611 016
Subsidiary of the University of Ruse in Razgrad
Lecturers:
Assoc. Prof. D. Caneva, PhD, Department of Materials & Manufacturing Engineering, tel.:082 888 307
Abstract:
The aim of this subject is to introduce students to some common basic instrumental methods of analysis. Some of the most widely spread chromatographic methods are also examined. Each method is made clear by explaining the underlying theory and the application. The limitations of each method are also pointed out. This subject builds on previous knowledge in analytical, organic and inorganic chemistry and physics.
Course content:
Atomic absorption spectral analysis. Atomic emission spectral analysis. Molecular spectrometry in the visible, ultraviolet and infrared spectrum. Electrochemical methods of analysis without external pressure. Chromatography – ion exchange and thin layer. Refractometry. Viscosimetry.
Teaching and assessment:
There are lectures and laboratory classes in this subject. Students get acquainted with the theoretical basis of methods, the block diagrams of apparatuses, the application and the limitations of the methods. They are required to do a course assignment. Two quizzes are administered. 50% of the final grade is based on the quizzes and 50% is based on the exam. Students who get a pass at the quizzes may be exempt from the theoretical part of the exam.

0251 Chemistry and technology of growth media of microorganisms

ECTS credits: 5 **Weekly workload:** 2lec+0sem+2labs+0ps
Assessment: exam **Type of exam:** written
Department involved:
Department of Biotechnology and Food Technology
Subsidiary of the Univrsity of Ruse in Razgrad
Lecturers:
Assoc. Prof. Hristo Vasilev Dimitrov, tel: 084 611 012
Abstract:
The biosynthetic activity of microbes is closely connected to the growth medium and the technology of cultivation. The composition of the growth medium is important for the cultivation of useful microorganisms. To provide the right composition one has to be aware of the physiological and biochemical characteristics of the particular microorganism. Therefore this subject is very important for students in Biochemistry.
Course content:
Introduction. Metabolism and nutrition of microorganisms. Transportation of the media components in microbial cells. Growth and nutrient media. Types of growth and nutrient media. Composition and nutritive proportion in growth media. Physicochemical properties of growth media. Chemistry and technology carbon components of growth media. Monosaccharides, oligosaccharides and polysaccharides. Alcohols, carboxylic acids and carbohydrates. Carbon sources from waste products. Chemistry and technology of nitrogen components of growth media. Synthetic inorganic and organic nitrogen components. Protein hydrolisates and amino acids. Sources of phosphorus, macro- and microelements. Complex organic components. Inductors, growth factors and vitamins as components of the growth medium. Approaches to optimization of growth media. Technology of preparation of growth media. Apparatuses. Control of growth media and their preparation.
Teaching and assessment:
There are lectures and laboratory classes in this subject. To illustrate them tables and diagrams are used. In laboratory classes students work in groups. The methodology of the experiments is explained. The final grade is based on a written exam.

0232 Refrigerating and drying engineering

ECTS credits: 4 **Weekly workload:** 3lec+0sem+3labs+0ps+cw
Assessment: exam **Type of exam:** written
Department involved:
Department of Thermotehnics, Hydro- and Pneumotechnics
Faculty of Agricultural and Industrial Engineering
Lecturers:
Assoc. Prof. Valentin Vasilev Bobilov, PhD, tel.:082/888-844, E-mail: bobilov@ru.acad.bg;
Abstract:
This subject gives basic knowledge in refrigerating and drying engineering. It aims at acquainting students with methods and means of analysis and the efficient use of real heat engineering systems and installations. Compression refrigeration machines and convective drying installations.
Course content:
Part 1. Methods of cooling. Physical principles of producing cold. "Working body" of the refrigeration machines. Cooling agents. Thermodynamic basis of refrigeration machines. Reverse cycle of Carnot. Assessment of the energy efficiency of the cycle. Heat pump. Cold air, absorption and vapor ejection refrigeration machines. De Laval nozzle. Components of refrigeration installations. Control systems.
Part 2. Drying. Methods of artificial drying. Balance of heat in driers. Diagrams of material and heat flow. Thermodynamic cycle of the convective drying process with or without recirculation. Characteristics of real installations.
Teaching and assessment:
Theoretical issues are examined in lectures and computational skills are developed in practical classes and in the course assignment. The students' participation in lectures and practical classes and the defense of the course assignment are taken into consideration when the final grade is formed. The final grade itself is given after an interview with the lecturer.

0233 Biochemistry II

ECTS credits: 6 **Weekly workload:** 2lec+0sem+3labs+0ps+cp
Assessment: exam **Type of exam:** written
Department involved:
Department of Biotechnology and Food Technology
Subsidiary of the University of Ruse in Razgrad
Lecturers:
Assoc. Prof. Ivan Genov Pishtiiski, PhD, tel: 032 603 720, University of Food Technology, Plovdiv
Abstract:
Biochemistry part 2 aims at enlarging students' knowledge of the chemical composition of living matter and the properties and metabolism of substances that build it up. Special attention is paid to biochemical processes that are used in food technology and biotechnology such as catabolism of carbohydrates, proteins, amino acids, etc. A significant part of the course is dedicated to the metabolism of amino acids. In addition some issues concerning nutrition biochemistry are studied briefly at the end of the course.
Course content:
Metabolism. Exchange of energy. Biochemical energetics. Metabolism of carbohydrates. Anaerobic metabolism of carbohydrates – glycolytic chain. Balance of energy. Anaerobic fermentation. Tricarboxylic acids cycle. Direct oxidation of glucose – pentose phosphate cycle. Biosynthesis of carbohydrates in autotrophic and heterotrophic organisms. Lipid metabolism. Triacylglycerol metabolism. Phosphoacylglycerol metabolism. Amino acid metabolism. Ornithine cycle. Phenylalanine and tyrosine metabolism. Metabolism of lysine, alanine, asparagines and glutamine. Metabolism of tryptophan. Biosynthesis of α-aminocarboxylic acids. Metabolism of nucleic acids. Protein metabolism. Relationship between the metabolic processes of carbohydrates, lipids and proteins. Biochemistry of nutrition.
Teaching and assessment:
There are lectures and laboratory classes in this subject. Various visual aids such as video, tables, diagrams and charts are used. Students are required to do a course assignment. To have the semester validated students have to defend the laboratory reports they have written. They have to submit and defend the course assignment and/or make a test. The final grade is based on a written exam.

0252 Molecular biology

ECTS credits: 6
Weekly workload: 2lec+0sem+3labs+0ps+cp
Assessment: exam
Type of exam: written
Department involved:
Department of Biotechnology and Food Technology
Subsidiary of the University of Ruse in Razgrad
Lecturers:
Assoc. Prof. Lydia Koleva, PhD, tel: 032 603455, University of Food Technology, Plovdiv
Abstract:
The aim of this subject is to acquaint students with the structure of the most significant biological macromolecules and cellular components and to clarify the mechanism of their function. Molecular biology studies phenomena in animate nature on the molecular level. It examines the basic principles and mechanisms of cell self regulation and the ways of providing coordination and unity of all processes in the living cell.
Course content:
Cellular organization and sub cellular components. Cell membrane. Genetic material. Structure and function of the DNA. Messenger RNA. Protein synthesis. Function rRNA. Transfer RNA. Function of proteins.
Teaching and assessment:
There are lectures, laboratory classes and a course assignment in this subject. Lectures are delivered according to schedule and are illustrated with video and multimedia. In laboratory classes first, experimental methodology is explained, and then students are asked to work on their own, thus developing their skills to apply quality and quality analysis. The course assignment familiarizes students with advances in molecular biology such as molecular structure of biopolymers, ways of reproducing genetic information in cells and organisms, techniques of realization of genetic information via protein synthesis. The paper that students write for their course assignment should comprise at least 10 pages. The final grade is based on a written exam.

0253 Low molecular biologically active substances

ECTS credits: 8
Weekly workload: 3lec+0sem+3labs+0ps+cw
Assessment: exam
Type of exam: written
Department involved:
Department of Biotechnology and Food Technology
Subsidiary of the University of Ruse in Razgrad
Lecturers:
Assoc. Prof. Neiko Marinov Stoyanov,PhD tel: 084 611016,
Abstract:
Students are familiarized with bioproducts that have low molecular mass such as vitamins, alkaloids, hormones, pheromones and toxins. The relationship between the chemical composition and the physiological activity of compounds that are valuable to the living cell is also studied. He focus is on low molecular substances that are significant for nutrition and medical treatment and those that are used in biotechnology. Special attention is paid to the fact that standard specifications should be observed in order to preserve the biologically active substances in foodstuffs.
Course content:
Vitamins – characteristics, basic types, structure, properties, biological significance, distribution. Relationship between the structure and the biological activity. Alkaloids – essence, classification, identification methods, separation and analysis. Basic types. Toxins. Hormones. Pheromones.
Teaching and assessment:
There are lectures and laboratory classes in this subject. Lectures outline the theoretical basis. They are illustrated with models of bio organic compounds and overhead projector transparencies. Two tests are administered according to schedule and they account for up to 120 points. Each attendance at lectures accounts for 1 point and attendances at laboratory classes account for 2 points respectively. The final grade is based on a written test.

0254 Enzymology

ECTS credits: 7
Weekly workload: 3lec+0sem+3labs+0ps+ca
Assessment: exam
Type of exam: written
Department involved:
Department of Biotechnology and Food Technology
Subsidiary of the University of Ruse in Razgrad
Lecturers:
Assoc. Prof. Nasty Vasileva Ivanova, PhD, tel.: 084 611 012
Abstract:
The objective of Enzymology is to expand the knowledge of students about enzymes and to examine the basic properties and action of enzymes which are used in practice. In addition, all aspects of the industrial usage of enzymes in different branches of industry are studied in great detail. The major steps in microbiological production of enzyme preparations are also dealt with. Finally, special attention is paid to advances in enzyme application via immobilization.
Course content:
Properties, chemical characteristics and special features of enzymes. Production of enzyme preparations. Immobilised enzymes. Application of enzymes in the baking industry, the spirits industry, the brewing industry, in medicine, in the meat processing industry, in the canning industry, etc.
Teaching and assessment:
There are lectures, laboratory classes and a course assignment in this subject. Two tests are administered which require students to answer theoretical questions. At the end of the semester students defend the reports they have written in the laboratory classes. To have the semester validated, the student is required to attend at least 50% of the lectures, 100% of the laboratory classes, to make the two tests, to defend the reports and to submit the course assignment. Students with marks exceeding 5.00 (from the tests, the reports and the course assignment may be exempt from part of the theoretical questions at the exam. The final grade is based on the written exam.

0255 Technology of foodstuffs and fermented products

ECTS credits: 6
Weekly workload: 2lec+0sem+3labs+0ps+cw
Assessment: exam
Type of exam: written and oral
Department involved:
Department of Biotechnology and Food Technology
Subsidiary of the University of Ruse in Razgrad
Lecturers:
Assoc. Prof. Stanka Todorova Damyanova, PhD, tel.: 084 611 012
Abstract:
Technology of foodstuffs and fermented products aims at acquainting students with basic types of biotechnological production in the food processing and fodder industries such as baking bread, production of dairy products and cheese, pickles, sausages and meat products, manufacture of soya products and beverages (beer, wine, spirits) and ensilage.
Course content:
Basic types of biotechnological products – foodstuffs and silage. Biotechnological methods of production of food and silage. Bread and bakery products. Dairy products – butter, cream, yogurt, kefir (a fermented milk drink). Production of cheese. Types of cheese. Characteristics of cheese. Technology of cheese production. Sausages and meat products. Pickles and silage. Asian foodstuffs – soya and fish fermented products. Biotechnological methods of production of beverages.
Teaching and assessment:
There are lectures, laboratory classes and a course assignment in this subject. Lectures are delivered taking into consideration contemporary teaching methods. Care is taken to make the explanations clear and to provide appropriate examples. Students are required to prepare carefully for the laboratory classes. They are asked to write a report for each class. The report comprises review of the relevant theory, a description of the tasks that have been completed, the findings and the results from the experiments and the conclusions. Students are asked to do a course assignment based on the material taught at lectures. The exam comprises two parts – a written and an oral exam. The written part consists of answering two theoretical questions or making a test and then an interview with the lecturer follows.

0248 Marketing and management of a company

ECTS credits: 3
Weekly workload: 1lec+1sem+0labs+0ps+cw
Assessment: exam
Type of exam: written and oral
Department involved:
Department of Economics
Faculty of Business and Management.
Lecturers:
Assoc. Prof. Lyubomir D. Lyubenov, PhD, Department of Economics, tel.: 888-347,
E-mail: LLyubenov@ru.acad.bg
Abstract:
The aim of this subject is to familiarize students with methods of market research and management of a company
Course content:
Basic concepts and definition of marketing. Marketing environment. Marketing surveys. Marketing mix. Marketing strategy. Product policy. Distribution policy. Communication policy. Pricing policy. Planning. Organizing. Management. Control.
Teaching and assessment:
Lectures are delivered in the traditional way. They are illustrated with slides when necessary. In seminars problems are solved and tests are made. To have the semester validated the usual requirements such as attendance of lectures and seminars and submission and defense of the course assignment are applied.

0256 Industrial microbiology

ECTS credits: 6
Weekly workload: 2lec+0sem+3labs+0ps+ca
Assessment: exam
Type of exam: written
Department involved:
Department of Biotechnology and Food Technology
Subsidiary of the University of Ruse in Razgrad
Lecturers:
Assoc. Prof. Lyubka Jordanova Kojuharova, PhD, tel.: 032 603642, University of Food Technology, Plovdiv
Abstract:
This subject aims at acquainting students with strain producers of different bioproducts that are used in the biotech industry. Their particular nutrition requirements and the special features of their industrial cultivation are also examined. And finally, contaminants and contemporary systems of microbiological control of all stages in production processes are studied.
Course content:
Biological agents. Isolating. Preserving. Ageing and death. Mixed cultures. Contamination in biotech industry. Microbial biosynthesis of bioproducts (amino acids, organic acids, vitamins, antibiotics, enzymes, proteins). Bacterial fertilizers. Bioinsecticides. Microbial processes in waste water treatment.
Teaching and assessment:
Lectures are delivered according to the curriculum. They are illustrated with video and multimedia. In laboratory classes first the experimental methodology is explained, when the students work on their own under the supervision of the assistant professor. The course assignment involves a study of the microbial synthesis of organic acids, amino acids, vitamins, enzymes, antibiotics, bacterial fertilizers, bioinsecticides, protein products, etc. An investigation into the influence of the growth medium and its components as well as the conditions of cultivation on the development of strain producers and the formation of bioproducts is also carried out. The paper that the students write for their course assignment should be at least 10 pages long. The course assignment should be divided into 3 parts and each part should be submitted according to schedule. The final grade is based on the written exam.

0257 Technological equipment

ECTS credits: 7
Weekly workload: 3lec+0sem+0labs+2ps+cw
Assessment: exam
Type of exam: written
Department involved:
Department Of Heat Engineering, Ruse University
Lecturers:
Assoc. Prof. Tsonka Godjevurgova PhD, tel.: 056 858 353, Professor Asen Zlatarov University
Abstract:
Technological equipment aims at giving students knowledge about equipment in biotech industry. Lectures examine the essence of processes, the structure of machines, apparatuses and equipment that are used in biotechnological plants and their operation and maintenance. Various types of bioreactors where the quality and quantity characteristics of bioproducts are formed are also studied. Separation, concentration and purification equipment is presented. Finally, equipment for finishing operations is studied.
Course content:
Sterilization processes. Sterilization of growth and nutrient media. Air purification and sterilization. Mechanisms of deposition of aerosol particles. Filtration materials and experimental assessment of their efficiency. Air sterilization technology. Stirring and aeration in fluid media. Bioreactors and filtration equipment. Apparatuses for fermentation processes. Types of bioreactors, filtration and centrifugation equipment. Mass - exchange processes in microorganism cultivation. Ion exchange processes. Extraction. Methods of extraction. Types of extractors. Membrane processes. Membrane equipment and technologies. Vaporization. Types of vaporization installations. Drying. Drying equipment. Types of driers – convection, conduction and special driers.
Teaching and assessment:
There are lectures and practical classes in this subject. Tables and diagrams are used to illustrate lectures and classes. At the beginning of each practical class a discussion is held to clarify the methods of investigation and experiment. To have the semester validated students have to complete their tasks in practical classes, submit and defend their course project and take an active part in class discussions. The final grade is based on a written exam.

0258 Technology of microbial protein products

ECTS credits: 6
Weekly workload: 2lec+0sem+3labs+0ps+ca
Assessment: exam
Type of exam: written
Department involved:
Department of Biotechnology and Food Technology
Subsidiary of the University of Ruse in Razgrad
Lecturers:
Assoc. Prof. Lyubka Jordanova Kojuharova, PhD, tel.: 032 603642, University of Food Technology, Plovdiv
Abstract:
This subject aims at acquainting students with the theoretical basis and the technologies of production of microbial protein products for fodder and food. Students examine the methods and the technological features of microbial producers for different raw materials.
Course content:
Microbial producers of proteins. Technology of production of fodder yeast. Technology of production of bread yeast. Technology of production of protein – vitamin concentrate from algae. Biotechnological production of biomass from fungi.
Teaching and assessment:
Lectures are delivered according to schedule and are illustrated with multimedia and video. In laboratory classes students work under the supervision of an assistant professor. Experimental methods are discussed beforehand. The course assignment involves a study of the morphology, the specific features of the culture and the physiology of the microbial producers of protein products. It also deals with the technological characteristics of protein production from different raw materials as well as the production of fodder and bread yeast and protein concentrates for food. The paper that the students write for their course assignment should comprise at least 10 pages. The final grade is based on a written exam.

0259 Technology of antibiotics

ECTS credits: 8
Weekly workload: 3lec+0sem+3labs+0ps+cw
Assessment: exam
Type of exam: written
Department involved:
Department of Biotechnology and Food Technology
Subsidiary of the University of Ruse in Razgrad
Lecturers:
Assoc. Prof. Lyubka Jordanova Kojuharova, PhD, tel.: 032 603642, University of Food Technology, Plovdiv
Abstract:
Production of antibiotics is developing fast. Antibiotics are widely used in medicine and veterinary medicine, stock breeding, plant growing and food processing industry. This subject aims at giving students knowledge about the technology of antibiotics.
Course content:
Definition and classification of antibiotics. Probiotics. How antibiotics work. Synergism and resistance. Block diagram of antibiotic production. Isolating strain producers and creating a screening programme. Biosynthesis of antibiotics. Block diagram, conditions and control of the process. Preliminary treatment of the culture liquid. Filtration. Chemical purification and isolation of antibiotics. Sedimentary, extraction and ion exchange methods of isolation. Beta-lactam antibiotics. Classification. Penicillin. Cephalosporin. Tetracycline antibiotics. Macrolide antibiotics. Aminoglycoside antibiotics. Aromatic antibiotics. Antitumor and antimycotic antibiotics. Antracyclines. Environmental issues connected with the production of antibiotics. Antibiotics in veterinary medicine. Nutritive antibiotics. Side effects in antibiotic treatment. Methods of control- pharmacological and others
Teaching and assessment:
There are lectures and laboratory classes in this subject. Tables and diagrams as well as video are used to illustrate lectures. In laboratory classes students work in groups and experimental methods are discussed beforehand. Each student is given a course assignment. The final grade is based on a written exam.

0260 Genetics

ECTS credits: 3
Weekly workload: 1lec+0sem+2labs+0ps+cp
Assessment: continuous assessment
Type of exam: written
Department involved:
Department of Biotechnology and Food Technology
Subsidiary of the University of Ruse in Razgrad
Lecturers:
Dr Nadejda Mihailova, tel 084/615 359
Abstract:
Lectures deal with agents of heredity and the genetic structure of prokaryotes and eukaryotes. Part of the course is dedicated to classical Mendelian genetics, the crossbreeding of species and the natural selection of species. Genetic variability, types of mutations, mutation factors, and the application of mutagenesis in improving industrial microorganisms are also studied. Students learn about genetic recombination and the carrying of genes as well as basics of genetic engineering – vectors, cloning and recombinant cells. The areas of application of genetic engineering are also outlined
Course content:
Introduction to modern genetics. Heredity. Mendelian inheritance. Genetic variability. Genetic recombination. Carrying of genes. Genetic engineering. Basic principles. Vectors – plasmids, bacteriophages, cosmids. Transformation of recombination vectors into bacteria. Cloning of recombination cells. Application of gene engineering methods and techniques in the selection of industrial strains of microorganisms.
Teaching and assessment:
There are lectures, laboratory classes and a course assignment in this subject. Lectures are delivered taking into consideration the contemporary teaching methods. Explanations are clear and visual aids are used to illustrate the material. To have the semester validated students have to meet the common requirements. The final grade is based on a test.

0261 Biotechnology of agrobiological products

ECTS credits: 5 **Weekly workload:** 3lec+0sem+4labs+0ps
Assessment: exam **Type of exam:** written + oral
Department involved:
Department of Biotechnology and Food Technology, tel 084 611 012
Subsidiary of the University of Ruse in Razgrad
Lecturers:
Assoc. Prof. Iliya Ivanov Muhtanov, Dept. of Agricultural Engineering, tel: 082 888 312, Ruse University
Abstract
Biotechnology of agrobiological products acquaints students with important products in agriculture. They study biological products which have different biological action. Part of the course is dedicated to the study of technologies of bioproducts (bacterial fertilizers and phytohormones) that are used to enhance the fertility of soil and plants. Another part of the course deals with the production of bioinsecticides, antibiotics, etc. Special attention is paid to the requirements that bioproducts in plant growing should meet and their application.
Course content:
Advantages of bioproducts in plant growing. Bacterial fertilizers. Phytohormones. Microbial insecticides. Microbial preparations for pest control – properties. Technologies of production. Use. Usage of microorganisms as insecticides. Genetic method of protection of plants. Use of biologically active substances in insects for treatment of plants. Bacterial preparations in plant growing. Antibiotics in plant growing.
Teaching and assessment:
There are lectures and laboratory classes in this subject. Students are acquainted with the theoretical basis of the subject in lectures which are illustrated with tables, diagrams and an overhead projector. Laboratory classes correspond to the material taught in lectures. To have the semester validated students have to defend the reports they have written in the laboratory classes. The final grade is based on a written exam.

0262 Standardization of bioproducts

ECTS credits: 4 **Weekly workload:** 3lec+0sem+3labs+0ps
Assessment: exam **Type of exam:** written
Department involved:
Department of Biotechnology and Food Technology, tel 084 611 012
Subsidiary of the University of Ruse in Razgrad
Lecturers:
Assoc. Prof. Tsonka Godjevurgova, PhD, tel 056 858 353 Professor Asen Zlatarov University
Abstract:
This subject aims at acquainting the students with the fundamentals of contemporary theory and practice of quality control and with the bringing of national and international regulations and standards into line with each other. It studies major statistical methods of quality control, registration of bioproducts and foodstuffs, accreditation, testing, certification and assessment according to Bulgarian and international legislature. Finally it deals with safety of foodstuffs, bioproducts and medicines and system of labour safety.
Course content:
Essence of the standardization of bioproducts. Theory and practice in quality control. Registration and control of bioproducts. Accreditation, testing, certification and assessment of the particular products. Quality control systems, safe working environment. Audit and certification of control systems. Integrated systems for quality control.
Teaching and assessment:
There are lectures and laboratory classes in this subject. Students are familiarized with the theoretical basis of the subject. Two tests are administered. The marks from the tests account for 50% of the final mark.

0249 Industrial ecology

ECTS credits: 4 **Weekly workload:** 3lec+0sem+3labs+0ps
Assessment: exam **Type of exam:** written
Department involved:
Department of Ecology and Environmental Engineering, Ruse University
Lecturers:
Prof. Vladimir Tomov Vladimirov, tel 082 888 498
Abstract:
This subject examines the basic concepts and the trends in ecology focusing on sources of pollution, means of protection, introduction of low waste and wasteless technologies and waste recycling.
Course content:
Basis of the theory about the biosphere. Anthropogenic impact on the biosphere. Air contamination and harmful emissions. Sources of pollution. Techniques of reducing air pollution. Ecological issues in use and preservation of water resources. Biotechnological approaches in waste water treatment. Soil conservation and protection of the Earth's nucleus. Forecasts, diagnosis, monitoring and ecological examination.
Teaching and assessment:
Lectures are delivered according to the curriculum and are illustrated with modern visual aids. The laboratory classes supplement the course of lectures. The final grade is based on a written exam.

0250 Reliability of machines

ECTS credits: 3 **Weekly workload:** 3lec+2sem+0labs+0ps
Assessment: continuous assessment **Type of exam:** written
Department involved:
Department of Repair, Reliability and Chemical Technologies, tel 082 888 441, Ruse University
Lecturers:
Assoc. Prof. Plamen Kangalov, PhD, tel 082 888 441
Abstract:
This subject aims at giving students knowledge and skills to ensure and improve the quality and reliability of machines. It also studies the designing, use and maintenance of machines. To this end the basic concepts and mathematical foundations of reliability and design are examined. Finally, the defining of characteristics and factors of reliability are dealt with as well as breakdowns and causes of breakdowns.
Course content:
Basic concepts and definitions of the state of machinery. Major properties of contemporary equipment. Durability, smooth running, repair and maintenance. Breakdowns. Causes of systems' and elements' failure. Factors in reliability. Reliability as a major factor for quality of machines.
Teaching and assessment:
There are lectures and seminars in this subject. Students write reports in the seminars. Three tests are administered based on the three parts of the material. To have the semester validated students have to meet the usual requirements. The final grade is based on the tests. Students who have less than 25 points are required to make another test comprising everything that was taught during the semester. Students wishing to get a higher mark can make this last test.

Bachelor thesis

ECTS credits: 10
Assessment: official defense **Type of exam**: oral
Department involved:
Department of Biotechnology and Food Technology
Department of Chemistry and Chemical Technology
Subsidiary of the University of Ruse in Razgrad
Consultants:
All lecturers from the Department of Biotechnology and Food Technology.
Abstract:
The Bachelor thesis is an independent creative assignment, which is fulfilled under the supervision of a research lecturer and if necessary, under the supervision of a research consultant. Its objective is to give opportunity to students to demonstrate the knowledge and skills acquired during their studies for achieving the objectives and tasks of the Bachelor thesis and to present their creative development successfully in front of an examination board.
Course content:
The Bachelor thesis could be either a continuation and extension of a former project or an independent task. The students are required to solve a technological problem or improve existing technology and equipment.
Teaching and assessment:
Students are supposed to apply the knowledge and skills they acquired during their studies. They are expected to use reference books, conduct research and carry out experiments. The Department of Biotechnology and Food Technology provides students with the equipment needed to complete their task. The Final year students present their Bachelor thesis in front of the State Examination Board.

UNDERGRADUATE STUDIES IN FOOD TECHNOLOGY

PROFESSIONAL STANDARDS
OF A BACHELOR IN

FOOD TECHNOLOGY

Degree programme: **Food Technology**
Educational Degree: **Bachelor**
Professional Qualification: **Engineer in Food Technology**
Length of programme: **4 years (8 semesters)**

Field of Study: The **Food Technology** degree programme aims at preparing highly qualified Bachelor of Engineering professionals whose skills and knowledge could be applied in a wide range of professional settings.

Professional Qualifications: The Bachelor of Engineering degree course is designed for students who seek comprehensive education in food technology and prepares professionals for scientific and practical work in the area. Graduates will be able to do research work, develop new products and manage production in food processing companies.

Bachelor of Engineering graduates will complete the programme acquiring a high level of theoretical and practical understanding of food technology, microbiology, ecology, engineering and management and marketing. Foreign language knowledge and understanding of the cultural peculiarities of doing business in a global setting are other assets to this programme.

The academic programme is built around the following cornerstones:

- **Professional preparation** - builds upon the foundations of chemistry, mathematics, physics, physical chemistry, basic heat exchange and chemical processes, electrical engineering, IT, environmental science, and foreign languages.
- **Specialized preparation** - focuses on the basis and peculiarities of food technologies, canning and food refrigeration, technological equipment, contemporary methods of analysis of the quality of food, automatic control of processes and the use of service and production forms and records and technical documentation in general.

The Bachelor of **Food Technology** graduates will be able to:

- Creatively apply their knowledge of food technology and continuously update it according to the emergence of new technologies and practices.
- Be competent IT users.
- Apply modern chemical, physicochemical, biochemical and microbiological methods of analysis of raw materials and finished products.
- Use up-to-date laboratory equipment.
- Have a thorough command of technological equipment in food processing plants.
- Responsibly manage safety, implement wasteless technologies and uphold ecological standards.

Employment prospects: Employment in the food industry is growing because of the need to improve the quality, quantity, variety and safety of foods. Common areas of employment are: product development, quality assurance and control, processing and engineering and business and management. Good employment opportunities exist with all kinds of companies involved in the production of cheese, fermented milk products, beer, wine and many others.

CURRICULUM
of the degree course in
FOOD TECHNOLOGY

First year

Code	*First semester*	*ECTS*	*Code*	*Second semester*	*ECTS*
0200	Mathematics part 1	5	0210	Informatics part 2	4
0201	Engineering Graphics	5	0211	Mathematics part 2	5
0202	Informatics part 1	6	0212	Physics	7
0203	Basic and inorganic chemistry	6	0213	Analytical chemistry	7
0204	Stoichiometric computations	3	0214	Organic chemistry	7
	Foreign language:	5			
0205	English 1				
0206	German 1				
0207	French 1				
0208	Russian 1				
	Total Credits for the semester:	***30***		**Total Credits for the semester:**	***30***

Second year

Code	*Trird semester*	*ECTS*	*Code*	*Fourth semester*	*ECTS*
0216	Physical chemistry	6	0222	Microbiology	7
0217	Heat Engineering	6	0224	Biochemistry part 1	7
0218	Mechanics	6	0225	Processes and apparatuses part 1	8
0219	Colloidal chemistry	2	0226	Technical safety	3
0220	Electrical and Electronic Engineering	5	0227	Economics	5
0221	Machine elements	5			
	Total Credits for the semester:	***30***		**Total Credits for the semester:**	***30***

Work placement 2 credits

Third year

Code	*Fifth semester*	*ECTS*	*Code*	*Sixth semester*	*ECTS*
0228	Processes and apparatuses part 2	6	0235	Technology of Milk and Dairy Products	7
0229	Automation	6	0237	Technology of Meat, Poultry and Fish	4
0230	Instrumental methods of analysis	4	0238	Technology of Sugar and Sugar Products	8
0234	Application of Enzymes in the Food-Processing Industry	5	0239	Microbiological Control of Food Products	4
0232	Refrigerating and drying engineering	3	0240	Food Additives and Spices	4
0233	Biochemistry part 2	6	0248	Marketing and management of a company	3
	Total Credits for the semester:	***30***		**Total Credits for the semester:**	***30***

Industrial placement 2 credits

Fourth year

Code	*Seventh semester*	*ECTS*	*Code*	*Eighth semester*	*ECTS*
0241	Technology of the Grain Processing Industry and the Bakery Industry	7	0246	Technology of Food Canning	5
0242	Technology of the Vegetable Lipids and Essential Oils	7	0247	Packaging of Food Products	4
0243	Technology of meat, poultry, and fish food products	6	0249	Industrial ecology	4
0244	Technological Equipment of the Food Processing Industry	7	0250	Reliability of machines	3
0245	Technological Control and Safety of Foods	3		Self preparation for the Bachelor thesis	4
				Bachelor thesis	10
	Total Credits for the semester:	**30**		**Total Credits for the semester:**	**30**

Total for the training course of study: 240 ECTS credits

0200 Mathematics part 1

ECTS credits: 5
Assessment: exam
Weekly workload: 2lec+2sem+ca
Type of exam: written
Department involved:
Department of Algebra and Geometry
Faculty of Natural Sciences and Education
Lecturers:
Assoc. Prof. Ivanka Mitkova Jeleva, PhD, Subsidiary of the University of Ruse in Razgrad
E-mail: vzh@abv.bg
Abstract:
The course is a basic one in engineering education. It uses the mathematical knowledge from secondary school and extends it on a higher level. It is a prerequisite for the next level mathematical subjects, Physics, Mechanics, general and special engineering courses.
Course content:
Sets. Real and complex numbers. Systems of linear equations and determinants. Matrix theory and determinants. Linear systems. Polynomials. Vector space. Linear dependence and independence of families of vectors. Dot (scalar) product. Coordinate systems Cross (vector) product. Lines and planes. Second order curves and surfaces.
Teaching and assessment:
The theoretical basis of the topics presented at lectures is enhanced at seminars through solving problems; individual practicing and reinforcing is accomplished by weekly assignments. Two written tests are administered and students with grades above 4.50 are exempt from the exam and their mark is formed on the basis of an interview with the lecturer. Each student is required to do a course assignment. Its successful presentation at seminars and regular class attendance are a necessary prerequisite to have the semester validated.

0201 Engineering Graphics

ECTS credits: 5
Assessment: continuous assessment
Weekly workload: 1lec+0sem+0labs+3ps+ca
Type of exam: written
Department involved:
Department of Engeneering Drawing
Faculty of Automotive and Transport Engineering
Lecturers:
Assoc. Trifon Ivanov Trifonov, PhD, Department of Engeneering drawing, tel.: 082 888437
Abstract:
Engineering graphics is a basic subject that studies design methods, standards and the rules of creating and using technical drawings, sketches and text documents. This subject is a base for further learning of other technical branches of science, especially when solving design problems and documenting them.
Course content:
Drawing of objects. Methods of orthographic and axonometric projection. Geometric modeling. View, cross section, front section. Documentation. Standards. Drawing a component. Documents that accompany technical drawings of an assembled unit.
Teaching and assessment:
The theory, presented at lectures by didactic means, provides the needed base for practical classes and course assignments. During the practical classes problems are solved, instructions are given, examples are considered. Each student is required to do a course assignment, which is submitted according to the lecturer's schedule. Two tests are administered. The final course mark is formed on the basis of the grades of the tests and the course assignment results. The requirements to have a term validated are regular class attendance and course assignment submission.

0202 Informatics part 1

ECTS credits: 6 **Weekly workload:** 2lec+0sem+0labs+3ps+ca
Assessment: exam **Type of exam:** written
Department involved:
Department of **Informatics** and Information Technologies
Faculty of Natural Science and Education.
Lecturers:
Assoc. Prof. Ivanka Mitkova Jeleva, PhD,E-mail: vzh@abv.bg
Abstract:
Informatics part 1 acquaints students with the computer as a technical means with its components and its arithmetic and logic basis. Basic algorithms are developed to enhance the logical thinking of students. Students are acquainted with PASCAL. Lectures comprise topics concerning the basic structures in algorithms: branching, loops and multiple choice. Various types of data are studied. The problems that students solve might be useful in their future jobs.
Course content:
History and classification of computers. Hardware. Operating systems. Application software. Number systems. Boolean algebra. Algorithms - basic concepts. Algorithms –branching, loops. Algorithms with one dimensional arrays. Structure of a program in PASCAL. Types of data in PASCAL. Input and output of data. Branch and multiple choice. Loop operators. Types of arrays. Work with arrays.
Teaching and assessment:
Lectures take place once a week. Practical classes are held in the computer laboratory under the supervision of an assistant professor .Practical classes start with an entry test or an oral quiz. Two tests are administered. Course assignments require students to work on their own, using the programming systems they have studied. Students are given marks for their course assignments as well. Students with an average grade exceeding 4.50 may be exempt from the written exam. The final grade is based on the mark of the exam and the average mark from the tests and the course assignments.

0203 Basic and inorganic chemistry

ECTS credits: 6 **Weekly workload:** 3lec+0sem+3labs+0ps+ca
Assessment: exam **Type of exam:** written
Department involved:
Department of Chemistry and Chemical Technology
Subsidiary of the University of Ruse in Razgrad
Lecturers:
Assoc. Prof. Miluvka Stancheva, MScEng, PhD, Department of Chemistry and Chemical Technology
Subsidiary of the Univrsity of Ruse in Razgrad, tel: 662 989,
Abstract:
Basic and inorganic chemistry deals with the theoretical basis of inorganic chemistry, the chemical processes and dispersion systems. Students are acquainted with the main chemical operations, the laboratory equipment and apparatuses and the basic rules concerning work in a chemical laboratory. Laboratory classes help students understand what they were taught at lectures and develop their skills so that they will be able to work in a chemical laboratory.
Course content:
Basic concepts and laws in chemistry. Structure of the atom. Rutherford planetary model. Contemporary theories about the structure of the atom. Structure of the nucleus. The Periodic law and The Periodic Table of the Chemical Elements. The Periodic Law and the structure of the atom. Recurring (periodic) chemical properties. Chemical bonding. Molecular orbital theory. Hydrogen bond. Valence and oxidation state. Dispersive systems. Types of dispersive systems. Characteristics of dissolution – heat effect. Solutions and electrolytes. Vapour pressure and temperature of boiling. Osmosis. The theory of electrolytic dissociation. Acidity of solutions. Neutralization and hydrolysis. Rough dispersions. Sorption.
Teaching and assessment:
Lectures deal with basic issues concerning the structure of the atom and chemical bonding, plain and complex substances and chemical processes. Visual aids such as posters, diagrams and overhead transparencies are used in lectures. Laboratory classes focus on developing skills to handle laboratory equipment, to master the basic operations in chemistry and learn about the properties of compounds. Students work in pairs.

0204 Stoichiometric computations

ECTS credits:3 **Weekly workload:** 0lec+3sem+0ps
Assessment: exam **Type of exam:** written
Department involved:
Department of Chemistry and Chemical Technology
Subsidiary of the University of Ruse in Razgrad
Lecturers:
Assoc. Prof. Diana Vasileva Caneva, MScEng, PhD, Department of Materials & Manufacturing Engineering, tel: 082 888 307
Abstract:
Stoichiometric computations is in close connection with Basic and inorganic chemistry. It helps students acquire in-depth knowledge and link theory and practice.
Course content:
Basic concepts in chemistry. Laws in chemistry. Atomic-molecular theory. Symbols in chemistry. Chemical formulae. Nomenclature of inorganic compounds according to IUPAC. Basic computations in chemistry. Mass and mol parts as percentage. Composition of compounds. Defining the empirical and molecular formulae of compounds. Equivalent. The Law of equivalents.
Teaching and assessment:
Seminars comprise theory and solving stoichiometric problems. Three tests are administered. The final grade is based on the marks from the tests.

Foreign language
0205 English, 0206 German, 0207 French, 0208 Russian

ECTS credits: 5 **Weekly workload:** 0lec+0sem+0labs+4ps+ca
Assessment: continuous assessment **Type of exam**: written and oral
Department involved:
Department of Foreign Languages
Faculty of Law
Lecturers:
Sr. Assist. Prof. Iliana Gancheva Benina, MA, Department of Foreign Languages,
E-mail: lbenina@ecs.ru.acad.bg
Sr. Assist. Prof. Tsvetelina Amdreeva Nedelcheva, MA, Department of Foreign Languages,
E-mail: tandreeva@ecs.ru.acad.bg
Sr. Assist. Prof. Tinka Angelova Karaivanova, MA, Department of Foreign Languages, tel.: 888 824,
E-mail: tkaraivanova@ecs.ru.acad.bg
Sr. Assist. Prof. Rumiana Ivanova Milanova, MA, Department of Foreign Languages,
E-mail: rmivanova@ecs.ru.acad.bg
Sr. Assist. Prof. Iliana Gancheva Benina, MA, Department of Foreign Languages,
E-mail: lbenina@ecs.ru.acad.bg
Sr. Assist. Prof. Katalina Peicheva Boqnowska, MA, Department of Biotechnology and food technology
Subsidiary of the University of Ruse in Razgrad, тел.: 084 620 090
Abstract:
The foreign language course is aimed at achieving communicative competence in the area of the subject specialist and the future job. The teaching objectives comprise the development of reading comprehension skills to handle specialist texts and the acquisition of communication skills to interact successfully in professional settings and everyday situations.
Course content:
Meetings and introductions, giving personal details, describing things and places, writing a CV. propositions, plans, comparisons, linking facts and ideas, searching for special information, reading strategies, applying for work
Teaching and assessment:
A wide range of authentic and specially constructed texts (i. e. articles, diagrams and tables, brochures, catalogues, manuals, etc.) as well as audio, video, and multimedia materials are used to acquire the necessary knowledge and skills in using the language as a means of communication. Students are offered lessons in computer laboratories, in which multimedia learning packages and on-line materials are used in line with the latest trends in foreign language teaching. The final grade is based on written tests and oral quizzes. An active and regular participation in the learning process is required for semester passing approval as well as course assignment submission and defense.

0210 Informatics part 2

ECTS credits: 4
Weekly workload: 1lec+0sem+0labs+3ps+ca
Assessment: continuous assessment
Type of exam: written
Department involved:
Department of **Informatics** and Information Technologies
Faculty of Natural Science and Education.
Lecturers:
Assoc. Prof. Ivanka Mitkova Jeleva, PhD, Subsidiary of the Univrsity of Ruse in Razgrad, E-mail: vzh@abv.bg
Abstract:
Informatics part 2 aims at teaching students how to use the most widely spread programming systems Microsoft Windows, word processors – such as WORD and spreadsheets – EXCEL. This is meant to help the students do their course assignments and perform various tasks in their future jobs.
Course content:
The WINDOWS Operating System. Word processors. WORD. Spreadsheets. EXCEL.
Teaching and assessment:
Lectures give the theoretical basis and acquaint students with existing operating systems word processors and spreadsheets. The Microsoft products are studied in detail. There are three practical classes a week. Two tests are administered and students are asked to do a course assignment.The final course mark is formed on the basis of the tests and the course assignment.

0211 Mathematics part 2

ECTS credits: 5
Weekly workload: 2lec+2sem+cp
Assessment: exam
Type of exam: written
Department involved:
Department of **Mathematical** Analysis
Faculty of Natural Science and Education
Lecturers:
Assoc. Prof. Ivanka Mitkova Jeleva, PhD, Subsidiary of the Univrsity of Ruse in Razgrad
E-mail: izheleva@ru.acad.bg
Abstract:
The subject acquaints students with basic notions of mathematical analysis, necessary for further study of Mechanics, Physics, theoretical basis of Electrical Engineering, Processes and apparatuses, etc.
Course content:
Basic topics: Functions of more than one variable. Differential calculus. Integral calculus. Ordinary differential equations.
Teaching and assessment:
At lectures students are introduced to main theoretical issues, logically presented and illustrated with appropriate examples. The theoretical basis of the topics presented at lectures is acquired at seminars through solving problems, having theoretical and application character. Two written tests are administered during the semester and the students are required to do a course project. . Students with an average grade exceeding 4.50 may be exempt from the written exam. In this case the final grade is based on the average mark from the tests and the course project. If students are to sit for the examination, final assessment is based on the written exam consisting of problems to be solved and theoretical questions to be answered. The marks from the tests are also taken into consideration. The requirement to have the semester validated is regular seminar attendance.

0212 Physics

ECTS credits: 7
Weekly workload: 3lec+0sem+3labs+0ps
Assessment: exam
Type of exam: written and oral
Department involved:
Department of Physics
Faculty of Electrical Engineering, Electronics and Automation
Lecturers:
Assoc. Prof. Tamara Grigorievna Pencheva, PhD, tel.: 082888218; mobile: 0887716785
Abstract:
The course aims at acquainting the students with the physical character of processes and phenomena in nature and the methods for their investigation, with the general properties of matter and the material objects. The laboratory exercises aim at creating skills for experimental investigation of physical phenomena and solving of physical problems. It is meant to serve as a basis for further studies in biotechnology, chemical technology and food technology, as well as other engineering subjects.
Course content:
Measuring physical quantities. Kinematics and dynamics of material point and rigid body. Interaction in nature. Inertial and inenertial reference frames. Inertia forces. Gravitational theory Work and energy. Mechanical preservation laws. Vibrations and waves. Basics of acoustics. Molecular physics and thermodynamics. Phenomena and transfer. Surface phenomena. Electric field and electric current. Magnetic field and magnetic forces. Electromagnetic waves. Light.
Teaching and assessment:
Lectures give the main theoretical material, supported by some demonstrations of physical phenomena and processes using multimedia and video. At the laboratory classes the students work independently and investigate particular physical phenomena. The knowledge of lecture material and laboratory classes is tested regularly. If the results of this assessment are good, the students are allowed to take the exam. An entry test or an oral quiz lasting 15 minutes is administered at the beginning of each laboratory class. Students are given 2 points for passing each test or quiz. At the end of the laboratory class a report is to be defended. A validated report accounts for further 2 points. The final assessment is formed after a discussion with the student. At the exam the students answer two theoretic questions and do a laboratory exercise.

0213 Analytical chemistry

ECTS credits: 7
Weekly workload: 3lec+0sem+3labs+0ps+ca
Assessment: exam
Type of exam: written
Department involved:
Department of Chemistry and Chemical Technology
Subsidiary of the University of Ruse in Razgrad, tel.: 611 016
Lecturers:
Assoc. Prof. Diana Vasileva Caneva, Department of Materials and Manufacturing Engineering,
tel.: 082 888 307
Abstract:
Analytical chemistry is studied in the first year and it examines the application of the Theory of chemical equilibrium in analysis. It gives students knowledge and develops their skills in quality and quantity analysis and eye detection of analytical signals.
Course content:
Basics of analytical chemistry. Classification of analytical methods. Analytical properties of substances. Analytical signal. Basic computations in chemical analysis. Solutions, preparations and standardization. Photolytic equilibrium. Sediment equilibrium. Complex equilibrium. Reduction-oxidation equilibrium. Fraction quality analysis. Gravimetry. Protolytemetry. Complexometry. Sediment titremetry. Titration curves and choice of indicator. Verification of analysis results.
Teaching and assessment: There are lectures and laboratory classes in this subject. Students are acquainted with the theory and practice of chemical analysis. Four tests are administered at regular intervals during the semester. Each test comprises three tasks accounting for 2, 3 and 5 points respectively. The maximum number of points that students can collect from the tests is 40. The course assignment accounts for 20 points. And finally the examination accounts for 40 points.

0214 Organic chemistry

ECTS credits: 7 **Weekly workload:** 3lec+0sem+3labs+0ps
Assessment: exam **Type of exam:** written
Department involved:
Department of Chemistry and Chemical Technology, tel.: 611 016
Subsidiary of the University of Ruse in Razgrad
Lecturers:
Assoc. Prof. Neiko Marinov Stoqnov, Department of Chemistry and Chemical Technology, tel: 084 611016
Abstract:
Organic chemistry acquaints students with basic types of organic compounds (acids, peptides, proteins and enzymes, nucleic acids, carbohydrates, steroids, etc.) which are very important for specialists in biotechnology and food technology.
Course content:
Introduction to organic chemistry. Physicochemical methods of analyzing the structure of organic compounds. Hydrocarbons. Types of isomerism. Basic types of organic reactions. Orientation in aromatic compounds. Halogen hydroxyl derivatives. Carbonyl compounds. Nitrogen organic compounds. Carboxylic acids and their derivatives. Lipids. Isoprenoid. Heterocyclic compounds. Nucleic acids. Alkaloids. Carbohydrates. Peptides, proteins and enzymes.
Teaching and assessment:
Students are taught the theoretical basis at lectures and they carry out experiments in laboratory classes. An overhead projector is used to show various models of organic compounds. Two tests are administered and students may be given up to 120 points for them. Attendance at lectures brings one point and laboratory classes bring two points. The maximum number of points for attendance is 45. Thus the total number of points is 285. To have the semester validated the student is required to have at least 100 points. The final grade is based on the written exam.

0216 Physical chemistry

ECTS credits: 6 **Weekly workload:** 3lec+0sem+3labs+0ps
Assessment: exam **Type of exam:** written and oral
Department involved:
Department of Chemistry and Chemical Technology
Subsidiary of the University of Ruse in Razgrad
Lecturers:
Pr. Assist. Prof. T. Haralanova,PhD, Department of Chemistry and Chemical Technology, tel: 084 611 016
Abstract:
Basic thermodynamic laws and their applications are studied. The equilibrium state of chemical compounds is examined. Details are given about its characteristics, criteria for recognition, conditions of its attaining as well as conditions of its shifting. The process of chemical reactions is studied by applying basic kinetic equations and taking into consideration the impact of various factors such as temperature catalysts, etc.
Course content:
Basic laws in physical chemistry, thermodynamic systems, phase transitions, chemical kinetics. Thermal and chemical reactions. Laws in thermal chemistry
Teaching and assessment:
There are lectures and laboratory classes in Physical Chemistry. Lectures examine basic phase diagrams and principles of control of chemical reactions and their applications. The equilibrium state of chemical compounds is examined. Details are given about its characteristics, criteria for recognition, conditions of its attaining as well as conditions of its shifting. The process of chemical reactions is studied by applying basic kinetic equations and taking into consideration the impact of various factors such as temperature catalysts, etc. To have the semester validated students are required to have collected a minimum of 20 points allocated for attendance of lectures and another set of 60 points allocated for the defense of laboratory reports. The final exam comprises 36 topics.

0217 Heat Engineering

ECTS credits: 6
Weekly workload: 3lec+0sem+0labs+2ps+cp
Assessment: exam
Type of exam: written oral and
Department involved:
Department of Heat Engineering, Hydraulic and Pneumatic Equipment
Faculty of Agricultural and Industrial Engineering**.**
Lecturers:
Assoc. Prof. Veselka Ivanova Kamburova, MScEng, PhD, tel: 084 611012, E-mail: veselkakamburova@dir.bg
Abstract:
The aim of this subject is to provide students with basic theoretical and practical knowledge of heat as a form of energy, its conversion into other types of energy and its distribution. The thermodynamic properties of various substances and materials, the main laws of thermodynamics and heat transfer as well as basic heat computations in heat exchange apparatuses are also examined. Finally, heat processes, apparatuses and machinery are studied.
Course content:
Basic thermodynamic concepts, thermodynamic processes with ideal gases. First and second law of thermodynamics. Carnot cycle. Steam processes. Gases. Humid air. Heat and mass exchange. Heat conduction. Convection heat exchange. Radiant heat exchange. Complex heat exchange and heat transfer. Types of heat exchange apparatuses. Heat computations. Applied thermodynamics.
Teaching and assessment:
Lectures provide students with theoretical knowledge. They are illustrated with multimedia materials. Some of the laboratory classes are carried out on laboratory installations, others on real industrial sites. For each laboratory class students work out a written report which includes processing and analysis of the experimental data. The assessment is done on the basis of students' performance during the laboratory classes and their written reports. Students are required to do a course assignment. The exam is in written form, followed by oral testing. It comprises theoretical questions and problems to be solved. The final mark is a complex one, based on the results of the exam, the course assignment and the students' performance at the laboratory classes.

0218 Mechanics

ECTS credits: 6
Workload per week: 2lec+0sem+0labs+3ps+ca
Assessment: exam
Type of exam: written
Department involved:
Department of Technical Mechanics
Faculty of Mechanical and Manufacturing Engineering.
Lecturers:
Assoc. Prof. Ivanka Mitkova Jeleva, PhD, tel.: 662332
Abstract:
The students are acquainted with the methods for investigation of various kinds of rigid body motion, for different force transformations, and for investigation of the mechanical interaction in rigid bodies in equilibrium. The subject provides a basis for modeling of structures, mechanisms, dynamic processes and gives engineering methods for practical problem solution. Previous knowledge of Mathematics and Physics is necessary for this course. The discipline is fundamental for the engineering courses dealing with the analysis and design of mechanical structures and machines.
Course content:
The subject comprises the following parts: Statics, Kinematics, Dynamics and Introduction to Materials science.
Teaching and assessment:
The theoretical basis of the topics is elucidated in lectures and it is illustrated by examples. The students solve problems in practical classes. They apply the learned methods in their course work, which is assigned individually to each student. The course assignment comprises either two problems concerning Statics, Kinematics and Dynamics respectively or two problems concerning Materials science. The course work is controlled and graded by means of a grading system and it is submitted according to schedule. The exam consists of several questions and some problems to solve. When the final grade for the semester is formed the students' participation in practical classes and the course assignment are also taken in consideration. Regular attendance of classes and course work submission are required for semester passing approval.

0219 Colloidal chemistry

ECTS credits: 2
Weekly workload: 1lec+0sem+1labs+0ps
Assessment: exam
Type of exam: written
Department involved:
Department of Chemistry and Chemical Technology
Subsidiary of the Univrsity of Ruse in Razgrad
Lecturers:
Pr. Assist. Prof. T. Haralanova,PhD, Department of Chemistry and Chemical Technology
Subsidiary of the Univrsity of Ruse in Razgrad, tel: 084 611 016
Abstract:
Dispersion systems are very important in technological processes in the chemical industry. Colloidal systems are common in chemical products. Colloidal chemistry studies the properties- electrical, optical, kinetic, palpitation, ageing, etc. as well as the structure of colloidal systems. Students are acquainted with some of the most important methods of production of colloidal systems
Course content:
Types of dispersion systems and properties of colloidal systems. Structure of colloidal particles.
Teaching and assessment:
Lectures acquaint students with dispersion systems and colloidal solutions and the properties- electrical, optical, kinetic, palpitation, ageing, etc. of colloidal systems. Laboratory classes start with an entry test and finish with a defense of the laboratory report. Students receive a mark for each laboratory class. When the final grade is decided the lecturer takes into consideration students' participation in laboratory classes and the assignments given during the semester. There are three assignments for the entire semester concerning the structure of colloidal particles and their properties. An end of term test is administered. At the end of the semester students are required to have at least 10 points showing they have attended the lectures and a minimum of 50 points showing they have submitted their assignments and defended the laboratory reports.

0220 Electrical and Electronic Engineering

ECTS credits: 5
Weekly workload: 2lec+0sem+0labs+2ps+ca
Assessment: exam
Type of exam: written and oral
Department involved:
Department of Biotechnology and Food Technology
Subsidiary of the Uniersity of Ruse in Razgrad
Lecturers:
Assoc. Prof. Radoslav Ivanov Kjuchukov, MScEng, PhD, Department of Electrical Power Supply and Equipment Faculty of Electrical and Electronic Engineering and Automation
Assoc. Prof. Veselka Ivanova Kamburova, MScEng, PhD, Department of Biotechnology and Food Technology, e-mail: veselkakamburova@dir.bg
Abstract:
The subject of Electrical and Electronic Engineering is part of the curriculum for the bachelor degree courses in Biotechnology, Chemical technology and Food technology. The aim of the subject is to introduce students to the basics of electrical engineering, the main electrical machines and apparatuses and some electronic devices.
Course content:
Electric and magnetic field. DC electric circuits. Ohm's law, Kirchhoff's law, Joule's law, Lenz's law. AC electric circuit. Three phase electric circuits Electrical measurements. Transformers. Asynchronous machines. DC machines. Lighting. Electricity generation, electric power transmission, electric distribution and use. Semiconductor materials. Diodes, bipolar junction transistors and field effect transistors, thyristors. Electronic devices.
Teaching and assessment:
The teaching process is organized in lectures and practical classes. Two tests are administered. They consist of a questionnaire ad some problems to be solved. Student whose marks exceed 5.00 are exempt from the examination. The exam is in writing. It lasts 120 minutes and is held within the semester.

0221 Machine Elements

ECTS credits: 5
Weekly workload: 2lec+0sem+0labs+2ps+ca
Assessment: continuous assessment
Type of exam: written and oral
Department involved:
Department of Machine Science and Machine Elements
Faculty of Automotive and Transport Engineering.
Lecturers:
Assoc. Prof. Ognyan Lyubenov Alipiev, MScEng, PhD, Department of Theory of Mechanisms and Machines and Material Handling Engineering and Technologies, Faculty of Agricultural and Industrial Engineering, tel: 888 593, E-mail: oalipiev@ru.acad.bg.
Assoc. Prof. Ivan Georgiev Spasov, MScEng, PhD, Department of Machine Science and Machine Elements, Faculty of Automotive and Transport Eengineering tel.:888 235, E-mail: igs@ru.acad.bg
Assoc. Prof. Stoqn Borisov Stojkov, MScEng, PhD, Department of Theory of Mechanisms and Machines and Material Handling Engineering and Technologies, Faculty of Agricultural and Industrial Engineering, tel: 888 486, E-mail: sstoykov@ru.acad.bg
Abstract:
This subject aims at introducing students to basic approaches and laws in constructing mechanical systems, where mechanisms and machine elements are very important. Students gain knowledge in research and design of particular mechanisms and machine elements. Basic issues in the theory, practice and design of the mechanical part in mechanical systems are also examined.
Course content:
Basic concepts. Structure and classification of mechanisms. Analysis of leverage mechanism, cam mechanisms, gears and complex mechanisms. Involute gears – geometric theory, kinematics, computation of contact strength and bending strength. Types of coupling. Rotary motion elements: axes, shafts, bearings and clutches. Worm, sprocket rack and pinion gears. Dynamics of electromechanical systems. Balancing of mechanisms.
Teaching and assessment:
The theoretical issues presented at lectures are developed at practical classes and in the course assignment. Lectures and practical classes are illustrated with various kinematics models and models of genuine mechanisms and machine elements. Computer simulations of different processes as well as installations and stands are also used. For further reading students use paper based and electronic textbooks. Students make a test at the beginning of each practical class and there are several additional tests. The final grade is based either on the tests or the exam.

0222 Microbiology

ECTS credits: 7
Weekly workload: 3lec+0sem+3labs+0ps+cp
Assessment: exam
Type of exam: written
Department involved:
Department of Biotechnology and Food Technology
Subsidiary of the University of Ruse in Razgrad
Lecturers:
Assoc. Prof. Todor Dimitrov Dimitrov, GSM 0896615457, Trakia University, Stara Zagora
Abstract:
The aim of Microbiology is to provide students with basic knowledge about microorganisms, the favorable and unfavorable processes that they cause and the methods of studying them. The morphology, taxonomy, physiology, metabolism and genetics as well as ecology of basic types of microorganisms are examined. Infections, immunity and food poisoning are also studied.
Course content:
Morphology of microorganisms. Prokaryotes. Eukaryote. Physiology. Feeding. Types of feeding. Anaerobic metabolism of carbohydrates. Fermentation. Breathing. Metabolism of nitrogen compounds. Cultivation. Spread. Impact of external factors on the development of microorganisms. Genetics. Microbe synthesis. Microbiological and veterinary supervision.
Teaching and assessment:
Lectures provide a theoretical basis for laboratory classes. Visual aids are widely used. In laboratory classes students are required to write reports showing the results of the experiments. Four tests are administered during the semester and students can get maximum 40 points. The course paper that students have to write accounts for 3 points. The final grade is based on the written exam.

0224 Biochemistry part 1

ECTS credits: 7
Weekly workload: 3lec+0sem+2labs+0ps+cw
Assessment: exam
Type of exam: written
Department involved:
Department of Biotechnology and Food Technology
Subsidiary of the University of Ruse in Razgrad
Lecturers:
Assoc. Prof. Ivan Genov Pishtiiski, tel: 032 603 720, University of Food Technology, Plovdiv
Abstract:
Biochemistry part 1 aims at acquainting students with the chemical composition of living matter and the properties and metabolism of substances that build it up. Special attention is paid to biochemical processes that are used in food technology and biotechnology such as catabolism of carbohydrates, proteins, amino acids, etc. A significant part of the course is dedicated to enzymes.
Course content:
Introduction to biochemistry. Static, dynamic and functional biochemistry. Application of biochemistry in food technologies. Carbohydrates. Monosaccharides. Disaccharides. Polysaccharides. Proteins. Chemical composition and classification of α-aminocarboxylic acids. Essential α-aminocarboxylic acids. Chemical properties. Structure of proteins. Enzymes. Nucleic acids. Biological significance, composition and structure.
Teaching and assessment:
There are lectures and laboratory classes in this subject. Various visual aids such as video, tables, diagrams and charts are used. Students are required to do a course assignment. To have the semester validated students have to defend the laboratory reports they have written. They have to submit and defend the course assignment and make a test. The final grade is based on a written exam.

0225 Processes and apparatuses part 1

ECTS credits: 8
Weekly workload: 3lec+0sem+3labs+0ps+ca
Assessment: exam
Type of exam: written
Department involved:
Department of Biotechnology and Food Technology
Subsidiary of the University of Ruse in Razgrad
Lecturers:
Assoc. Prof. Nastq Vasileva Ivanova,PhD, Department of Biotechnology and Food Technology
Subsidiary of the Univrsity of Ruse in Razgrad, E-mail: nivanova@ru.acad.bg
Assoc. Prof. Gencho Stoikov Popov,PhD, Department of Thermotehnics, Hydro- and Pneumotechnics, Faculty of Agricultural and Industrial Engineering
Abstract:
Biotechnological, food processing and chemical plants use various technological processes that transform raw materials into a finished product. Raw materials undergo chemical, physical and physicochemical changes. The structure, the composition and the properties of substances are changed. Nevertheless, a number of underlying processes may be considered as basic.
Course content:
This subject studies the theoretical basis of mechanical and hydraulic processes, the structure, operation and computations of machines that are involved in these processes. The types of mechanical processes are studied in detail. Special attention is paid to breaking into small pieces, grinding, sorting, sifting out, pressing and mixing as well as transportation of fluids, compression and rarefying of gases, separation of fluid and gas dispersion systems and mixing in fluids.
Teaching and assessment:
There are lectures and practical classes in this subject and students are required to do a course assignment. Two tests are administered according to schedule. The tests consist of problems to be solved. At the end of the semester students have to defend the reports they have written in laboratory classes. The final grade is based on a written exam lasting 3 hours. At the exam students answer two theoretical questions and solve one problem.

0226 Technical safety

ECTS credits*: 3*
Weekly workload: 2lec+0sem+0labs+1ps+cp
Assessment: continuous assessment
Type of exam: written
Department involved:
Department of Ecology and Environmental Protection
Faculty of Agricultural and Industrial Engineering.
Lecturers:
Prof. Vladimir Tomov Vladimirov, Department of Ecology and Environmental Engineering, tel: 082 888 498
Abstract:
Safety rules are very important in contemporary production. Labour safety plays a major role in safeguarding the life and the health of employees and in addition it influences labour productivity and product quality. This in turn influences the economic results on production. That is why providing a safe work environment is a task of high priority of management.
Course content:
Industrial toxicology. Hermetic sealing of machinery. Measures concerning hazardous leak of toxic or flammable substances. Fire and explosion protection. Ergonomic work environment. Ventilation. Safety rules concerning work with pressure devices. Risks. Electrical safety. Protection against noise and vibrations. Lighting.
Teaching and assessment:
The lectures are made clear with visual aids such as posters, tables and diagrams, an overhead projector, etc. Practical classes are held in the laboratory. At the beginning of each practical class students make a test. They defend their reports at the end of the class. Course work is assigned to each student individually. Three tests are administered each of them accounting for 20 points. The final grade is based on the results from the tests, the course assignment and the students' and participation in classes.

0227 Economics

ECTS credits: 5
Weekly workload: 3lec+2sem+0labs+0ps+ca
Assessment: exam
Type of exam: written
Department involved:
Department of Economics
Faculty of Business and Management.
Lecturers:
Assoc.Prof. Djanko Hristov Minchev, MEcon, PhD, Dept. of Economics, tel. 888 557,
E-mail: Dminchev@ru.acad.bg
Abstract:
The subject is concerned with the general problems, laws and categories of the contemporary market economy. Thus it creates a certain basis for the remaining economic subjects. It also gives general knowledge, which is expressed in alternative ways of economic viewing and which forms and creates abilities for independent and expert choice in economic surroundings. Course prerequisite is knowledge of mathematics and it is related to other branch and functional economic subjects.
Course content:
Introduction – the economic system and the fundamentals of economic theory. Main economic issues. Market mechanism. Demand and supply. Consumer demand and behavior. Manufacture, expenditure and revenue. Imperfect competition and supply. Price formation and incomes depending on production factors. Gross domestic product and economic growth. Economic cycles, unemployment and inflation. Fiscal and monetary policy of the state.
Teaching and assessment:
Material is taught in two ways – lectures and practical classes, which elucidate and develop further some of the issues discussed at lectures. Students are encouraged to do some further reading. They are required to do a course assignment. The final grade is based on the exam and the students' participation in classes is also taken into consideration.

0228 Processes and apparatuses part 2

ECTS credits: 6
Weekly workload: 2lec+0sem+0labs+2ps+cw
Assessment: exam
Type of exam: written
Department involved:
Department of Biotechnology and Food Technology
Subsidiary of the University of Ruse in Razgrad
Lecturers:
Assoc. Prof. Nastq Vasileva Ivanova,PhD, Department of Biotechnology and Food Technology
Subsidiary of the University of Ruse in Razgrad, tel.: 084 611 012
Abstract:
Biotechnological, food processing and chemical plants use various technological processes that transform raw materials into a finished product. Raw materials undergo chemical, physical and physicochemical changes. The structure, the composition and the properties of substances are changed. Processes and apparatuses part 2 is a continuation to Processes and apparatuses part 1 and serves as a link between fundamental and specialized subjects. It helps students gain knowledge about particular technologies and machinery.
Course content:
Processes and apparatuses part 2 deals with the theory of heat (heating, cooling, vapourization and condensation) and the mass exchange processes such as absorption, adsorption, distillation, rectification, extraction and drying. It also examines the operation and the computations of the machinery involved in these processes.
Teaching and assessment:
There are lectures and practical classes in this subject and students are required to do a course assignment. Two tests are administered according to schedule. The tests consist of problems to be solved. At the end of the semester students have to defend the reports they have written in laboratory classes. The final grade is based on a written exam lasting 3 hours. At the exam students answer two theoretical questions and solve one problem.

0229 Automation

ECTS credits: 6
Weekly workload: 2lec+0sem+0labs+2ps+cw
Assessment: exam
Type of exam: written and oral
Department involved:
Department of Biotechnology and Food Technology
Subsidiary of the University of Ruse in Razgrad
Lecturers:
Assoc. Prof. Veselka Ivanova Kamburova, MScEng, PhD, e-mail:veselkakamburova@dir.bg
Abstract:
Automation is the only subject that deals with automation systems. Students gain knowledge about automatic control systems, the primary transformers of technological variables, automatic controllers and actuating devices. Students are acquainted with major processes, technologies and apparatuses in biotechnology and food industry and they study how they can be automated and controlled. In practical classes students examine the elements of the system of automatic control and some closed systems.
Course content:
Basic concepts of automatic control systems. Mathematical background of linear continuous automatic control systems. Properties and identification of the objects to be controlled in the chemical industry. Analysis of automatic control systems. Automatic control of technological variables – temperature, pressure, consumption, level, pH, concentration, humidity, etc. Automatic controllers. Actuating devices and controls. Automatic control systems that adjust the temperature, the consumption, the quantity, the pressure, the level and pH.
Teaching and assessment:
Lectures acquaint students with the elements of automatic control systems in biotechnology and food processing industry. Block diagrams are shown on slides, overhead projector transparencies and photos. Practical classes are meant to extend and develop the material thought in lectures. They start with a short test or a quiz and finish with defense of reports written in class. The final grade is calculated according to the following formula: 70% from the exam and 30% from the course assignment

0230 Instrumental methods of analysis

ECTS credits: 4 **Weekly workload:** 2lec+0sem+2labs+0ps+ca
Assessment: continuous assessment **Type of exam:** written
Department involved:
Department of Chemistry and Chemical Technology, tel.: 611 016
Subsidiary of the University of Ruse in Razgrad
Lecturers:
Assoc. Prof. D. Caneva, PhD, Department of Materials & Manufacturing Engineering, tel.: 082 888 307
Abstract:
The aim of this subject is to introduce students to some common basic instrumental methods of analysis. Some of the most widely spread chromatographic methods are also examined. Each method is made clear by explaining the underlying theory and the application. The limitations of each method are also pointed out. This subject builds on previous knowledge in analytical, organic and inorganic chemistry and physics.
Course content:
Atomic absorption spectral analysis. Atomic emission spectral analysis. Molecular spectrometry in the visible, ultraviolet and infrared spectrum. Electrochemical methods of analysis without external pressure. Chromatography – ion exchange and thin layer. Refractometry. Viscosimetry.
Teaching and assessment:
There are lectures and laboratory classes in this subject. Students get acquainted with the theoretical basis of methods, the block diagrams of apparatuses, the application and the limitations of the methods. They are required to do a course assignment. Two quizzes are administered. 50% of the final grade is based on the quizzes and 50% is based on the exam. Students who get a pass at the quizzes may be exempt from the theoretical part of the exam.

0234 Application of Enzymes in the Food-Processing Industry

ECTS credits: 5 **Weekly workload:** 2 lec +0 sem + 2 lab + 0 ps
Assessment**:** exam **Type of exam**: written
Department involved:
Department of ''Biotechnology and Food Technologies", tel.: 084 611 012, Subsidiary - Razgrad
Lecturers: Assoc. Prof. Nastya Vasileva Ivanova, Ph.D., Department of Biotechnology and Food Technologies, email: nivanova@ru.acad.bg
Abstract:
The course in **Application of Enzymes in the Food-processing Industry** aims at broadening the knowledge of students about enzymes. It also gives information about their properties and the mechanisms of action of those enzymes that have actual practical implementation. In addition to this, students study the detailed industrial application of enzymes in various branches of industry. An emphasis is put on the main aspects of microbiological obtaining of enzymatic preparation. Special attention is paid to the perspective aspects of enzyme application through advanced immobilization.
Course content:
The course content includes the following topics: Properties, Chemical structure, Specificity of enzymes; Production of enzymatic preparation; Immobilised enzymes; Uses of enzymes in the production of bread, alcohol, beer, medicines, meat products and canning of foods.
Teaching and assessment:
The material is presented at lectures and laboratory classes.
During the semester two tests (based on theoretical questions) are administered following a schedule that is agreed in advanced. At the end of the semester students defend the results obtained in laboratory work done during the semester. The results are kept and presented in laboratory diaries. The tests and the lab diaries are graded with marks from 2-6. In order to have the semester verified students have to attend 50% of the lectures and 100% of the practical exercises. In addition to this, students must do the two tests and have their lab reports defended. If students receive an average mark of 5, 00 and higher from the continuous assessment (the two tests and the defense of the lab reports) they are exempt from part of the theoretical material for the final written exam. The final grade is formed after taking into consideration the results from the continuous assessment and the result of the written exam. The results of the written exam are graded from 2-6. Students can see their written work. Students with poor marks can retake the exam which is also a written one and is administered under the same conditions.

0232 Refrigerating and drying engineering

ECTS credits: 4 **Weekly workload:** 3lec+0sem+3labs+0ps+cw
Assessment: exam **Type of exam:** written
Department involved:
Department of Thermotehnics, Hydro- and Pneumotechnics
Faculty of Agricultural and Industrial Engineering
Lecturers:
Assoc. Prof. Valentin Vasilev Bobilov, PhD, tel.:082/888-844, E-mail: bobilov@ru.acad.bg;
Abstract:
This subject gives basic knowledge in refrigerating and drying engineering. It aims at acquainting students with methods and means of analysis and the efficient use of real heat engineering systems and installations. Compression refrigeration machines and convective drying installations.
Course content:
Part 1. Methods of cooling. Physical principles of producing cold. "Working body" of the refrigeration machines. Cooling agents. Thermodynamic basis of refrigeration machines. Reverse cycle of Carnot. Assessment of the energy efficiency of the cycle. Heat pump. Cold air, absorption and vapor ejection refrigeration machines. De Laval nozzle. Components of refrigeration installations. Control systems.
Part 2. Drying. Methods of artificial drying. Balance of heat in driers. Diagrams of material and heat flow. Thermodynamic cycle of the convective drying process with or without recirculation. Characteristics of real installations.
Teaching and assessment:
Theoretical issues are examined in lectures and computational skills are developed in practical classes and in the course assignment. The students' participation in lectures and practical classes and the defense of the course assignment are taken into consideration when the final grade is formed. The final grade itself is given after an interview with the lecturer.

0233 Biochemistry II

ECTS credits: 6 **Weekly workload:** 2lec+0sem+3labs+0ps+cp
Assessment: exam **Type of exam:** written
Department involved:
Department of Biotechnology and Food Technology
Subsidiary of the University of Ruse in Razgrad
Lecturers:
Assoc. Prof. Ivan Genov Pishtiiski, PhD, tel: 032 603 720, University of Food Technology, Plovdiv
Abstract:
Biochemistry part 2 aims at enlarging students' knowledge of the chemical composition of living matter and the properties and metabolism of substances that build it up. Special attention is paid to biochemical processes that are used in food technology and biotechnology such as catabolism of carbohydrates, proteins, amino acids, etc. A significant part of the course is dedicated to the metabolism of amino acids. In addition some issues concerning nutrition biochemistry are studied briefly at the end of the course.
Course content:
Metabolism. Exchange of energy. Biochemical energetics. Metabolism of carbohydrates. Anaerobic metabolism of carbohydrates – glycolytic chain. Balance of energy. Anaerobic fermentation. Tricarboxylic acids cycle. Direct oxidation of glucose – pentose phosphate cycle. Biosynthesis of carbohydrates in autotrophic and heterotrophic organisms. Lipid metabolism. Triacylglycerol metabolism. Phosphoacylglycerol metabolism. Amino acid metabolism. Ornithine cycle. Phenylalanine and tyrosine metabolism. Metabolism of lysine, alanine, asparagines and glutamine. Metabolism of tryptophan. Biosynthesis of α-aminocarboxylic acids. Metabolism of nucleic acids. Protein metabolism. Relationship between the metabolic processes of carbohydrates, lipids and proteins. Biochemistry of nutrition.
Teaching and assessment:
There are lectures and laboratory classes in this subject. Various visual aids such as video, tables, diagrams and charts are used. Students are required to do a course assignment. To have the semester validated students have to defend the laboratory reports they have written. They have to submit and defend the course assignment and/or make a test. The final grade is based on a written exam.

0235 Technology of Milk and Dairy Products

ECTS credits: 7 **Weekly workload**: 3 lec + 0 sem+ 3 labs + 0 ps +cp
Assessment: exam **Type of exam**: written
Department involved:
Department of "Biotechnology and Food Technologies", tel.: 084 611 012, Subsidiary-Razgrad, Russe University "A. Kanchev"
Lecturer: Prof. Todor Dimitrov Dimitrov Ph.D., GSM 0896615457, Trakia University –Stara Zagora
Abstract:
The subject acquaints students with the chemical composition and properties of milk and the basic technological processes for dairy production. The processes are studied from physicochemical and technological points of view. Students also learn about some of the contemporary technological methods for production of famous Bulgarian and international dairy products.
Course content:
The main topics include: composition and properties of milk; special features; membrane methods for milk processing; processing through heat; cooling; technologies for the production of dairy products (pasteurized и sterilized milk, powdered milk, ice cream, butter, cheese); technology of dairy products from secondary milk products.
Teaching and assessment:
The teaching is done at lectures and laboratory classes and through course work supervised by the lecturer. The lectures are given in accordance with the curriculum and are illustrated with the use of modern technologies. At the laboratory classes students work applying methods that have been discussed in advance and observe the basic technological processes of the production of milk and dairy products. The results of the experiments are presented in a laboratory report.
The aim of the course paper is to develop the students' abilities to work independently and to apply creatively the acquired skills and knowledge when solving practical problems in the sphere of milk production.
The final grade is formed after students sit for a written exam.

0237 Technology of Meat, Poultry and Fish

ECTS credits: 4 **Weekly workload**: 2 lec + 0 sem + 0 labs + 1 ps+cp
Assessment: exam **Type of exam**: written
Department involved:
Department of "Biotechnology and Food Technologies", tel.: 084 611 012, Subsidiary - Razgrad
Lecturer: Prof. Doctor of Technical Sciences Dimitar Delchev Kyosev, GSM 0888647589, University of Food Technologies-Plovdiv
Abstract:
The course deals with issues concerning the histological and morphological structure of animal tissues; the anatomic structure and characteristics of the body, systems and organs; and the chemical composition and main technological characteristics of animals slaughtered for food, poultry, and fish. Special attention is paid to topics related to the technological schemes for processing of animals, poultry, and fish used for food.
Course content:
Knowledge about met as raw material. Technology of production of animal meat as food. Technology of fish. Technology of animal meat fats. Technology of secondary and technical products. Production and technical control in the production of animal meat, poultry, and fish as food.
Teaching and assessment:
The teaching is done at lectures and laboratory exercises and through course work supervised by the lecturer. The lectures are given in accordance with the curriculum and are illustrated with the use of modern technologies. At the laboratory classes students work applying methods that have been discussed in advance and observe the basic technological processes of the production of milk and dairy products. The results of the experiments are presented in a laboratory report.
The lab reports are defended by the students and verified by the lecturer. Two tests are administered during the semester on an agreed schedule.
The final mark for the course is formed after the students sit for a written exam.

0238 Technology of Sugar and Sugar Products

ECTS credits: 8 **Weekly workload:** 3lec +0sem+ 3labs + 0 ps+cp
Assessment: exam **Type of exam**: written
Department involved:
Department of "Biotechnology and Food Technologies", tel.: 084 611 012, Subsidiary - Razgrad
Lecturers: Assoc. Prof. Zlatka Mireva Yordanova, Ph.D, Department of "Biotechnology and Food Technologies", tel.: 084 611 012
Abstract:
Sugar and sugar products are one of the products that the used most often in the food processing industry. For this reason the course "Technology of Sugar and Sugar Products' acquaints the students with the different types of raw materials needed for this industry; the quality requirements; the technological suitability and storage conditions for sugar products.
Course content:
Principle technological scheme of a modern sugar beet plant. Characteristics of sugar beet. Indicators for quality classification of sugar beet and beet cossettes. Composition and characteristics of raw sugar syrup. Technological operations and processes. Technological scheme for the obtaining of raw sugar syrup. Technological processes for thickening of the purified juice and for obtaining and processing of the first sugar content to white sugar. Technological scheme for crystallization of sugar. Technologies for processing of raw sugar cane in Bulgarian factories. Classification and characteristics of caramelized sweets. Characteristics of chocolate substance. Classification of chocolates. Technology and technological scheme. Classification and technology of halva, loukoum, biscuits, and wafers.
Teaching and assessment:
The teaching is done at lectures and laboratory exercises following the syllabus. The teaching material is illustrated with the help of schemes, tables, etc. For the laboratory exercises the students are divided into groups after a discussion of the given methods. The results of each laboratory class are presented in a report. Every student must write a course project. The semester is verified after the successful completion of the laboratory exercise through defence of the laboratory reports, the course project, and active work during the semester and (or) the taking of a test. The final mark is given after students sit for a written exam.

0239 Microbiological Control of Food Products

ECTS кредити: 4 **Weekly workload**: 1 lec + 0 sem + 2 labs + 0 ps+ca
Assessment: exam **Type of exam**: written
Department involved:
Department of "Biotechnology and Food Technologies", tel.: 084 611012, Subsidiary - Razgrad
Lecturer: Prof. Stefan Venev, tel. 082 888 556, Russe University "A. Kanchev"
Abstract:
The course acquaints students with the microorganisms that cause decay of raw materials and finished products. Special attention is paid both to the causes for microbe food poisonings, toxic infections, microbe infections and to the possibilities for limiting the spreading of microorganisms. Students also study the control systems for food safety and their implementation in the various branches of industry.
Course content:
Microbiological methods, indicators, and norms. Microorganisms associated with raw materials, substances and packaging. Microbiological hazards associated with food products. Requirements for good production and hygiene practices.
Teaching and assessment:
The teaching is done at lectures, laboratory exercises and through course work supervised by the lecturer. The lectures are given according to the syllabus and are illustrated with the help of modern devices. At the laboratory exercises students work using methods that are discussed in advance. Students also have to work on a course assignment. At the end of the semester it is defended and graded.
The final mark is based on the results of a written exam. For the exam the students study a number of topics that are given to them in advance and when it is administered they choose two questions at random that have to be answered. After the test students are allowed to see their results.
If the tests results are poor, students can retake the exam following the same rules.

0240 Food Additives and Spices

ECTS credits: 4 **Weekly workload:** 2lec +0sem + 2 lab + 0 ps +cp
Assessment: continuous assessment **Type of exam**: written
Department involved:
Department of "Biotechnology and Food Technologies", tel.: 084 611 012, Subsidiary - Razgrad
Lecturer: Assoc. Prof. Stanka Todorova Damyanova Ph.D, Department of "Biotechnology and Food Technologies", email: sdamianova@ru.acad.bg
Abstract:

The course "Food Additives and Spices" aims at acquainting the students both with the main additives used in the food products and the spices used most often in them. The students acquire knowledge about the safety of food additives and the hygiene requirements towards them. The main groups of additives are outlined in the course: food coloring agents, preservatives, aantioxidants and acidity regulators, emulsifiers, thickeners and gelling agents (stabilizers), sweeteners and flavour enhancers. Students also study their characteristics, use, law regulations for application, advantages and possible drawbacks.

Course content:
Main topics: Introduction to the course. Classification of additives. Law regulations. The meaning of E-Numbering. Safety of food additives. Criteria and indicators for the toxicological assessment of additives. Food colouring agents. Preservatives. Antioxidants and acidity regulators. Emulsifiers. Thickeners and gelling agents (stabilizers). Sweeteners. Flavour enhancers. Types, activities, use. Spices used in the food products.
Teaching and assessment:
The teaching is done at lectures, laboratory exercises and through course work supervised by the lecturer. The lectured material is structured in such a way that it is easily comprehended by students and is illustrated with the help of modern methods. During the semester students do laboratory exercises which end with the preparation of protocols that consist of a brief theoretical outline, the assigned tasks, the results and the conclusions from the completed laboratory work. Students have to prepare themselves in advance for the laboratory classes. They also have to write a course project based on the lectured material. The final mark is formed after students sit for a written exam at the end of the semester.

0248 Marketing and management of a company

ECTS credits: 3 **Weekly workload:** 1lec+1sem+0labs+0ps+cw
Assessment: exam **Type of exam:** written and oral
Department involved:
Department of Economics
Faculty of Business and Management.
Lecturers:
Assoc. Prof. Lyubomir D. Lyubenov, PhD, Department of Economics, tel.: 888-347,
E-mail:LLyubenov@ru.acad.bg
Abstract:
The aim of this subject is to familiarize students with methods of market research and management of a company
Course content:
Basic concepts and definition of marketing. Marketing environment. Marketing surveys. Marketing mix. Marketing strategy. Product policy. Distribution policy. Communication policy. Pricing policy. Planning. Organizing. Management. Control.
Teaching and assessment:
Lectures are delivered in the traditional way. They are illustrated with slides when necessary. In seminars problems are solved and tests are made. To have the semester validated the usual requirements such as attendance of lectures and seminars and submission and defense of the course assignment are applied.

0241 Technology of the Grain Processing Industry and the Bakery Industry

ECTS credits: 7 **Weekly workload: 3**lec +0sem + 3 labs + 0 ps+cp
Assessment**:** exam **Type of exam**: written + oral
Department involved:
Department of "Biotechnology and Food Technologies", tel.: 084 611 012, Subsidiary - Razgrad
Lecturer: Assoc. Prof. Stanka Todorova Danyanova, Ph.D., Department of "Biotechnology and Food Technologies", email: sdamianova@ru.acad.bg
Abstract:

The course introduces the students to the basic theoretical and practical knowledge concerning the cultivating, storing, and processing of grain into food and fodder products, the quality of grain and how it is determined. It also acquaints students with issues referring to the quality management of grain, grain and paste products.

Course content:
Morphological characteristics and anatomic structure of grain. Chemical composition of grain. Physical properties of grain. Heat properties of grain. Methods and modes of drying. Methods for storing. Processing of wheat grain into flour. Preparation of grain for grinding. Grinding of grain. Main materials for production of bread and bread products. Storage of the main and subsidiary materials. Scheme of the technological process of bread production. Storage and transportation of bread. Types of bread and bread products. Quality characteristics of the finished products. Improvement of the quality and the nutrition indicators of the ready products.

Teaching and assessment:
The teaching is done at lectures, laboratory exercises and through course work supervised by the lecturer. The lectured material is structured in such a way so that it is easily comprehended by students and is illustrated with the help of modern methods. During the semester students do laboratory exercises which end with the preparation of protocols that consist of a brief theoretical outline, the assigned tasks, the results and the conclusions from the completed laboratory work. Students have to prepare themselves in advance for the laboratory classes.
Students also have to write a course project based on the lectured material. In order to have the semester verified students have to attend at least 90% of the lectures and to submit the course projects by the set deadline. The exam consists of a written and oral section. For the written part of the students have to answer in writing to two questions from the lectured material or to complete a test. During the oral part of the exam students have do elaborate on the questions or answer additional once from the examiner. Students can retake the exam following the same rules in case of a poor result.

0242 Technology Of The Vegetable Lipids And Essential Oils

ECTS credits: 7 **Weekly workload: 3** lec +0 sem + 3 labs+ 0 ps +cp
Assessment**:** exam **Type of exam**: written and oral
Department involved:
Department of "Biotechnology and Food Technologies", tel.: 084 611 012, Subsidiary - Razgrad
Lecturer: Assoc. Prof. Stanka Todorova Damyanova , PH.D. email: sdamianova@ru.acad.bg
Abstract:
The course aims at acquainting the students with the main production processes of the essential oils industry and the oil-bearing industry. The students receive knowledge about the raw materials, their processing, composition and the quality of the obtained vegetable lipids and essential oils.

Course content:
Main topics: Raw materials for vegetable fats and essential oils. Processing of oil-bearing seeds. Obtaining oils through pressing. Obtaining of oils through extraction. Refinement of vegetable oils. Obtaining of natural aromatic products. Primary processing of natural essential oils. Improvement and modification of the quality of natural essential oils. Isolation of components from the essential oils. Methods of production of Bulgarian essential oils.

Teaching and assessment:
The teaching is done at lectures and laboratory exercises. At lectures the material is illustrated with the help of modern methods. At the beginning of each laboratory class the lecturer administers an entry test and at the end the obtained results are discussed and a report is prepared. Students have to work on a course project based on the lectured material. Students sit for an exam that consists of a written and oral part. The final mark for the course is based on the exam results and the laboratory exercises.

0243 Technology of meat, poultry, and fish food products

ECTS credits: 6 **Weekly workload**: 2 lec+0 sem+2 labs+0 ps+cp
Assessment**:** exam **Type of exam**: written
Department involved:
Department of "Biotechnology and Food Technologies", tel.:611012,
Subsidiary - Razgrad, Russe University "A. Kanchev"
Lecturer:
Prof. Doctor of Technical Sciences Dimitar Delchev Kyosev, GSM 0888647589, University of Food Technologies-Plovdiv
Abstract:
The students are acquainted with the main and additional raw materials, the additives, the spices and other substances used in the production of different types of finished products: sausages; salted, dried, and smoked meat, poultry and fish products. The students also receive knowledge referring to the aims, organization and methods of the technological control in the production of meat, poultry, and fish. They also study relevant ecological problems.
Course content:
General fundamentals of the technology of meat products. Technology of sausage products. Specific technology of meat products. Technology of fish products. Control of the technological processes.
Teaching and assessment:
The teaching is done at lectures, laboratory exercises and course work controlled by the lecturer. Lectures are given in accordance with the syllabus and ale illustrated using modern devices. At the laboratory classes students work using methods that are discussed beforehand. The results from the experiments are presented in protocols.
The course project: aims at building skills and habits for independent work and a creative approach for solving technological problems.
Types of continuous assessment: the reports from the laboratory classes are defended by the students and verified by the lecturer. During the semester students sit for two tests following an agreed schedule.
The final mark is formed after students take a written exam.

0244 Technological Equipment of the Food Processing Industry

ECTS credits: 7 **Weekly workload: 3**lec +0sem + 0 labs + 2 ps+cp
Assessment**:** exam **Type of exam**: written
Department involved:
Department of "Thermotechnics, Hydro- and Pneumo-technics", tel.: 082 888 580, Russe University "A. Kanchev"
Lecturers:
Assoc. Prof. Nastya Vasileva Ivanova Ph.D, Department of "Biotechnology and Food Technology",
email: nivanova@ru.acad.bg
Assoc. Prof. Gencho Stoykov Popov, Ph.D., Faculty of Agricultural Mechanization, department of "Thermotechnics, Hydro- and Pneumo-technics", Russe University "A. Kanchev", тел.: 082 888 580
Abstract:
The course "Technological Equipment of the Food Processing Industry" aims giving knowledge about the basic technological equipment used in the different branches of the food processing industry, namely the production of meat and meat products, milk and dairy products, sugar and sugar products, essential oils and vegetable oils, bread and in the grain processing and canning industries. The course provides with practical knowledge and skills that will help students operate and maintain the basic equipment in the above mentioned industries in their future work as specialists.
Course content:
The course "Technological equipment" aims at giving knowledge about the machinery, devices and other equipment used in the industries for production of meat products, dairy products and milk, sugar and sugar products, oils and essential oils, bread and bread products as well as in the cosmetics industry, the grain processing industry, and the canning industry.
Teaching and assessment:
The teaching is done at lectures, practical exercises and course work supervised by the lecturer - a course project. During the semester students do two tests (based on theoretical questions and tasks) following an agreed schedule. The course project is assigned at the third week of the semester and has to be completed by the end of the semester. The protocols of the laboratory exercises have also to be defended at the end of the semester. All written work is graded from 2-6. The final mark is formed after students sit for a written exam and lecturers take into account the results from the continuous control. Students can see their written work from the exam and can retake the exam in case they fail.

0245 Technological Control and Safety of Foods

ECTS credits: 3 **Weekly workload: 2**lec +0sem + 1 lab + 0 ps +ca
Assessment**:** exam **Type of exam**: written
Department involved:
Department of ”Biotechnology and Food Technologies”, tel..: 084 611 012, Subsidiary -Razgrad
Lecturer:
Prof. Stefan Venev, Russe University “A. Kanchev”, tel. 082/888556
Abstract:
The course “Technological Control and Safety of Foods” aims at giving knowledge about the most important aspects of control in food production as a key element in the management of the technological process, the efficient use of materials, ant the obtaining of high quality of ready products. Students are also acquainted with the current law regulations governing the safety and hygiene requirements of food products and food production: the systems for Hazard Analysis and Critical Control Points (HACCP) and quality management. Following this curriculum, students receive fundamental knowledge concerning the production of high quality food products.
Course content:
Introduction to the course. Importance of technological control for the production of safe and high quality food products. Fundamentals of standardization and quality control of food products. Control of raw materials from vegetable and animal origin. Control of the technological process. Veterinary supervision and expertise of animal meat in the processing operations. Basic principle of inspection. Control and supervision of ready food products from animal and vegetable origin. Systems for self control in the food processing factories. Government control of food products.
Teaching and assessment:
The teaching is done at lectures, laboratory classes and course work controlled by the lecturer. The lectured material is structured in such a way so that it is easily comprehended by students and is illustrated with the help of modern methods. Students do laboratory exercises during the semester and at the end of each class they prepare a report. They also have to compete a course assignment based on the lectured material. The final mark is formed after students sit for a written exam.

0246 Technology Of Food Canning

ECTS credits: 5 **Weekly workload**: 3 lec + 0 sem + 4 labs + 0 ps
Assessment**:** exam **Type of exam**: written
Department involved:
Department of “Biotechnology and Food Technologies”, tel.:611012, Subsidiary - Razgrad
Lecturer: Prof. Todor Dimitrov Dimitrov Ph.D., GSM 0896615457, Trakia University –Stara Zagora
Abstract:
The course outlines in details the basic principles of food canning based on biosis, anabiosis, abiosis, and cenoanabiosis. Students learn about the composition of cells and the basic technological, microbiological and chemical properties of raw materials from animal and vegetable origin. They are also presented with information not only about the basic technological schemes for initial preparation of materials through mechanical processing and heating but also about the necessary additives and spices. Special attention is paid to the types of packaging used, its preparation, the dosage of ingredients and the process of canning through pressure.
Students are involves in the study of the different aspects of the theory of sterilization of cans and the production of different types of canned food.
Teaching and assessment:
The teaching is done at lectures and laboratory exercises. The lectures are given according to the syllabus and are well illustrated with modern devices. At the laboratory exercises the students work in groups or individually using methods that are explained in advance. The results from the experimental tasks are presented in protocols.
The final mark is formed after students sit for a written exam which is based on the theoretical material. It is administered as the students choose at random for question which they have to answer in written. The questions are related to topics that are given to students before the exam.

0247 Packaging of Food Products

ECTS credits: 4 **Weekly workload: 3**lec +0sem + 0 labs +30 ps
Assessment**:** exam **Type of exam**: written
Department involved:
Department of "Biotechnology and Food Technologies", tel.: 084 611 012, Subsidiary - Razgrad
Lecturer: Pr. Assist. Prof. Stefan Stefanov, Ph.D., GSM: 0888 142 468, University of Food Technologies-Plovdiv
Abstract:
The course "Packaging of Food Products" includes all kinds of packaging: metal, glass, polymer, combined, paper and cardboard, and transport ones. Students study the materials used for the production of the different packaging, their construction, the quality indicators and the requirements they meet. The new trends in food packaging are also presented. Emphasis is put not only on the packaging of particular foods and drinks, which increases the durability of these goods, but also on the quality control of the materials needed for the production of these types of packaging. The ecological effect of packaging on the environment is also mentioned. It is studied in relation to the economic effect of recycling of packages. The course outlines contemporary technical and industrial solutions for packaging of food in the main types of food packaging.
Course content:
Functions of the packaging. Requirements to be met. Life cycle of the packaging. Classification and basic terminology. Packaging materials for food products. Types of technological processes for packaging of food products in consumer packaging. Transport packaging of food products. Labeling. Contemporary technologies for packing that prolongs the durability of food products. Packing in ready-made hard types of packaging. Packing in ready-made soft types of packaging. Types of packaging machines – for group and individual packing, and for packaging that is formed on the machine. Machines for labeling and marking. Recycling of the packaging.
Teaching and assessment:
The teaching is done at lectures and the studied material meets the entry – exit level requirements for acquiring of the necessary knowledge about food product packaging. The practical seminars are carried out in factories from the food processing and packaging industries equipped with modern machines for production of packaging or packing of various foods. The continuous assessment is administered through tests and class or course work supervised by the lecturer. The final mark is formed on the basis of the results from the written test and the continuous assessment.

0249 Industrial ecology

ECTS credits: 4 **Weekly workload:** 3lec+0sem+3labs+0ps
Assessment: exam **Type of exam:** written
Department involved:
Department of Ecology and Environmental Engineering, Ruse University
Lecturers:
Prof. Vladimir Tomov Vladimirov, tel 082 888 498
Abstract:
This subject examines the basic concepts and the trends in ecology focusing on sources of pollution, means of protection, introduction of low waste and wasteless technologies and waste recycling.
Course content:
Basis of the theory about the biosphere. Anthropogenic impact on the biosphere. Air contamination and harmful emissions. Sources of pollution. Techniques of reducing air pollution. Ecological issues in use and preservation of water resources. Biotechnological approaches in waste water treatment. Soil conservation and protection of the Earth's nucleus. Forecasts, diagnosis, monitoring and ecological examination.
Teaching and assessment:
Lectures are delivered according to the curriculum and are illustrated with modern visual aids. The laboratory classes supplement the course of lectures. The final grade is based on a written exam.

0250 Reliability of machines

ECTS credits: 3 **Weekly workload:** 3lec+2sem+0labs+0ps
Assessment: continuous assessment **Type of exam:** written
Department involved:
Department of Repair, Reliability and Chemical Technologies, tel 082 888 441, Ruse University
Lecturers:
Assoc. prof. Plamen Kangalov, PhD, tel 082 888 441
Abstract:
This subject aims at giving students knowledge and skills to ensure and improve the quality and reliability of machines. It also studies the designing, use and maintenance of machines. To this end the basic concepts and mathematical foundations of reliability and design are examined. Finally, the defining of characteristics and factors of reliability are dealt with as well as breakdowns and causes of breakdowns.
Course content:
Basic concepts and definitions of the state of machinery. Major properties of contemporary equipment. Durability, smooth running, repair and maintenance. Breakdowns. Causes of systems' and elements' failure. Factors in reliability. Reliability as a major factor for quality of machines.
Teaching and assessment:
There are lectures and seminars in this subject. Students write reports in the seminars. Three tests are administered based on the three parts of the material. To have the semester validated students have to meet the usual requirements. The final grade is based on the tests. Students who have less than 25 points are required to make another test comprising everything that was taught during the semester. Students wishing to get a higher mark can make this last test.

Bachelor Thesis

ECTS credits: 10
Weekly workload: 0lec+0sem+0labs+0ps
Assessment: official defense
Type of exam: oral
Department involved:
Department of Biotechnology and Food Technology
Faculty:
Subsidiary - Razgrad
Lecturers:
An Examination Commission
Abstract:
The aim of the Bachelor Thesis is to give students knowledge how to deal individually with more complex scientific and practical problems.
Content of the Bachelor Thesis:
The bachelor thesis could be an extended course project or it could be a new creative piece of written work. It aims at solving a particular problem such as a construction, a technology or its improvement.
Teaching and assessment:
Students use the knowledge they have acquired through the entire period of studies. They can also consult reference literature, previous research and observations. Scientific appliances or installations have to be used. Students must also use contemporary scientific research methods.

UNDERGRADUATE STUDIES IN CHEMICAL TECHNOLOGIES

PROFESSIONAL STANDARDS
OF A BACHELOR IN

CHEMICAL TECHNOLOGIES

Degree programme: **Biotechnology**
Educational Degree: **Bachelor**
Professional Qualification: **Engineer in Biotechnology**
Length of programme: **4 years (8 semesters)**

Field of Study: The **Chemical Technologies** degree programme aims at preparing highly qualified Bachelor of Engineering professionals whose skills and knowledge could be applied in a wide range of professional settings.

Professional Qualifications: The Bachelor of Engineering degree course is designed for students who seek comprehensive education in biotechnology and prepares professionals for scientific and practical work in the area. Graduates will be able to do research work, develop new products and manage production in companies that use biotechnology.

Bachelor of Engineering graduates will complete the programme acquiring a high level of theoretical and practical understanding of chemical technologies, microbiology, ecology, engineering and management and marketing. Foreign language knowledge and understanding of the cultural peculiarities of doing business in a global setting are other assets to this programme.

- **Professional preparation** - builds upon the foundations of chemistry, the chemical composition and properties of substances, their chemical and physicochemical transformations, the laws of physics and mathematics, IT, organization and management of production, electrical engineering, environmental science and foreign languages.
- **Specialized preparation** - focuses on the theoretical basis and the peculiarities of inorganic and organic chemical technologies, the technological equipment of chemical plants, the contemporary methods of analysis of the composition and the quality of chemical products, automatic control of production processes and the use of service and production forms and records and technical documentation in general.

The Bachelor of **Chemical Technologies** graduates will be able to:

- Creatively apply their knowledge of chemical technologies and continuously update it according to the emergence of new technologies and practices.
- Be competent IT users.
- Apply modern chemical, physicochemical, biochemical and microbiological methods of analysis of raw materials and finished products.
- Have a thorough command of technological equipment in chemical plants and use up-to-date laboratory equipment.
- Systematically approach and implement up-to-date methods and new materials to reach optimal solutions to various technological problems within the chemicals framework.
- Responsibly manage safety, implement wasteless technologies and uphold ecological standards.

Employment prospects: Even though employment in the chemical manufacturing industry is expected to decline, there will be a continuous demand for researching and developing new products and processes. Chemical engineering careers can branch out into various specializations in the fields of chemical technology, biotechnology, environmental engineering, healthcare and the services field.

CURRICULUM

of the degree course in

CHEMICAL TECHNOLOGIES

First year

Code	*First semester*	*ECTS*	*Code*	*Second semester*	*ECTS*
0200	Mathematics part 1	5	0210	Informatics part 2	4
0201	Engineering Graphics	5	0211	Mathematics part 2	5
0202	Informatics part 1	6	0212	Physics	7
0203	Basic and inorganic chemistry	6	0213	Analytical chemistry	7
0204	Stoichiometric computations	3	0215	Inorganic Chemistry	7
	Foreign language:	5			
0205	English 1				
0206	German 1				
0207	French 1				
0208	Russian 1				
	Total Credits for the semester:	***30***		**Total Credits for the semester:**	***30***

Second year

Code	*Trird semester*	*ECTS*	*Code*	*Fourth semester*	*ECTS*
0216	Physical chemistry	6	0231	Organic chemistry part 2	8
0223	Organic Chemistry part 1	6	0225	Processes and apparatuses part 1	8
0218	Mechanics	6	0236	Physical chemistry (phase systems and kinetics)	6
0219	Colloidal chemistry	2	0226	Technical safety	3
0220	Electrical and Electronic Engineering	5	0227	Economics	5
0221	Machine elements	5			
	Total Credits for the semester:	***30***		**Total Credits for the semester:**	***30***

Work placement 2 credits

Third year

Code	*Fifth semester*	*ECTS*	*Code*	*Sixth semester*	*ECTS*
0266	Control and Quality Management	3	0268	Inorganic Synthesis	5
0229	Automation	6	0269	Organic Synthesis	5
0230	Instrumental methods of analysis	4	0270	Inorganic Chemical Technologies	5
0228	Processes and apparatuses part 2	6	0271	Organic Chemical Technologies	5
0217	Heat Engineering	6	0272	Mineralogy, Crystallography and Radiology	5
0267	Theoretical Fundamentals of Chemical Technologies	5		Students choose either 0273 or 0253	5
			0273	Mineral Resources	
			0253	Low molecular biologically active substances	
	Total Credits for the semester:	***30***		**Total Credits for the semester:**	***30***

Industrial placement 2 credits

Fourth year

Code	*Seventh semester*	*ECTS*
	Students choose either 0274 or 0275	
0274	Thermal Processes and Equipment in the Silicate Technologies	6
0275	Technology of the Surface – Active Substances	6
	Students choose either Group A or Group B	
	Group A	
0276	Technology of Ceramics	8
0277	Technology of Glass	8
0278	Inorganic Pigments	5
0279	High Temperature Synthesis Methods	3
	Group B	
0280	Technology of Pharmaceutical Products	8
0281	Technology of Aromatic Products	8
0282	Plant Protection Products	5
0283	Analysis of Organic Products	3
Total Credits for the semester:		**30**

Code	*Eighth semester*	*ECTS*
0249	Industrial ecology	4
0248	Marketing and management of a company	3
	Students choose two subjects	
0284	Technology of Inorganic Binding Substances	5
0285	Types of Plating with Special Uses	4
0286	Technology of Cosmetic Products	5
0287	Organic Additives	4
	Self preparation for the Bachelor thesis	4
	Bachelor thesis	10
Total Credits for the semester:		**30**

Total for the training course of study: 240 ECTS credits

0200 Mathematics part 1

ECTS credits: 5
Weekly workload: 2lec+2sem+ca
Assessment: exam
Type of exam: written
Department involved:
Department of Algebra and Geometry
Faculty of Natural Sciences and Education
Lecturers:
Assoc. Prof. Ivanka Mitkova Jeleva, PhD, Subsidiary of the University of Ruse in Razgrad, E-mail: vzh@abv.bg
Abstract:
The course is a basic one in engineering education. It uses the mathematical knowledge from secondary school and extends it on a higher level. It is a prerequisite for the next level mathematical subjects, Physics, Mechanics, general and special engineering courses.
Course content:
Sets. Real and complex numbers. Systems of linear equations and determinants. Matrix theory and determinants. Linear systems. Polynomials. Vector space. Linear dependence and independence of families of vectors. Dot (scalar) product. Coordinate systems Cross (vector) product. Lines and planes. Second order curves and surfaces.
Teaching and assessment:
The theoretical basis of the topics presented at lectures is enhanced at seminars through solving problems; individual practicing and reinforcing is accomplished by weekly assignments. Two written tests are administered and students with grades above 4.50 are exempt from the exam and their mark is formed on the basis of an interview with the lecturer. Each student is required to do a course assignment. Its successful presentation at seminars and regular class attendance are a necessary prerequisite to have the semester validated.

0201 Engineering Graphics

ECTS credits: 5
Weekly workload: 1lec+0sem+0labs+3ps+ca
Assessment: continuous assessment
Type of exam: written
Department involved:
Department of Engeneering Drawing
Faculty of Automotive and Transport Engineering
Lecturers:
Assoc. Prof. Trifon Ivanov Trifonov, PhD, Department of Engeneering Drawing, tel.: 082 888437
Abstract:
Engineering graphics is a basic subject that studies design methods, standards and the rules of creating and using technical drawings, sketches and text documents. This subject is a base for further learning of other technical branches of science, especially when solving design problems and documenting them.
Course content:
Drawing of objects. Methods of orthographic and axonometric projection. Geometric modeling. View, cross section, front section. Documentation. Standards. Drawing a component. Documents that accompany technical drawings of an assembled unit.
Teaching and assessment:
The theory, presented at lectures by didactic means, provides the needed base for practical classes and course assignments. During the practical classes problems are solved, instructions are given, examples are considered. Each student is required to do a course assignment, which is submitted according to the lecturer's schedule. Two tests are administered. The final course mark is formed on the basis of the grades of the tests and the course assignment results. The requirements to have a term validated are regular class attendance and course assignment submission.

0202 Informatics part 1

ECTS credits: 6 **Weekly workload:** 2lec+0sem+0labs+3ps+ca
Assessment: exam **Type of exam:** written
Department involved:
Department of **Informatics** and Information Technologies
Faculty of Natural Science and Education.
Lecturers:
Assoc. Prof. Ivanka Mitkova Jeleva, PhD,E-mail: vzh@abv.bg
Abstract:
Informatics part 1 acquaints students with the computer as a technical means with its components and its arithmetic and logic basis. Basic algorithms are developed to enhance the logical thinking of students. Students are acquainted with PASCAL. Lectures comprise topics concerning the basic structures in algorithms: branching, loops and multiple choice. Various types of data are studied. The problems that students solve might be useful in their future jobs.
Course content:
History and classification of computers. Hardware. Operating systems. Application software. Number systems. Boolean algebra. Algorithms - basic concepts. Algorithms –branching, loops. Algorithms with one dimensional arrays. Structure of a program in PASCAL. Types of data in PASCAL. Input and output of data. Branch and multiple choice. Loop operators. Types of arrays. Work with arrays.
Teaching and assessment:
Lectures take place once a week. Practical classes are held in the computer laboratory under the supervision of an assistant professor .Practical classes start with an entry test or an oral quiz. Two tests are administered. Course assignments require students to work on their own, using the programming systems they have studied. Students are given marks for their course assignments as well. Students with an average grade exceeding 4.50 may be exempt from the written exam. The final grade is based on the mark of the exam and the average mark from the tests and the course assignments.

0203 Basic and inorganic chemistry

ECTS credits: 6 **Weekly workload:** 3lec+0sem+3labs+0ps+cp
Assessment: exam **Type of exam:** written
Department involved:
Department of Chemistry and Chemical Technology
Subsidiary of the Univrsity of Ruse in Razgrad
Lecturers:
Assoc. Prof. Miluvka Stancheva, MScEng, PhD, Department of Chemistry and Chemical Technology
Subsidiary of the Univrsity of Ruse in Razgrad, tel: 662 989,
Abstract:
Basic and inorganic chemistry deals with the theoretical basis of inorganic chemistry, the chemical processes and dispersion systems. Students are acquainted with the main chemical operations, the laboratory equipment and apparatuses and the basic rules concerning work in a chemical laboratory. Laboratory classes help students understand what they were taught at lectures and develop their skills so that they will be able to work in a chemical laboratory.
Course content:
Basic concepts and laws in chemistry. Structure of the atom. Rutherford planetary model. Contemporary theories about the structure of the atom. Structure of the nucleus. The Periodic law and The Periodic Table of the Chemical Elements. The Periodic Law and the structure of the atom. Recurring (periodic) chemical properties. Chemical bonding. Molecular orbital theory. Hydrogen bond. Valence and oxidation state. Dispersive systems. Types of dispersive systems. Characteristics of dissolution – heat effect. Solutions and electrolytes. Vapour pressure and temperature of boiling. Osmosis. The theory of electrolytic dissociation. Acidity of solutions. Neutralization and hydrolysis. Rough dispersions. Sorption.
Teaching and assessment:
Lectures deal with basic issues concerning the structure of the atom and chemical bonding, plain and complex substances and chemical processes. Visual aids such as posters, diagrams and overhead transparencies are used in lectures. Laboratory classes focus on developing skills to handle laboratory equipment, to master the basic operations in chemistry and learn about the properties of compounds. Students work in pairs.

0204 Stoichiometric computations

ECTS credits: 3
Weekly workload: 0lec+3sem+0ps+ca
Assessment: exam
Type of exam: written
Department involved:
Department of Chemistry and Chemical Technology
Subsidiary of the University of Ruse in Razgrad
Lecturers:
Assoc. Prof. Diana Vasileva Caneva, MScEng, PhD, Department of Materials & Manufacturing Engineering, tel: 082 888 307
Abstract:
Stoichiometric computations is in close connection with Basic and inorganic chemistry. It helps students acquire in-depth knowledge and link theory and practice.
Course content:
Basic concepts in chemistry. Laws in chemistry. Atomic-molecular theory. Symbols in chemistry. Chemical formulae. Nomenclature of inorganic compounds according to IUPAC. Basic computations in chemistry. Mass and mol parts as percentage. Composition of compounds. Defining the empirical and molecular formulae of compounds. Equivalent. The Law of equivalents.
Teaching and assessment:
Seminars comprise theory and solving stoichiometric problems. Three tests are administered. The final grade is based on the marks from the tests.

Foreign language
0205 English, 0206 German, 0207 French, 0208 Russian

ECTS credits: 5
Weekly workload: 0lec+0sem+0labs+4ps+ca
Assessment: continuous assessment
Type of exam: written and oral
Department involved:
Department of Foreign Languages
Faculty of Law
Lecturers:
Sr. Assist. Prof. Iliana Gancheva Benina, MA, Department of Foreign Languages,
E-mail: lbenina@ecs.ru.acad.bg
Sr. Assist. Prof. Tsvetelina Amdreeva Nedelcheva, MA, Department of Foreign Languages,
E-mail: tandreeva@ecs.ru.acad.bg
Sr. Assist. Prof. Tinka Angelova Karaivanova, MA, Department of Foreign Languages, tel.: 888 824,
E-mail: tkaraivanova@ecs.ru.acad.bg
Sr. Assist. Prof. Rumiana Ivanova Milanova, MA, Department of Foreign Languages,
E-mail: rmivanova@ecs.ru.acad.bg
Sr. Assist. Prof. Iliana Gancheva Benina, MA, Department of Foreign Languages,
E-mail: lbenina@ecs.ru.acad.bg
Sr. Assist. Prof. Katalina Peicheva Boqnowska, MA, Department of Biotechnology and food technology
Subsidiary of the University of Ruse in Razgrad, tel.: 084 620 090
Abstract:
The foreign language course is aimed at achieving communicative competence in the area of the subject specialist and the future job. The teaching objectives comprise the development of reading comprehension skills to handle specialist texts and the acquisition of communication skills to interact successfully in professional settings and everyday situations.
Course content:
Meetings and introductions, giving personal details, describing things and places, writing a CV. propositions, plans, comparisons, linking facts and ideas, searching for special information, reading strategies, applying for work
Teaching and assessment:
A wide range of authentic and specially constructed texts (i. e. articles, diagrams and tables, brochures, catalogues, manuals, etc.) as well as audio, video, and multimedia materials are used to acquire the necessary knowledge and skills in using the language as a means of communication. Students are offered lessons in computer laboratories, in which multimedia learning packages and on-line materials are used in line with the latest trends in foreign language teaching. The final grade is based on written tests and oral quizzes. An active and regular participation in the learning process is required for semester passing approval as well as course assignment submission and defense.

0210 Informatics part 2

ECTS credits: 4
Weekly workload: 1lec+0sem+0labs+3ps+ca
Assessment: continuous assessment
Type of exam: written
Department involved:
Department of **Informatics** and Information Technologies
Faculty of Natural Science and Education.
Lecturers:
Assoc. Prof. Ivanka Mitkova Jeleva, PhD, Subsidiary of the Univrsity of Ruse in Razgrad, E-mail: vzh@abv.bg
Abstract:
Informatics part 2 aims at teaching students how to use the most widely spread programming systems Microsoft Windows, word processors – such as WORD and spreadsheets – EXCEL. This is meant to help the students do their course assignments and perform various tasks in their future jobs.
Course content:
The WINDOWS Operating System. Word processors. WORD. Spreadsheets. EXCEL.
Teaching and assessment:
Lectures give the theoretical basis and acquaint students with existing operating systems word processors and spreadsheets. The Microsoft products are studied in detail. There are three practical classes a week. Two tests are administered and students are asked to do a course assignment. The final course mark is formed on the basis of the tests and the course assignment.

0211 Mathematics part 2

ECTS credits: 5
Weekly workload: 2lec+2sem+cw
Assessment: exam
Type of exam: written
Department involved:
Department of Mathematical Analysis
Faculty of Natural Science and Education
Lecturers:
Assoc. Prof. Ivanka Mitkova Jeleva, PhD, Subsidiary of the Univrsity of Ruse in Razgrad
E-mail: izheleva@ru.acad.bg
Abstract:
The subject acquaints students with basic notions of mathematical analysis, necessary for further study of Mechanics, Physics, theoretical basis of Electrical Engineering, Processes and apparatuses, etc.
Course content:
Basic topics: Functions of more than one variable. Differential calculus. Integral calculus. Ordinary differential equations.
Teaching and assessment:
At lectures students are introduced to main theoretical issues, logically presented and illustrated with appropriate examples. The theoretical basis of the topics presented at lectures is acquired at seminars through solving problems, having theoretical and application character. Two written tests are administered during the semester and the students are required to do a course project. . Students with an average grade exceeding 4.50 may be exempt from the written exam. In this case the final grade is based on the average mark from the tests and the course project. If students are to sit for the examination, final assessment is based on the written exam consisting of problems to be solved and theoretical questions to be answered. The marks from the tests are also taken into consideration. The requirement to have the semester validated is regular seminar attendance.

0212 Physics

ECTS credits: 7
Weekly workload: 3lec+0sem+3labs+0ps+cp
Assessment: exam
Type of exam: written and oral
Department involved:
Department of Physics
Faculty of Electrical Engineering, Electronics and Automation
Lecturers:
Assoc. Prof. Tamara Grigorievna Pencheva, PhD, tel.: 082888218; mobile: 0887716785
Abstract:
The course aims at acquainting the students with the physical character of processes and phenomena in nature and the methods for their investigation, with the general properties of matter and the material objects. The laboratory exercises aim at creating skills for experimental investigation of physical phenomena and solving of physical problems. It is meant to serve as a basis for further studies in biotechnology, chemical technology and food technology, as well as other engineering subjects.
Course content:
Measuring physical quantities. Kinematics and dynamics of material point and rigid body. Interaction in nature. Inertial and inenertial reference frames. Inertia forces. Gravitational theory Work and energy. Mechanical preservation laws. Vibrations and waves. Basics of acoustics. Molecular physics and thermodynamics. Phenomena and transfer. Surface phenomena. Electric field and electric current. Magnetic field and magnetic forces. Electromagnetic waves. Light.
Teaching and assessment:
Lectures give the main theoretical material, supported by some demonstrations of physical phenomena and processes using multimedia and video. At the laboratory classes the students work independently and investigate particular physical phenomena. The knowledge of lecture material and laboratory classes is tested regularly. If the results of this assessment are good, the students are allowed to take the exam. An entry test or an oral quiz lasting 15 minutes is administered at the beginning of each laboratory class. Students are given 2 points for passing each test or quiz. At the end of the laboratory class a report is to be defended. A validated report accounts for further 2 points. The final assessment is formed after a discussion with the student. At the exam the students answer two theoretic questions and do a laboratory exercise.

0213 Analytical chemistry

ECTS credits: 7
Weekly workload: 3lec+0sem+3labs+0ps+ca
Assessment: exam
Type of exam: written
Department involved:
Department of Chemistry and Chemical Technology
Subsidiary of the University of Ruse in Razgrad, tel.: 611 016
Lecturers:
Assoc. Prof. Diana Vasileva Caneva, Department of Materials and Manufacturing Engineering,
tel.: 082 888 307
Abstract:
Analytical chemistry is studied in the first year and it examines the application of the Theory of chemical equilibrium in analysis. It gives students knowledge and develops their skills in quality and quantity analysis and eye detection of analytical signals.
Course content:
Basics of analytical chemistry. Classification of analytical methods. Analytical properties of substances. Analytical signal. Basic computations in chemical analysis. Solutions, preparations and standardization. Photolytic equilibrium. Sediment equilibrium. Complex equilibrium. Reduction-oxidation equilibrium. Fraction quality analysis. Gravimetric. Protolytemetry. Complexometry. Sediment titremetry. Titration curves and choice of indicator. Verification of analysis results.
Teaching and assessment:
There are lectures and laboratory classes in this subject. Students are acquainted with the theory and practice of chemical analysis. Four tests are administered at regular intervals during the semester. Each test comprises three tasks accounting for 2, 3 and 5 points respectively. The maximum number of points that students can collect from the tests is 40. The course assignment accounts for 20 points. And finally the examination accounts for 40 points.

0215 Inorganic Chemistry (Systematization of elements)

ECTS credits: 7 **Weekly workload:** 3lec +sem + 3labs + 0 ps
Assessment: exam **Type of exam**: written
Department involved:
Department of of "Chemistry and Chemical Technologies", tel.: 611 016, Subsidiary - Razgrad
Lecturers: Assoc. Prof. Dpl.Eng. Miluvka Stancheva, Ph.D., tel.: 084 662 989, Department of "Chemistry and Chemical Technologies", Subsidiary - Razgrad
Abstract:
The course "Inorganic Chemistry (Systematization of elements)" is developed especially for the students who study Chemical Technologies at the Subsidiary in Razgrad. The systematic study of the periodical table of chemical elements will help them not only to understand the bonds between the elements in periods and groups but also to comprehend the material. Special attention is paid to the inorganic nomenclature. The course is based on the students' previous understanding of general and inorganic chemistry. Students are expected to be able to use their knowledge about the theory of chemical bonds and structure of molecules together with the achievements of coordination chemistry.
Course content:
Nuclear reactions. Origin of the chemical elements.
Hydrogen. Physical and chemical properties of hydrogen. Spreading, obtaining, and usage. Types of hydrates.
I A group. Introduction. Physical and chemical properties. Spreading in nature, obtaining, and usage. Chemical compounds.
II A group. Introduction. Beryllium. Physical and chemical properties. Spreading. Chemical compounds. Magnesium. Physical and chemical properties. Spreading. Chemical compounds. Spreading and usage. Calcium, strontium, barium, radium. Physical and chemical properties. Spreading and usage.
III A group. Introduction.Boron. Physical and chemical properties. Spreading. Chemical compounds. Aluminium. Physical and chemical properties. Spreading and usage. Gallium, indium, thallium.
Lanthanides and actinides. Characteristics. Physical and chemical properties. Compounds.
Teaching and assessment:
The teaching is done in lecture halls and laboratories.
In order to have the semester verified, students
- have to attend lectures and practical classes according to the rule and regulations of the University.
- must have reports from the laboratory exercises that are verified by the lecturer.

At the end of the course students sit for an exam and the final mark is formed
- by the result from the written test
- by the results from the continuous control.

0216 Physical chemistry

ECTS credits: 6 **Weekly workload:** 3lec+0sem+3labs+0ps
Assessment: exam **Type of exam:** written and oral
Department involved:
Department of Chemistry and Chemical Technology
Subsidiary of the University of Ruse in Razgrad
Lecturers:
Pr. Assist. Prof. T. Haralanova,PhD, Department of Chemistry and Chemical Technology, tel: 084 611 016
Abstract:
Basic thermodynamic laws and their applications are studied. The equilibrium state of chemical compounds is examined. Details are given about its characteristics, criteria for recognition, conditions of its attaining as well as conditions of its shifting. The process of chemical reactions is studied by applying basic kinetic equations and taking into consideration the impact of various factors such as temperature catalysts, etc.
Course content:
Basic laws in physical chemistry, thermodynamic systems, phase transitions, chemical kinetics. Thermal and chemical reactions. Laws in thermal chemistry
Teaching and assessment:
There are lectures and laboratory classes in Physical Chemistry. Lectures examine basic phase diagrams and principles of control of chemical reactions and their applications. The equilibrium state of chemical compounds is examined. Details are given about its characteristics, criteria for recognition, conditions of its attaining as well as conditions of its shifting. The process of chemical reactions is studied by applying basic kinetic equations and taking into consideration the impact of various factors such as temperature catalysts, etc. To have the semester validated students are required to have collected a minimum of 20 points allocated for attendance of lectures and another set of 60 points allocated for the defense of laboratory reports. The final exam comprises 36 topics.

0223 Organic Chemistry part 1

ECTS credits: 6 **Weekly workload:** 3lec +0sem + 2lab + 0 ps+ca
Assessment: exam **Type of exam**: written
Department involved: Department of “Chemistry and Chemical Technologies", tel.: 611 016, Subsidiary - Razgrad
Lecturers: Assoc. Prof. Neiko Marinov Stoyanov, Ph.D., tel.: 084 611 016, Department of “Chemistry and Chemical Technologies”, Subsidiary - Razgrad
Abstract:
The course content allows students to acquire theoretical and practical knowledge about the most important classes of chemical compounds. In the development of the program a special attention is paid to the general theoretical principles of organic chemistry and the stereo chemical relations of the main classes of organic compounds which are of key importance for the specialists in chemical technologies. When some classes of compounds are studied, students are acquainted in brief with their origin from a chemical point of view and their synthesis in nature.
Course content:
Main topics include theoretical background of Organic Chemistry; structure of organic compounds; structural theory; isometrics; chemical bonds and structure; quantum and mechanical approaches to the description of organic molecules; the resonance method; the method of molecular orbital; special structure of organic compounds; classification of organic reactions; mechanism of organic reactions; hydrocarbons; alkanes; cycloalkanes; alkenes and cycloalkenes; alkynes and cycloalkynes; alkadienes; aromatic hydrocarbons.
Teaching and assessment:
The teaching is done at lectures and laboratory classes.
The students are acquainted with the theoretical bases of the material at the lectures which are illustrated with the help of models of different compounds and sometimes an overhead projector.
During the semester students do two tests following an agreed schedule. After doing each test students can receive 120 points. In addition, for each attended lecture students receive 1 point and 2 points for each attended laboratory exercise. The maximum score a student can have for attendance is 45 points. In this way the maximum score for a semester is 285 points.

0218 Mechanics

ECTS credits: 6 **Workload per week:** 2lec+0sem+0labs+3ps+ca
Assessment: exam **Type of exam:** written
Department involved:
Department of Technical Mechanics
Faculty of Mechanical and Manufacturing Engineering.
Lecturers:
Assoc. Prof. Ivanka Mitkova Jeleva, PhD, tel.: 662332
Abstract:
The students are acquainted with the methods for investigation of various kinds of rigid body motion, for different force transformations, and for investigation of the mechanical interaction in rigid bodies in equilibrium. The subject provides a basis for modeling of structures, mechanisms, dynamic processes and gives engineering methods for practical problem solution. Previous knowledge of Mathematics and Physics is necessary for this course. The discipline is fundamental for the engineering courses dealing with the analysis and design of mechanical structures and machines.
Course content:
The subject comprises the following parts: Statics, Kinematics, Dynamics and Introduction to Materials science.
Teaching and assessment:
The theoretical basis of the topics is elucidated in lectures and it is illustrated by examples. The students solve problems in practical classes. They apply the learned methods in their course work, which is assigned individually to each student. The course assignment comprises either two problems concerning Statics, Kinematics and Dynamics respectively or two problems concerning Materials science. The course work is controlled and graded by means of a grading system and it is submitted according to schedule. The exam consists of several questions and some problems to solve. When the final grade for the semester is formed the students’ participation in practical classes and the course assignment are also taken in consideration. Regular attendance of classes and course work submission are required for semester passing approval.

0219 Colloidal chemistry

ECTS credits: 2
Weekly workload: 1lec+0sem+1labs+0ps
Assessment: exam
Type of exam: written
Department involved:
Department of Chemistry and Chemical Technology
Subsidiary of the University of Ruse in Razgrad
Lecturers:
Pr. Assist. Prof. T. Haralanova,PhD, Department of Chemistry and Chemical Technology
Subsidiary of the University of Ruse in Razgrad, tel: 084 611 016
Abstract:
Dispersion systems are very important in technological processes in the chemical industry. Colloidal systems are common in chemical products. Colloidal chemistry studies the properties- electrical, optical, kinetic, palpitation, ageing, etc. as well as the structure of colloidal systems. Students are acquainted with some of the most important methods of production of colloidal systems
Course content:
Types of dispersion systems and properties of colloidal systems. Structure of colloidal particles.
Teaching and assessment:
Lectures acquaint students with dispersion systems and colloidal solutions and the properties- electrical, optical, kinetic, palpitation, ageing, etc. of colloidal systems. Laboratory classes start with an entry test and finish with a defense of the laboratory report. Students receive a mark for each laboratory class. When the final grade is decided the lecturer takes into consideration students' participation in laboratory classes and the assignments given during the semester. There are three assignments for the entire semester concerning the structure of colloidal particles and their properties. An end of term test is administered. At the end of the semester students are required to have at least 10 points showing they have attended the lectures and a minimum of 50 points showing they have submitted their assignments and defended the laboratory reports.

0220 Electrical and Electronic Engineering

ECTS credits: 5
Weekly workload: 2lec+0sem+0labs+2ps+ca
Assessment: exam
Type of exam: written and oral
Department involved:
Departmant of Biotechnology and Food Technology
Subsidiary of the Univrsity of Ruse in Razgrad
Lecturers:
Assoc. Prof. Radoslav Ivanov Kjuchukov, MScEng, PhD, Department of Electrical Power Supply and Equipment Faculty of Electrical and Electronic Engineering and Automation
Assoc. Prof. Veselka Ivanova Kamburova, MScEng, PhD, Departmant of Biotechnology and Food Technology, e-mail: veselkakamburova@dir.bg
Abstract:
The subject of Electrical and Electronic Engineering is part of the curriculum for the bachelor degree courses in Biotechnology, Chemical technology and Food technology. The aim of the subject is to introduce students to the basics of electrical engineering, the main electrical machines and apparatuses and some electronic devices.
Course content:
Electric and magnetic field. DC electric circuits. Ohm's law, Kirchhoff's law, Joule's law, Lenz's law. AC electric circuit. Three phase electric circuits Electrical measurements. Transformers. Asynchronous machines. DC machines. Lighting. Electricity generation, electric power transmission, electric distribution and use. Semiconductor materials. Diodes, bipolar junction transistors and field effect transistors, thyristors. Electronic devices.
Teaching and assessment:
The teaching process is organized in lectures and practical classes. Two tests are administered. They consist of a questionnaire ad some problems to be solved. Student whose marks exceed 5.00 are exempt from the examination. The exam is in writing. It lasts 120 minutes and is held within the semester.

0221 Machine Elements

ECTS credits: 5 **Weekly workload: 2**lec+0sem+0labs+2ps+ca
Assessment: continuous assessment **Type of exam:** written and oral
Department involved:
Department of Machine Science and Machine Elements
Faculty of Automotive and Transport Engineering.
Lecturers:
Assoc. Prof. Ognyan Lyubenov Alipiev, MScEng, PhD, Department of Theory of Mechanisms and Machines and Material Handling Engineering and Technologies, Faculty of Agricultural and Industrial Engineering, tel: 888 593, E-mail: oalipiev@ru.acad.bg.
Assoc. Prof. Ivan Georgiev Spasov, MScEng, PhD, Department of Machine Science and Machine Elements, Faculty of Automotive and Transport Eengineering tel.:888 235, E-mail: igs@ru.acad.bg
Assoc. Prof. Stoqn Borisov Stojkov, MScEng, PhD, Department of Theory of Mechanisms and Machines and Material Handling Engineering and Technologies, Faculty of Agricultural and Industrial Engineering, tel: 888 486, E-mail: sstoykov@ru.acad.bg
Abstract:
This subject aims at introducing students to basic approaches and laws in constructing mechanical systems, where mechanisms and machine elements are very important. Students gain knowledge in research and design of particular mechanisms and machine elements. Basic issues in the theory, practice and design of the mechanical part in mechanical systems are also examined.
Course content:
Basic concepts. Structure and classification of mechanisms. Analysis of leverage mechanism, cam mechanisms, gears and complex mechanisms. Involute gears – geometric theory, kinematics, computation of contact strength and bending strength. Types of coupling. Rotary motion elements: axes, shafts, bearings and clutches. Worm, sprocket rack and pinion gears. Dynamics of electromechanical systems. Balancing of mechanisms.
Teaching and assessment:
The theoretical issues presented at lectures are developed at practical classes and in the course assignment. Lectures and practical classes are illustrated with various kinematics models and models of genuine mechanisms and machine elements. Computer simulations of different processes as well as installations and stands are also used. For further reading students use paper based and electronic textbooks. Students make a test at the beginning of each practical class and there are several additional tests. The final grade is based either on the tests or the exam.

0231 Organic Chemistry II

ECTS credits: 8 **Weekly workload:** 3lec +0sem + 3 labs + 0 ps+cp
Assessment**:** exam **Type of exam**: written
Department involved: Department of “Chemistry and Chemical Technologies", tel.: 611 016, Subsidiary - Razgrad
Lecturers:
Assoc. Prof. Neiko Marinov Stoyanov, Ph.D., tel.: 084 611 016, Department of “Chemistry and Chemical Technologies”
Abstract:
The course 0231 in Organic Chemistry is one of the basic courses in the curriculum for most of the students who study biology and chemistry specialties. The course content allows students to acquire theoretical and practical knowledge about the most important classes of chemical compounds. In the development of the program a special attention is paid to the general theoretical principles of organic chemistry and the stereo chemical relations of the main classes of organic compounds which are of key importance for the specialists in chemical technologies. When some classes of compounds are studied, students are acquainted in brief with their origin from a chemical point of view and their synthesis in nature.
Course content:
The main topics are as follows; Hydrocarbon derivatives; Halide derivatives; Hydroxyl derivatives; Carbonyl compounds; Carboxyl acids and functional derivatives; Organic compounds containing nitrogen; Element-organic compounds; Heterocyclic compounds; Natural organic compounds with important biological functions – carbohydrates, amino carboxyl acids, peptides, nucleic acids, lipids.
Teaching and assessment:
The teaching is done at lectures and laboratory exercises. The students are acquainted with the theoretical bases of the material and the lectures are illustrated with different models of organic compounds and sometimes the lecturers use an overhead projector. During the semester following a set schedule, the students sit for two tests and the results. For each of the tests the students can receive a score of maximum 120 points. The final mark is formed after the students sit for a written exam. The exam is 120 minutes long.

0225 Processes and apparatuses part 1

ECTS credits: 8 **Weekly workload:** 3lec+0sem+3labs+0ps+ca
Assessment: exam **Type of exam:** written
Department involved:
Department of Biotechnology and Food Technology
Subsidiary of the University of Ruse in Razgrad
Lecturers:
Assoc. Prof. Nastya Vasileva Ivanova,PhD, Department of Biotechnology and Food Technology
Subsidiary of the Univrsity of Ruse in Razgrad, E-mail: nivanova@ru.acad.bg
Assoc. Prof. Gencho Stoikov Popov,PhD, Department of Heat Engineering, Hydraulic and Pneumatic Equipment, Faculty of Agricultural and Industrial Engineering
Abstract:
Biotechnological, food processing and chemical plants use various technological processes that transform raw materials into a finished product. Raw materials undergo chemical, physical and physicochemical changes. The structure, the composition and the properties of substances are changed. Nevertheless, a number of underlying processes may be considered as basic.
Course content:
This subject studies the theoretical basis of mechanical and hydraulic processes, the structure, operation and computations of machines that are involved in these processes. The types of mechanical processes are studied in detail. Special attention is paid to breaking into small pieces, grinding, sorting, sifting out, pressing and mixing as well as transportation of fluids, compression and rarefying of gases, separation of fluid and gas dispersion systems and mixing in fluids.
Teaching and assessment:
There are lectures and practical classes in this subject and students are required to do a course assignment. Two tests are administered according to schedule. The tests consist of problems to be solved. At the end of the semester students have to defend the reports they have written in laboratory classes. The final grade is based on a written exam lasting 3 hours. At the exam students answer two theoretical questions and solve one problem.

0236 Physical chemistry (phase systems and kinetics)

ECST credits: 6 **Weekly workload**: 3 lec + 0 sem + 2 labs + 0 ps+ca
Assessment: exam **Type of exam**: written and oral
Department involved: Department of “Chemistry and Chemical Technologies”, Subsidiary – Razgrad
Lecturers: Pr. Assist. Prof. T. Haralanova, Ph.D., Department of “Chemistry and Chemical Technologies”, Subsidiary - Razgrad, tel.: 084 611 016
Abstract:
The course involves the study of basic methods of analysis in physical chemistry and their applications. It outlines the equilibrium of chemical systems – its characteristics, criteria for distinguishing, conditions for achieving it, as well as conditions for its reversing. The way the chemical reactions are carried out is studied through the application of basic kinetic equations while bearing in mind the influence of various factors such as temperature, catalyzers, etc. students have to use their knowledge in higher mathematics, physics, inorganic chemistry, analytical chemistry.
Course content:
Students study the basic laws of physical chemistry, thermodynamic systems, phase transitions and chemical kinetics. They also learn about the heat of chemical reactions and the laws of thermo chemistry.
Teaching and assessment:
The teaching is done at lectures and laboratory classes. The outline the theoretical knowledge concerning the basic phase diagrams, the principles of control of chemical reactions and their application. The students are also lectured about the equilibrium condition of chemical systems – its characteristics, criteria for distinguishing and the conditions under which it is achieved. The lecturer verifies the semester after students submit their course assignments. They must also gather 20 points from attending lectures. The lecturer who supervises the laboratory exercise also verifies the semester upon defense of protocols from laboratory exercises and in case the students have 60 points gathered from attendance of lab classes. The course finishes with an exam and students can not be exempt from it. The list of questions for the exam consists of 36 questions.

0226 Technical safety

ECTS credits: 3
Weekly workload: 2lec+0sem+0labs+1ps+cp
Assessment: continuous assessment
Type of exam: written
Department involved:
Department of Ecology and Environmental Protection
Faculty of Agricultural and Industrial Engineering.
Lecturers:
Prof. Vladimir Tomov Vladimirov, Department of Ecology and Environmental Engineering, tel: 082 888 498
Abstract:
Safety rules are very important in contemporary production. Labour safety plays a major role in safeguarding the life and the health of employees and in addition it influences labour productivity and product quality. This in turn influences the economic results on production. That is why providing a safe work environment is a task of high priority of management.
Course content:
Industrial toxicology. Hermetic sealing of machinery. Measures concerning hazardous leak of toxic or flammable substances. Fire and explosion protection. Ergonomic work environment. Ventilation. Safety rules concerning work with pressure devices. Risks. Electrical safety. Protection against noise and vibrations. Lighting.
Teaching and assessment:
The lectures are made clear with visual aids such as posters, tables and diagrams, an overhead projector, etc. Practical classes are held in the laboratory. At the beginning of each practical class student make a test. They defend their reports at the end of the class. Course work is assigned to each student individually. Three tests are administered each of them accounting for 20 points. The final grade is based on the results from the tests, the course assignment and the students' and participation in classes.

0227 Economics

ECTS credits: 5
Weekly workload: 3lec+2sem+0labs+0ps+ca
Assessment: exam
Type of exam: written
Department involved:
Department of Economics
Faculty of Business and Management.
Lecturers:
Assoc.Prof. Djanko Hristov Minchev, MEcon, PhD, Dept. of Economics, tel. 888 557,
E-mail: Dminchev@ru.acad.bg
Abstract:
The subject is concerned with the general problems, laws and categories of the contemporary market economy. Thus it creates a certain basis for the remaining economic subjects. It also gives general knowledge, which is expressed in alternative ways of economic viewing and which forms and creates abilities for independent and expert choice in economic surroundings. Course prerequisite is knowledge of mathematics and it is related to other branch and functional economic subjects.
Course content:
Introduction – the economic system and the fundamentals of economic theory. Main economic issues. Market mechanism. Demand and supply. Consumer demand and behavior. Manufacture, expenditure and revenue. Imperfect competition and supply. Price formation and incomes depending on production factors. Gross domestic product and economic growth. Economic cycles, unemployment and inflation. Fiscal and monetary policy of the state.
Teaching and assessment:
Material is taught in two ways – lectures and practical classes, which elucidate and develop further some of the issues discussed at lectures. Students are encouraged to do some further reading. They are required to do a course assignment. The final grade is based on the exam and the students' participation in classes is also taken into consideration.

0266 Control and Quality Management

ECTS credits: 3 **Weekly workload:** 1lec + 0sem + 1labs + 0 ps+cp
Assessment: continuous **Type of exam:** written
Department involved:
Department of "Chemistry and Chemical Technologies", Subsidiary - Razgrad Russe University "A. Kanchev"
Lecturers:
Assoc. Prof. Dragomir Dobruzhaliev, Ph.D., tel. 0889 099038, e-mail: dragodob@yaho.com
Abstract:
The aim of the course is to present students with knowledge concerning the contemporary requirements, means and methods of control and quality management of process, products, and personnel.
Course content:
Control and management of quality. Quality and reliability of equipment and technologies. Methods for finding analyzing discrepancies. Statistical methods for quality management. Computer management and provision for quality. CAQ systems. Analysis and modeling of production process. The importance of the human factor in the process of quality management in industrial enterprises.
Teaching and assessment:
The teaching is done at lectures and laboratory exercises.
Each student also receives an individual task for a course paper which is related to the lectured material. At the end of the semester the lecturer and the students discuss the course paper. For the development of the paper the students receive maximum 20 points and maximum 30 for its defense – maximum 50 points altogether. For attending each lecture students receive 2 points while for attending the laboratory exercises they receive 7 points. In this way the maximum number of scores a student can collect throughout the semester is 100.The final mark is formed as a result of a continuous assessment. The continuous assessment is calculated applying the formula $T= 6.T_1/100$, where T is the number of points each student has collected during the semester.

0229 Automation

ECTS credits: 6 **Weekly workload:** 2lec+0sem+0labs+2ps+cp
Assessment: exam **Type of exam:** written and oral
Department involved:
Department of Biotechnology and Food Technology
Subsidiary of the University of Ruse in Razgrad
Lecturers:
Assoc. Prof. Veselka Ivanova Kamburova, MScEng, PhD, e-mail: veselkakamburova@dir.bg
Abstract:
Automation is the only subject that deals with automation systems. Students gain knowledge about automatic control systems, the primary transformers of technological variables, automatic controllers and actuating devices. Students are acquainted with major processes, technologies and apparatuses in biotechnology and food industry and they study how they can be automated and controlled. In practical classes students examine the elements of the system of automatic control and some closed systems.
Course content:
Basic concepts of automatic control systems. Mathematical background of linear continuous automatic control systems. Properties and identification of the objects to be controlled in the chemical industry. Analysis of automatic control systems. Automatic control of technological variables – temperature, pressure, consumption, level, pH, concentration, humidity, etc. Automatic controllers. Actuating devices and controls. Automatic control systems that adjust the temperature, the consumption, the quantity, the pressure, the level and pH.
Teaching and assessment:
Lectures acquaint students with the elements of automatic control systems in biotechnology and food processing industry. Block diagrams are shown on slides, overhead projector transparencies and photos. Practical classes are meant to extend and develop the material thought in lectures. They start with a short test or a quiz and finish with defense of reports written in class. The final grade is calculated according to the following formula: 70% from the exam and 30% from the course assignment.

0230 Instrumental methods of analysis

ECTS credits: 4 **Weekly workload:** 2lec+0sem+2labs+0ps+ca
Assessment: continuous assessment **Type of exam:** written
Department involved:
Department of Chemistry and Chemical Technology, tel.: 611 016
Subsidiary of the University of Ruse in Razgrad
Lecturers:
Assoc. Prof. D. Caneva, PhD, Department of Materials & Manufacturing Engineering, tel.:082 888 307
Abstract:
The aim of this subject is to introduce students to some common basic instrumental methods of analysis. Some of the most widely spread chromatographic methods are also examined. Each method is made clear by explaining the underlying theory and the application. The limitations of each method are also pointed out. This subject builds on previous knowledge in analytical, organic and inorganic chemistry and physics.
Course content:
Atomic absorption spectral analysis. Atomic emission spectral analysis. Molecular spectrometry in the visible, ultraviolet and infrared spectrum. Electrochemical methods of analysis without external pressure. Chromatography – ion exchange and thin layer. Refractometry. Viscosimetry.
Teaching and assessment:
There are lectures and laboratory classes in this subject. Students get acquainted with the theoretical basis of methods, the block diagrams of apparatuses, the application and the limitations of the methods. They are required to do a course assignment. Two quizzes are administered. 50% of the final grade is based on the quizzes and 50% is based on the exam. Students who get a pass at the quizzes may be exempt from the theoretical part of the exam.

0228 Processes and apparatuses part 2

ECTS credits: 6 **Weekly workload:** 2lec+0sem+0labs+2ps+cp
Assessment: exam **Type of exam:** written
Department involved:
Department of Biotechnology and Food Technology
Subsidiary of the University of Ruse in Razgrad
Lecturers:
Assoc. Prof. Nastq Vasileva Ivanova,PhD, Departmant of Biotechnology and Food Technology
Subsidiary of the Univrsity of Ruse in Razgrad, tel.: 084 611 012
Abstract:
Biotechnological, food processing and chemical plants use various technological processes that transform raw materials into a finished product. Raw materials undergo chemical, physical and physicochemical changes. The structure, the composition and the properties of substances are changed. Processes and apparatuses part 2 is a continuation to Processes and apparatuses part 1 and serves as a link between fundamental and specialized subjects. It helps students gain knowledge about particular technologies and machinery.
Course content:
Processes and apparatuses part 2 deals with the theory of heat (heating, cooling, vapourization and condensation) and the mass exchange processes such as absorption, adsorption, distillation, rectification, extraction and drying. It also examines the operation and the computations of the machinery involved in these processes.
Teaching and assessment:
There are lectures and practical classes in this subject and students are required to do a course assignment. Two tests are administered according to schedule. The tests consist of problems to be solved. At the end of the semester students have to defend the reports they have written in laboratory classes. The final grade is based on a written exam lasting 3 hours. At the exam students answer two theoretical questions and solve one problem.

0217 Heat Engineering

ECTS credits: 6 **Weekly workload:** 3lec+0sem+0labs+2ps+p
Assessment: exam **Type of exam:** written oral and
Department involved:
Department of Heat Engineering, Hydraulic and Pneumatic Equipment
Faculty of Agricultural and Industrial Engineering**.**
Lecturers:
Assoc. Prof. Veselka Ivanova Kamburova, MScEng, PhD, tel: 084 611012, e-mail: veselkakamburova@dir.bg
Abstract:
The aim of this subject is to provide students with basic theoretical and practical knowledge of heat as a form of energy, its conversion into other types of energy and its distribution. The thermodynamic properties of various substances and materials, the main laws of thermodynamics and heat transfer as well as basic heat computations in heat exchange apparatuses are also examined. Finally, heat processes, apparatuses and machinery are studied.
Course content:
Basic thermodynamic concepts, thermodynamic processes with ideal gases. First and second law of thermodynamics. Carnot cycle. Steam processes. Gases. Humid air. Heat and mass exchange. Heat conduction. Convection heat exchange. Radiant heat exchange. Complex heat exchange and heat transfer. Types of heat exchange apparatuses. Heat computations. Applied thermodynamics.
Teaching and assessment:
Lectures provide students with theoretical knowledge. They are illustrated with multimedia materials. Some of the laboratory classes are carried out on laboratory installations, others on real industrial sites. For each laboratory class students work out a written report which includes processing and analysis of the experimental data. The assessment is done on the basis of students' performance during the laboratory classes and their written reports. Students are required to do a course assignment. The exam is in written form, followed by oral testing. It comprises theoretical questions and problems to be solved. The final mark is a complex one, based on the results of the exam, the course assignment and the students' performance at the laboratory classes.

0267 Theoretical Fundamentals of Chemical Technologies

ECST credits: 5 **Weekly workload**: 3 lec + 2 sem + 0 labs +cp
Assessment**:** exam **Type of exam**: written and oral
Department involved:
Department of "Chemistry and Chemical Technologies", Subsidiary -Razgrad
Lecturers:
Pr. Assist. Prof. Tsvetan Ivanov Dimitrov, Ph.D., Russe University "A. Kanchev", Subsidiary - Razgrad,
Department of "Chemistry and Chemical Technologies", tel. 084/ 62 36 79, e-mail: tz_dimitrow@abv.bg
Abstract:
The aim of the course is to acquaint students with the necessary knowledge concerning processes and used equipment; continuous and batch technological chemical processes; structure of chemical production; basic criteria for evaluating the effectiveness of technological chemical processes; material and energy balance of technological chemical processes; raw materials in chemical technologies; kinetics of chemical technologies; homogeneous and heterogeneous processes; catalytic processes and reactors.
Course content:
The main topics of the course are as follows: chemical technology – definition and basic notions; types of processes and necessary equipment; continuous and batch technological chemical processes – basic notions, schemes, advantages and disadvantages; material balance of technological chemical processes; equation of the heat balance; equilibrium processes and the factors that influence them; raw materials for the chemical technology and their classification.
Teaching and assessment:
The teaching is done at lectures and seminars. At the lectures the students receive basic theoretical knowledge concerning the various types of chemical processes and equipment.
Each student receives an individual task for a course paper. At the end of the semester the student and the lecturer discuss the paper. Students can receive maximum 15 points for preparing the paper and maximum 15 for its defense – maximum 30 pints altogether.
The final mark is formed after the students sit for a written exam.

0268 Inorganic Synthesis

ECTS credits: 5 **Weekly workload:** 2lec +0sem + 2labs + 0 ps + cp
Assessment: exam **Type of exam**: written
Department involved:
Department of ""Chemistry and Chemical Technologies", tel.: 611 016, Subsidiary -Razgrad,
Lecturers:
Assoc. Prof. M. Stancheva, Ph.D., Department of "Chemistry and Chemical Technologies",
tel.: 084 662 989, e-mail: miluvka_stancheva@abv.bg
Abstract:
The main aim of the course is to give knowledge about the main methods for obtaining inorganic substances – reduction, chlorination and bromating. It also outlines the methods for obtaining nitrites, carbides and oxides together with some basic productions of heavy organic synthesis. Special attention is paid to the latest developments in chemical production, too.
Course content:
The course topics include reduction processes; hydrogen based reduction; thermal methods for obtaining metals, alloys and non-metals; chlorination of non-metals, metals and oxides; production of ammonia production of nitric acid; production of sulphuric acid; production of hydrochloric acid**.**
Teaching and assessment:
The teaching is done at lectures and laboratory exercises. The lectured material is illustrated with the help of tables, schemes, an overhead projector, etc. The laboratory exercises are conducted at chemical labs. The emphasis is on the obtaining knowledge about the basic methods of synthesis and analytical control. Students also have to prepare a course paper based on an individual task. The conditions for verification of the semester are attendance of lectures and laboratory classes. These rules are in accordance with the internal rules and regulation of Russe University.
At the end of the course students sit for an exam and their mark is formed on the basis of the results from the continuous control, the results from the course paper, and the results from the written exam.

0269 Organic Synthesis

ECTS credits: 5 **Weekly workload:** 2lec + 0sem + 2labs + 0 ps + cp

Assessment: exam **Type of exam**: written
Department involved:
Department of "Chemistry and Chemical Technologies", Subsidiary - Razgrad
Lecturers:
Prof. Doctor of Chemical Sciences B. Alexiev
Abstract:
The course aims at acquainting students with the classical and contemporary aspects of the development of fine organic synthesis. These aspects are in the basis of the construction and development of the so called "smart" production processes which require a lot of intellectual efforts and thorough knowledge from the people involved in them. In this course students study not only the basic notions and characteristics of organic synthesis but also the contemporary tendencies in the research of its technological and chemical aspects. Students are given information about modern technological groups, too.
Course content:
The lectures include the topics related to the methods of organic synthesis and the resulting analytical and program problems. According to the latest developments in the field, emphasis is put on the fine organic synthesis. Attention is also paid to the enzyme synthesis of organic products and the related issues of immobilization of enzyme systems and live cells.
Teaching and assessment:
The teaching is done at lectures and laboratory classes.
Every student receives an individual task for a course paper which is connected with the lectured material. At the end of the semester the course paper is discussed with the lecturer. Students receive maximum 20 points for writing the paper and maximum 30 for defending it – maximum 50 points altogether. Students also receive 3 points for attending each lecture and 7 points for attending each laboratory class. Thus the maximum number of points students can accumulate from attendances is 150. the maximum number of points students can accumulate for their work in the course is 200.
The course ends with a written exam. Students can answer additional oral questions if this is necessary to form their final mark.

0270 Inorganic Chemical Technologies

ECTS credits: 5 **Weekly workload:**2lec+0sem+2labs+0ps +cp
Assessment**:** exam **Type of exam**: written and oral
Department involved:
Department of "Chemistry and Chemical Technologies", Subsidiary - Razgrad
Lecturers:
Assoc. Prof. Dpl.Eng. Miluvka Georgieva Stancheva, Ph.D., Department of "Chemistry and Chemical Technologies", tel.: 084 662 989, e-mail: miluvka_stancheva@abv.bg
Abstract:
The main objective of the course is to present knowledge about the modern production of acids, bases, etc and some metallurgic production processes. Students also learn about the production of glass, ceramics and binding materials and the latest developments in the respective production processes. In order to succeed in acquiring this lectured material, students must rely heavily on their previous knowledge in basic chemistry subjects, theoretical bases of chemical technologies and the respective processes and equipment. This course is a prerequisite for all subjects related to specific technological processes taught as part of the specialization syllabus and will also help students in their future realization as specialists.
Course content:
The main topics include the following - production of phosphoric acid; production of mineral/chemical fertilizers – phosphor and nitrogen based fertilizers; obtaining of ammonia (soda) ash; sodium hydroxide; glass and glass- like condition of the material and its obtaining; technology of ceramic products; ceramic products for the building construction; binding materials; cement; ferrous metallurgy – cast iron and steel; non-ferrous metallurgy; purification and softening of water.
Teaching and assessment:
The teaching is done at traditional lectures. The laboratory classes and lectures follow the syllabus. At the laboratory classes students work in groups or individually using methods that are discussed beforehand. Each laboratory session ends with the preparation of a protocol which represents the data and calculations from the experiments. The exam is administered at two stages. First, the students sit for a written test that determines their entry level. Second, they answer orally two questions from the syllabus.

0271 Organic Chemical Technologies

ECTS credits: 5 **Weekly workload:** 2lec+0sem+2lab+0ps+ca
Assessment**:** exam **Type of exam**: written
Department involved:
Department of "Chemistry and Chemical Technologies", Subsidiary – Razgrad, tel. :611016
Lecturers: Assoc. Prof. Hristo Dimitrov, Ph.D.
Abstract:
The aim of the course is to give students knowledge about the methods and sources for industrial processing of organic raw materials and obtaining new organic products and semi-products that have various uses including as sources for production or for fine organic synthesis.
Course content:
The main topics of the course in Organic Chemical Technologies can be describes in general as follows - introduction, subject, tasks and structure of the course. In particular the topics include – providing raw materials about the organic production processes; historic outline of the development of organic technologies; types of reactions in the organic chemical reactions; catalysis based on chemical bases and acids; heterogeneous catalysis; production of sugar from sugar cane and sugar beet; synthetic sweeteners; technologies based on alkanes; processing of oil and natural gasses; cracking processes; organic production based on alkynes; types of polyethylene.
Teaching and assessment:
The teaching is done at lectures and laboratory classes. The lectured material is illustrated with the help of tables, schemes, etc. the laboratory classes are conducted in chemical laboratories. And the students work individually or in groups of three at one work station. Special importance is given to the individual work in conducting the laboratory tasks because in this way students improve their practical skills. The semester is verified by the lecturer after the students defend their paper and when they have their laboratory protocols verified and defended. The final mark is a complex one and takes into account the results from the exam, the presentation of the paper, and the work done at the laboratory classes. The statistical weight of these three components is as follows 65: 15: 20 %.

0272 Mineralogy, Crystallography and Radiology

ECST credits: **5** **Weekly workload**: 2 lec+ 0 sem + 2 labs+0 ps+cp
Assessment**:** continuous **Type of exam**: written and oral
Department involved:
Department of "Chemistry and Chemical Technologies", Subsidiary-Razgrad, tel.: 084 611 016
Lecturers:
Assoc. Prof. Parvoleta Docheva, Ph.D. tel. 082-888219, 0885036192, e-mail: docheva@ru.acad.bg
Abstract:
The course in "Mineralogy, Crystallography and Radiology" aims at acquainting the students with the basic aspects of crystal forms, their inner structures and the physical properties of solid crystals. The course also includes knowledge about phenomena such as isomorphism, polymorphism, and defects of crystals, formation and growth of crystals.
Course content:
The course topics include the following – comparing the characteristics of amorphous and crystal forms, geometric crystallography, basic laws, symmetry of crystals, inner structure of crystals – properties of the special lattices; the 14 Bravais lattices; chemistry of crystals, basic laws in the chemistry of crystals, geometric limits of stability of structures with different coordination numbers; types of crystal structures.
Teaching and assessment:
The teaching is done at lectures and laboratory classes.
The practical exercises are conducted in a specially equipped laboratory. The laboratory classes finish with the defense of protocols with results from the lab tasks. Students also do three tests during the semester which are graded and the maximum number of points they can obtain is 20 for each test.
Each student receives an individual task for a course project which reflects the lectured material. At the end of the semester students answer questions connected with the project. They can receive maximum 20 points for writing the project and maximum 20 for its defense – 40 points altogether.
The final mark is based on the continuous assessment.

0273 Mineral Resources

ECTS credits: 5 **Weekly workload:** 2lec +0sem + 2lab + 0 ps + cpr
Assessment**:** continuous **Type of exam**: written
Department involved:
Department of "Chemistry and Chemical Technologies", tel.: 611 011, Subsidiary - Razgrad
Lecturers:
Assoc. Prof. Dpl.Eng. Miluvka Georgieva Stancheva, Ph.D., Department of "Chemistry and Chemical Technologies", tel.: 084 662 989, e-mail: miluvka_stancheva@abv.bg
Abstract:
The course aims at giving basic theoretical and practical knowledge in the sphere of mineral resources. Inorganic natural resources containing silicon, alumosilicates, limestone, sulphates, and feldspar are used in production processes based on silicates. The course also outlines the basic theoretical processes and methods in the extraction and enrichment of mineral resources.
Course content:
Basic raw materials in the silicate industry.
Raw materials rich in silicic dioxide. Recourses rich in Al2O3.
Carbonate materials. Sulphates. Feldspar materials.
Silicate materials containing magnesium. Types of slag and ashes. Lead and boron compounds.
Teaching and assessment:
The teaching is done at lectures and laboratory classes. The lectures outline the basic aspects of the properties of minerals, their mineralogy and deposits and lecturers use various devices for illustrating the material – tables, schemes, n overhead projector, etc. The laboratory classes are organized in a chemical laboratory where students use classical methods for analysis of the properties of chemical substances and acquire skills for. The lectures are illustrated with the help of tables, schemes, overhead projectors, etc. the laboratory classes are diagnosing using radiology methods, etc. Students also work on an individual task to complete a course project. To have the semester verified students must attend classes regularly. The final mark is given after lecturers take into consideration the results from the continuous assessment, the course project and the written exam.

0253 Low molecular biologically active substances

ECTS credits: 8 **Weekly workload:** 3lec+0sem+3labs+0ps+ca
Assessment: exam **Type of exam:** written
Department involved:
Department of Biotechnology and Food Technology
Subsidiary of the University of Ruse in Razgrad
Lecturers:
Assoc. Prof. Neiko Marinov Stoyanov,PhD tel: 084 611016,
Abstract:
Students are familiarized with bioproducts that have low molecular mass such as vitamins, alkaloids, hormones, pheromones and toxins. The relationship between the chemical composition and the physiological activity of compounds that are valuable to the living cell is also studied. He focus is on low molecular substances that are significant for nutrition and medical treatment and those that are used in biotechnology. Special attention is paid to the fact that standard specifications should be observed in order to preserve the biologically active substances in foodstuffs.
Course content:
Vitamins – characteristics, basic types, structure, properties, biological significance, distribution. Relationship between the structure and the biological activity. Alkaloids – essence, classification, identification methods, separation and analysis. Basic types. Toxins. Hormones. Pheromones.
Teaching and assessment:
There are lectures and laboratory classes in this subject. Lectures outline the theoretical basis. They are illustrated with models of bio organic compounds and overhead projector transparencies. Two tests are administered according to schedule and they account for up to 120 points. Each attendance at lectures accounts for 1 point and attendances at laboratory classes account for 2 points respectively. The final grade is based on a written test.

0274 Thermal Processes and Equipment in the Silicate Technologies

ECTS credits: 6 **Weekly workload:** 2lec + 0sem + 2labs + 0 ps + cp
Assessment: exam **Type of exam:** written
Department involved:
Department of “Chemistry and Chemical Technologies”, Subsidiary - Razgrad, Russe University ‘A. Kanchev”
Lecturers:
Assoc. Prof. Veselka Ivanova Kamburova, Ph.D., department of “Biotechnology and Food Technology”, Subsidiary- Razgrad Russe University ‘A. Kanchev”, tel. 084/652376, e-mail: veselkakamburova@dir.bg
Pr. Assist. Prof. Tsvetan Ivanov Dimitrov, Ph.D,, Department of “Chemistry and Chemical Technologies”, Subsidiary- Razgrad,Russe University ‘A. Kanchev”, tel. 084/ 623679, e-mail: tz_dimitrow@abv.bg
Abstract:
The main objective of the course is to enhance the technical skills and knowledge of students and to expand them in one particular sphere which is closely related to their future profession. The course outlines the basic theoretical issues concerning the mechanics of gasses, burning processes and equipment for burning different types of fuels.
Course content:
The main topics include mechanics of gasses; classification of fuels; equipment for burning of fuels; heat transfer; equipment for utilization of heat emitted by fumes coming out of furnaces; materials and components for constructing furnaces.
Teaching and assessment:
The teaching is done at lectures and laboratory classes. The lectures outline basic issues related to the mechanics of gases, burning processes, equipment for burning different typed of fuels and transfer of heat through convection, heat conducting and emitting. The laboratory classes follow the syllabus. After each laboratory class students prepare a protocol in which they include their calculations. They also receive an individual task for a course project. It must include schemes of thermo aggregates which have to be calculated. The final mark is given after students sit for a written exam during which they give an answer to 3 question chosen by them at random. The exam last 120 min.

0275 Technology of the Surface –Active Substances

ECTS credits: 6 **Weekly workload:** 2lec +0sem + 2 lab + 0 ps +cpr
Assessment**:** exam **Type of exam**: written
Department involved:
Department of "Repairing, Reliability and Chemical Technologies", Faculty of Agricultural Mechanization, tel.: 082/ 888 733, Russe University "A.Kanchev"
Lecturers:
Assoc. Prof. Dimitar Pavlov, Ph.D., tel.: 082/ 888 733, Department of "Repairing, Reliability and Chemical Technologies"
Abstract:
The course acquaints students with the surface active substances of all types – cations, anions, ampholits, non-ions, etc. Their properties and mechanisms of action are studied from physicochemical and practical point of view. The course also gives knowledge about the raw materials and necessary equipment for the production of surface-active substances.
Course content:
The main topics include: definition of surface-active substances; their classification; basic notions; properties of the anions; soaps; sulphatized oils; condensation products derived from higher fatty acids; production of surface-active substances
Teaching and assessment:
The teaching is done at lectures and laboratory classes. The lectured material includes the theoretical fundamentals and is illustrated with the help of different models of surface-active substances. During the semester the students do two tests for which they can obtain 120 points. To have the semester verified, they must have 100 points. The final mark is given after students sit for a written exam (test).

0276 Technology of Ceramics

ECTS credits: 8 **Weekly workload:** 3lec +0sem + 3lab + 0 ps + cpr
Assessment**:** exam **Type of exam**: written
Department involved:
Department of "Chemistry and Chemical Technologies", tel.: 611 016, Subsidiary - Razgrad
Lecturers:
Assoc. Prof. Diana Vasileva Tsaneva, Ph.D., department "Materials & Manufacturing Engineering", tel.: 082 888 307, Russe University "A.Kanchev"
Abstract:
The course aims at giving fundamental theoretical and practical knowledge and skills to the students who take it. Emphasis is put not only on the traditional methods for synthesis bit also on the new ones for obtaining of fine disperse substances and for forming and firing of ceramics. Glazing substances, a key element of the technological and aesthetic improvement of ceramics, are studied, too.
Course content:
The main topics include: methods for forming; types of ceramic substances; structure and properties of used for pressing; processes in pressing; new methods for pressing; fine ceramic materials; porcelain – composition, properties and types; faience materials – composition, properties and types; Fire resistant materials – obtaining and properties; types of fire resistant materials; high fire resistant materials bases on oxides – corundum, zirconium, beryllium, and peryclase ceramics.
Teaching and assessment:
The teaching is done at lectures and laboratory classes. A written exam is administered at the end of the semester. The final mark is formed on the basis of the results from the continuous assessment, the course project and the results from the written exam.

0277 Technology of Glass

ECST credits: 8 **Weekly workload:** 3 lec+0 sem+3 lab+0 ps+cpr
Assessment: exam **Type of exam:** written and oral
Department involved:
Department of "Chemistry and Chemical Technologies", Subsidiary - Razgrad, Russe University "A.Kanchev"
Lecturers:
Pr. Assist. Prof. Tsvetan Ivanov Dimitrov, Ph.D., Russe University "A.Kanchev", Subsidiary – Razgrad, Department of "Chemistry and Chemical Technologies", tel. 084/ 62 36 79, e-mail: tz_dimitrow@abv.bg
Abstract:
The aim of the course is to provide knowledge about the physicochemical properties of glass-like materials and the relation between the properties, chemical composition, structure and methods for obtaining of these materials.
Course content:
Topics include glass-like condition; crystallization of glass and molts; physicochemical properties of glass; thermal, optical, electrical, and chemical properties of glass; raw materials for obtaining glass-like materials; physicochemical processes of melting glass-like materials; forming of glass-like materials; flat glass; domestic and packaging uses of glass; glass tubes and fibers; electro-vacuum and photo-technical types of glass; quartz glass; new technologies for synthesis of glass-like materials.
Teaching and assessment:
The teaching is done at lectures and laboratory classes. Some form of assessment is administered to determine the entry level of the students before each laboratory exercise. The results from laboratory classes are presented in a protocol and discussed at the end of each laboratory exercise. The protocols are defended then, too.
Each student receives an individual task for a course project. The final mark is given after students sit for a written exam. The test lasts 120 min and students give a written answer to three questions from a list that covers all topic studied during the semester.

0278 Inorganic Pigments

ECTS credits: 5 **Weekly workload:** 2lec + 0sem + 3lab + 0 ps+cp
Assessment: exam **Type of exam:** written
Department involved:
Russe University "A.Kanchev", Subsidiary – Razgrad, Department of "Chemistry and Chemical Technologies"
Lecturers:
Assoc. Prof. Dimitar Georgiev, Ph.D., e-mail: dgeorgiev@btu.bg
Abstract:
The aim of the course is to outline the essence, chemical composition, basic properties, methods for obtaining and ways of using inorganic pigments.
Course content:
The main topics include classification of inorganic pigments, their technological properties, physicochemical principles underlying the synthesis of pigments, chemical composition, structure and properties of inorganic pigments.
Teaching and assessment:
The teaching is done at lectures and laboratory classes. The laboratory exercises are carried out in laboratory for silicate materials. Each student receives an individual task for a course paper which is related to the lectured material. At the end of the semester the course paper is discussed with the lecturer. Students receive maximum 20 points for writing the paper and 30 points for defending it – maximum 50 points altogether. The maximum score students can accumulate during the semester is 100. To have the semester verified, they must have at least 60 points.
The final mark is formed after a written exam. The test lasts 120 min and students give a written answer to three question. Thorough and accurate answers result in a maximum 90 points – 30 point for each answer. Students can see their exam papers after they graded. The exam mark T is formed applying he following formula $T= 4.T_1/90 + 2.T_2/100$, where T_1 is the score from the exam and
T_2 is the number of points gathered during the semester.

0279 High Temperature Synthesis Methods

ECST credits: 3 **Weekly workload**: 1 lec + 0 sem + 2 lab +ca
Assessment:: continuous **Type of exam**: written and oral
Department involved:
Department of "Chemistry and Chemical Technologies", Subsidiary - Razgrad, Russe University "A.Kanchev"
Lecturers:
Professor, Doctor of Technical Sciences, Vladimir Stoyanov Kozhuharov, e-mail: vi_ko@abv.bg
Abstract:
The aim of the course is to enhance the knowledge and technical skills of students and to expand them in one particular sphere that is closely related to their future profession. Students receive expertise about the unconventional methods for high temperature synthesis of materials and thin layers.
Course content:
The main topics of the lectured material include classification of materials, methods for high temperature synthesis and synthesis from gas and liquid phase.
Teaching and assessment:
The teaching is done at lectures and laboratory exercises following the syllabus. After each laboratory class students prepare a protocol which includes calculations. 3 points are granted for attending each lecture and 6 points are granted for attending each laboratory class. Thus, the maximum number of points accumulated from attendance is 60. During the semester students also work on a course assignment related to the lectured material. 20 points are given for both its successful completion and defense. The maximum number of points students can gather during the semester is 100. The final mark is formed on the basis of continuous assessment.

0280 Technology Of Pharmaceutical Products

ECTS credits: 8 **Weekly workload:** 3lec +0sem + 3 lab + 0 ps+cpr
Assessment: exam **Type of exam**: written
Department involved:
Department of "Chemistry and Chemical Technologies", tel.: 611 016, Subsidiary - Razgrad
Lecturers:
Assoc. Prof. Neiko Marinov Stoyanov, Ph.D., tel.: 084 611 016
Abstract:
The aim of the course is to acquaint students with the classical and contemporary methods for synthesis of drugs; the methods for research and verification of their structure; and the metabolic reactions in which they may take part. Attention is paid to issues such as structure /activity of different classes of pharmaceutical substances. The latest developments in the pharmaceutical technologies are outlined, too.
Course content:
The main topics include the basic methods for obtaining drugs; analysis of medical preparations; narcotics and drugs for sleeping disorders; anticonvulsant drugs; narcoanalgetics; methods for treating drug addicts; peptides based on opiates; strategy and practice of peptide synthesis; meaning of peptide libraries; cytostatics; methods for treating tumors; local anesthetics; cocaine and its analogues; medicines for treating heart diseases, ulcer and tuberculosis; anti hypertonic drugs; types of antibiotics.
Teaching and assessment:
The teaching is done at lectures and laboratory classes. The lectured material is illustrated with various models of organic compounds and an overhead projector. Every student is given a course paper to work on during the semester. Also, following a set schedule, students sit for two tests for which they receive 120 points. Attending a lecture brings 1 point while attending a laboratory class brings 2 points – maximum 45 point from attendances. The total number of point each student can accumulate during the semester is 285. To have the semester verified, students must have at least 100 points. The final mark for the course work is given after students sit for a written exam.

0281 Technology of Aromatic Products

ECTS credits: 8 **Weekly workload:** 3lec +0sem + 3 lab + 0 ps+cpr
Assessment: exam **Exam** : written + oral
Department involved:
Department of "Chemistry and Chemical Technologies", tel.: 611 016, Subsidiary - Razgrad
Lecturers:
Assoc. Prof. Stanka Todorova Damyanova, Ph.D., tel.: 084 611 012, e-mail: sdamianova@ru.acad.bg
Abstract:
The course aims at acquainting students with the theoretical basis and production of essential oils. Students receive knowledge about the raw materials and their processing; the composition and quality of the obtained aromatic product; the new trends in the industry and the research methods for developing new aromatic products.
Course content:
The main topics include the following: basic notions and importance of essential oils; storage of raw materials used in the production of natural essential oils; preparation of raw materials for production; obtaining of aromatic products; technology, composition and properties of aromatic products.
Teaching and assessment:
The teaching is done at lectures, laboratory classes and through course work supervised by the lecturer. Before each laboratory class the lecturer examines students to determine their entry level knowledge, while at the end they discuss the obtained results from the laboratory experiments. In addition, students work on a course project. When it is submitted, keeping the set deadline, students receive points (0, 1 or 2) depending on the correctness of the accomplished task and the layout of the material itself. To have the semester verified, students must attend all laboratory classes, 90 % of the lectures and to submit his/her course project on time. Before the exams, students must also submit a file with protocols from attended laboratory classes. The exam is administered at two stages – written and oral.

0282 Plant Protection Products

ECTS credits: 5 **Weekly workload:** 2lec +0sem + 3 lab + 0 ps+cp
Assessment: exam **Type of exam**: written
Department involved:
Department of "Chemistry and Chemical Technologies", tel.:611016, Subsidiary - Razgrad
Lecturers:
Assoc. Prof. Neiko Marinov Stoyanov, Ph.D., tel.: 084 611 016
Abstract
The course aims at acquainting the students with the issues related to the chemical methods for protecting agricultural plants from disease, dangerous pests and weeds.
Course content:
The basic topics include using chemicals for plant protection; basic notions; chemical classification of pesticides - organic phosphorus products, organic chlorine products, carbamate and thiocarbamate products, dithiocarbamate products, triazine products, production of dichlorophenylacetic acid, derivatives of charbamide.
Teaching and assessment:
The teaching is done at lectures and laboratory classes. The lectured material is illustrated with various models for plant protection and an overhead projector. Every student is given a course paper to work on during the semester. Also, following a schedule, students sit for two tests for which they receive 120 points. Attending a lecture brings 1 point while attending a laboratory class brings 2 points – maximum 45 point from attendances. The total number of point each student can accumulate during the semester is 285. To have the semester verified, students must have at least 100 points. The final mark for the course work is given after students sit for a written exam.

0283 Analysis of Organic Products

ECTS credits: 3 **Weekly workload: 1**lec +0sem + 2 lab + 0 ps+ca
Assessment**:** exam **Type of exam**: written
Department involved:
Department of "Chemistry and Chemical Technologies", tel.: 611 016, Subsidiary - Razgrad
Lecturers:
Assoc. Prof. Dimitar Pavlov, Ph.D., tel.: 082 888 733
Abstract:
The aim of the course is to introduce students to the essence of organic synthesis and its methods so that, upon completion of the course, they can independently choose approaches to analysis of organic substances in each particular case using data and instructions about the analyzed substance.
Course content:
Basic topics include: preliminary analysis of organic substances and samples; determining the solubility of organic ones; separation of mixtures; finding more important functional groups and determining the structure of organic compounds; reactions for finding of a hydroxyl group; reactions for finding of an amino group; reactions for finding of amino acids; obtaining of derivatives from organic compounds.
Teaching and assessment:
The teaching is done and lectures and laboratory classes. The lectured material is illustrated with models of organic products, schemes, and an overhead projector. During the semester, following a set schedule, students sit for two tests from which student can accumulate a maximum of 120 points. To have the semester verified, students must have at least 100 points.

0249 Industrial ecology

ECTS credits: 4 **Weekly workload:** 3lec+0sem+3labs+0ps
Assessment: exam **Type of exam:** written
Department involved:
Department of Ecology and Environmental Engineering, Ruse University
Lecturers:
Prof. Vladimir Tomov Vladimirov, tel 082 888 498
Abstract:
This subject examines the basic concepts and the trends in ecology focusing on sources of pollution, means of protection, introduction of low waste and wasteless technologies and waste recycling.
Course content:
Basis of the theory about the biosphere. Anthropogenic impact on the biosphere. Air contamination and harmful emissions. Sources of pollution. Techniques of reducing air pollution. Ecological issues in use and preservation of water resources. Biotechnological approaches in waste water treatment. Soil conservation and protection of the Earth's nucleus. Forecasts, diagnosis, monitoring and ecological examination.
Teaching and assessment:
Lectures are delivered according to the curriculum and are illustrated with modern visual aids. The laboratory classes supplement the course of lectures. The final grade is based on a written exam.

0248 Marketing and management of a company

ECTS credits: 3 **Weekly workload:** 1lec+1sem+0labs+0ps+ca
Assessment: exam **Type of exam:** written and oral
Department involved:
Department of Economics, Faculty of Business and Management.
Lecturers:
Assoc. Prof. Lyubomir D. Lyubenov, PhD, Department of Economics, tel.: 888-347,
E-mail:LLyubenov@ru.acad.bg
Abstract:
The aim of this subject is to familiarize students with methods of market research and management of a company
Course content:
Basic concepts and definition of marketing. Marketing environment. Marketing surveys. Marketing mix. Marketing strategy. Product policy. Distribution policy. Communication policy. Pricing policy. Planning. Organizing. Management. Control.
Teaching and assessment:
Lectures are delivered in the traditional way. They are illustrated with slides when necessary. In seminars problems are solved and tests are made. To have the semester validated the usual requirements such as attendance of lectures and seminars and submission and defense of the course assignment are applied.

0284 Technology of Inorganic Binding Substances

ECST credits: **5** **Weekly workload**: 3 lec + 0 sem + 4 lab + 0 ps
Assessment**:** exam **Type of exam**: written and oral
Department involved:
Department of “Chemistry and Chemical Technologies", Subsidiary - Razgrad, Russe University “A.Kanchev”
Lecturers:
Pr. Assist. Prof. Tsvetan Ivanov Dimitrov,Ph.D., Department of “Chemistry and Chemical Technologies", Russe University “A.Kanchev”, Subsidiary - Razgrad, tel. 084/ 62 36 79, e-mail: tz_dimitrow@abv.bg
Abstract:
The course aims at giving theoretical and practical knowledge about the binding substances. Students study the theoretical bases of the technology of the production process of binding materials. Special attention is paid to the needed raw materials, the physical and chemical properties of the produced materials and the requirements for their use.
Course content:
The main topics include the basic types of binding materials – air binding materials, gypsum binding materials, lime binding materials, hydraulic binding materials – hydraulic lime, Portland cement. Methods for production of Portland cement clinker. Obtaining and properties of Portland cement clinker – extraction and preparation of materials. Cracking, grinding, and homogenizing. Making of Portland cement clinker. Processes of clinker production. Possibilities for intensification of the clinker-making process.
Teaching and assessment:
The teaching is done at lectures and practical exercises. For attending each lecture student receive 2 points and 5 points for attending each practical class - maximum number of 60 point. In order to have the semester verifies students must have at least 40 points.
The final mark is given after the students sit for a written exam. The exam lasts 120 min. Each student answers in writing to 3 questions and each correct answer gives maximum 30 points. The final score is maximum 90 points. Students can see their work after it is graded.

0285 Types of Plating with Special Uses

ECTS credits: 4 **Weekly workload:** 3lec+ 0sem + 3lab + 0 ps

Assessment: **continuous** **Exam:** written

Department involved:
Russe University “A.Kanchev”, Subsidiary– Razgrad, Department of “Chemistry and Chemical Technologies"
Lecturers:
Pr. Assist. Prof. Tsvetan Ivanov Dimitrov, Ph.D., Department of “Chemistry and Chemical Technologies", Subsidiary– Razgrad, Russe University “A.Kanchev”, tel. 084/ 623679**,** e-mail: tz_dimitrow@abv.bg
Abstract:
The course Types of plating with Special Uses is taught during the VIII semester to students who study Chemical Technologies. The aim of the course is to improve their technical skills and elaborate on them in one particular sphere related to the types of plating with special uses and their application.
Course content:
The main topics are as follows **-** Physical and chemical aspects of the obtaining of inorganic types of plating; Preparation of surfaces in order for the plating to be applied and formed; Methods for obtaining inorganic plating on hard sheets; Obtaining plating from different sources including solutions, suspensions, melts and semi-melts.
Teaching and assessment:
The teaching is done at lectures and laboratory classes. The lectures outline the basic theoretical issues related to the physical and chemical aspects of the obtaining of inorganic plating, the characteristics of this technological process. Students also receive knowledge about the technology of obtaining plating that is resistant to heat, the preparation of surfaces for treating and forming of plating.
The mark is formed on the basis of continuous assessment.

0286 Technology of Cosmetic Products

ECTS credits: 5 **Weekly workload:** 3lec +0sem + 4 labs + 0 ps
Assessment: exam **Type of exam**: written and oral
Department involved:
Department of “Chemistry and Chemical Technologies", tel.:611 011, Subsidiary– Razgrad
Lecturers:
Assoc. Prof. Stanka Todorova Damyanova, Ph.D., tel.: 084 611 012, e-mail: sdamianova@ru.acad.bg
Abstract:
The course aims at giving detailed and up-to-date knowledge about the theory and practice of cosmetic products. Students also receive information not only about the raw materials used for the production of cosmetic products and their properties but also about the technology and the quality of the modern cosmetic products. Students are acquainted with the contemporary scientific methods for development and production of cosmetic products.
Course content:
Basic topics: anatomy and physiology of the skin. Cosmetic products. Cosmetic creams. Toothpaste and mouth rinsing water. Body and hair washing products. Deodorants and antiperspirant products. Decorative cosmetics: lipsticks, powders and rough, nail polishers, hair dying products.
Teaching and assessment:
The teaching is done at lectures, laboratory exercises and through course work supervised by the lecturer. The lectured material is structured in such a way that it is easily comprehended by students and is also illustrated using contemporary methods. Students prepare in advance for the laboratory exercises and after each of them they prepare a report which includes the theoretical basis of the tasks, the tasks themselves, the results and the conclusions made after completing the laboratory tasks.
To have the semester verified the students must attend at least 90% of the lectures, all laboratory classes, to complete the tasks related with them.
At the exam students have to present a file with all laboratory reports. The exam has two parts – a written and an oral one.

0287 Organic Additives

ECTS credits: 4 **Weekly workload:** 3lec +0sem + 3 lab + 0 ps
Assessment: continuous assessment **Type of exam**: written
Department involved:
Department of “Chemistry and Chemical Technologies", tel.: 611 016, Subsidiary - Razgrad
Lecturers:
Assoc. Prof. Petar Kopchev, tel.: 082/448773, 082 888228
Abstract:
The course “Organic Additives” aims at acquainting the students both with the main organic additives used in the food products. The students acquire knowledge about the safety of food additives and the hygiene requirements towards them. The main groups of additives are outlined in the course: food coloring agents, preservatives, antioxidants and acidity regulators, emulsifiers, thickeners and gelling agents (stabilizers), sweeteners and flavour enhancers. Students also study their characteristics, application, law regulations for application, advantages and possible drawbacks.
Course content:
Main topics: Introduction to the course include - Classification of additives; Law regulations. The meaning of E-Numbering; Safety of food additives Criteria and indicators for the toxicological assessment of additives; Colouring agents; Organic colouring additives - types, characteristics, obtaining, usage; Synthetic colouring additives - types, characteristics, obtaining, usage; Preservatives - types, characteristics, obtaining, usage. Antibiotics used as preservatives.
Teaching and assessment:
The teaching is done at lectures, laboratory exercises and through course work supervised by the lecturers. The lectured material is structured in such a way that it is easily comprehended by students and is also illustrated using contemporary methods. During the semester students do laboratory exercises and after each of them they prepare a report which includes the theoretical basis of the tasks, the tasks themselves, the results and the conclusions made after completing the laboratory tasks.
The final mark is formed after students sit for a written exam at the end of the semester.

Bachelor Thesis

ECTS credits: 10
Weekly workload: 0lec+0sem+0labs+0ps
Assessment: official defense
Type of exam: oral
Department involved:
Department of “Chemistry and Chemical Technologies”
Faculty:
Subsidiary - Razgrad
Lecturers:
An Examination Commission
Abstract:
The aim of the Bachelor Thesis is to give students knowledge how to deal individually with more complex scientific and practical problems.
Content of the Bachelor Thesis:
The bachelor thesis could be an extended course project or it could be a new creative piece of written work. It aims at solving a particular problem such as a construction, a technology or its improvement.
Teaching and assessment:
Students use the knowledge they have acquired through the entire period of studies. They can also consult reference literature, previous research and observations. Scientific appliances or installations have to be used. Students must also use contemporary scientific research methods.

Erasmus

ECTS

Information Package

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